

# A curated online educational portal for staff and students at a University of Technology

by

Abdool Haq Mahomed Bhorat

July 2014

# A curated online educational portal for staff and students at a University of Technology

by

Abdool Haq Mahomed Borat

Thesis submitted in fulfilment of the requirements for the degree of Doctorate of Technology: Language Practice in the Faculty of Arts and Design, Durban University of Technology

I declare that this thesis is my own work and has not been submitted for any other degree or examination at any other institution.

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

Approved for final submission:

Promoter: Professor D.D. Pratt

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

## **ABSTRACT**

The innovative application of an online educational portal in everyday teaching and learning is proposed to meet the needs of the new generation of students entering Universities of Technology (UoTs). The setting is against a background of educationally under-prepared but multimedia-literate students, and the university vision of integrating eLearning into the curriculum. The emergence of the Academic Commons Attribution has facilitated the channelling of free-to-use/open source educational information through the dedicated artefact. The investigation combined the challenges of artefact design with the necessity of authenticating subject content so that it was geared to the needs of the students in the Photography Programme. This study highlights the importance of managing knowledge so that it can be passed down to current and future generations in ways which keep pace with their exponential development of digital expertise.

This research was carried out within Bhaskar's critical realist philosophy, which argues that there is a real world which exists independently of one's perception of it. It must be stressed that the artefact contained in the multimedia portal did not follow a linear, logical development but was a process of transformational iterative change, very similar to the developmental consistency described by Bhaskar. Bhaskar's philosophical overview was complemented by Archer's morphogenetic approach. The latter showed that the application of technology in teaching and learning is not just about use of "better tools" but signals a shift in social structure. The main technical challenge was for the researcher to standardise the multimedia resources so that they could be used on most personal computers, with the option of downloading short tutorials on mobile phones for later use. The resulting multimedia portal provides strong support in guiding inexperienced students and novice academics to choose resources appropriate to both the Photography curriculum and rapidly changing Industry requirements. The portal can also reduce the number of time consuming searches on various themes or topics, as it directs users to specific hyperlinked online resources in any given syllabus item.

The curated educational portal is, therefore, currently being introduced as an enhancement to the traditional teaching and learning methods hitherto used in the Photography Programme. While the traditional methods have the strong humanist leanings essential for personal development, they are not geared to tackle the cutting edge technological advances required by industry. Moreover, in promoting the Durban University of Technology (DUT) as a centre using cutting-edge multimedia tuition, the portal might better establish influences with Industry (one of the core functions of a UoT) as well as attract international academics and students. The end result is to offer a blended learning model of tertiary programme delivery which is supported by the literature as currently being one of the most effective options.



## **ACKNOWLEDGMENTS**

In preparing this dissertation, I obtained assistance from a number of different people. My heartfelt thanks go to Professor D.D. Pratt, my supervisor and mentor, for invaluable help in guiding me with the writing of the thesis.

In addition, thanks to both staff and students who were considerate enough to respond to my personal enquiries, communications and surveys. Your participation helped to shape the outcome of this investigation.

Special thanks go to Dr Gharbarran for editing and proof-reading the thesis.

The financial assistance of the Durban University of Technology Research Committee towards this study is hereby acknowledged.

# PREFACE

The work contained in this thesis has not been previously submitted for a degree or diploma at any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person, except where due reference is made.

The following conventions have been applied in this thesis:

- ([ ]) has been used to indicate approximate page numbers on publications from Internet sites, following Hofstee (2006: 252).  
e.g. (Meeker 2010: [13])  
Shaw (2003: [1])
- Where each chapter in an e-book runs from page 1, the page number has been cited as “chapter number.page number”, following the convention used throughout by Oblinger and Oblinger (2005a).  
e.g. Dede 2005: 15.16  
(Barone 2005: 14.5)
- When “Photography” refers to the research field or subject discipline it starts with a capital letter, but “photography” (lower case) is used for the activity of taking photographs.
- EndNote 6 referencing software has been used, with the DUT Harvard 2013 Referencing Style.
- While the web addresses of individual websites mentioned in the text as exemplars are given, the websites are not listed in the References.
- Personal communications (telephone conversation, interviews and e-mail) are noted in the in-text reference but are not included in the References.
- To maintain anonymity, pseudonyms have been used to replace the names of all university staff and students mentioned in the thesis, except in the case of theses, articles, papers and/or reports published or disseminated for open access.

## GLOSSARY

The following terms are used in the thesis in the general sense indicated below. They are defined and discussed in more detail in the relevant thesis chapters.

- blended (or mixed mode) learning: a mixture of online learning with traditional face-to-face classroom (or lecturing) delivery (although a case can be made for blends of other modes or media).
- curation: managing and promoting the use of data to ensure its fitness for purpose and availability for discovery and re-use. Curation may involve constant updating and creation of links with other materials, as well as archiving and preservation of data.
- digital curation: this term was used to apply existing approaches to the curation of hard copies of documents and analogue artefacts to digital collections.
- e-learning: learning through the medium of the Internet (again, a case can be made for inclusion of other modes/media).
- horizontal portal design: while the online resources are available from one access point, no attempt is made to order or make sense of the information except in the most general sense (e.g. alphabetizing a content index).
- information and communication technology (ICT) and information systems (IS): technologies for the processing, storage, and transmission of digital materials, comprising hardware and software systems for physical storage and logical representation of sets of data. These terms are used synonymously in the thesis.
- Internet portal: an online gateway or access point to a website containing a specialist grouping of curated online resources, usually freely available, for the purposes of information sharing, research, aesthetics or education, amongst others.

- learning object: any device which can be re-used to facilitate learning in various contexts (its use is not necessarily restricted to computer applications).
- massive open online courses (MOOCs): freely available online courses which are the results of corporate attempts (often with university collaboration) to provide student-facing online courses. MOOCs make provision for mainly built-in feedback and assessment. The term “open” may not necessarily mean free or without cost, particularly if registration and certification at a university is sought.
- open courseware (OCW): freely available online tuition ranging from individual notes to sets of educational applications and/or complete online courses. OCW can comprise part or whole of OERs.
- open educational resources (OERs): notes, lectures, videos or other learning resources made freely available online by educators or academics without necessarily being curated or organised into courses.
- vertical portal design: the online content is curated and structured so as to make sense of both the subject matter and the order of viewing or instruction.

# EDITING AND PROOF-READING AFFIDAVIT

Flat 1211

Cell: 0822673192

Kensington

311 Peter Mokaba Road

Morningside

4001

11 July 2014

## TO WHOM IT MAY CONCERN

**Thesis title: A curated online educational portal for staff and students at a University of Technology**

This is to certify that I have proofread and edited the D Tech thesis of Abdool Haq Mahomed Bhorat for accuracy of language and expression. After implementing changes, wherever applicable, I declare that this thesis, to the best of my knowledge and ability, is grammatically correct and error-free.

 .....

Dr H.L. Garbharran

B.A., Honours, M.P.A., D.P.A.

# TABLE OF CONTENTS

Abstract.....	i
Acknowledgements.....	lii
Preface.....	iv
Glossary.....	v
Editing and proof-reading affidavit.....	vii

## Chapter 1: Introduction

1.1	Introduction.....	1
1.2	The context of the research .....	1
1.2.1	General aim .....	3
1.3	Aims and objectives.....	3
1.3.1	General aim of the research.....	3
1.3.2	Specific research objectives .....	4
1.4	Overview of the project .....	4
1.5	Key terms or concepts .....	5
1.5.1	E-learning.....	5
1.5.2	Curation.....	6
1.5.3	Critical realism.....	6
1.5.4	Morphogenesis and morphostasis.....	7
1.5.5	Technology.....	7
1.6	Main themes of the research .....	7
1.6.1	Integrating ICT enhancements into teaching and learning.....	8
1.6.2	Causality.....	9
1.6.3	Social structure.....	9
1.6.4	The role of technology in social structure.....	10
1.6.5	Artefact design.....	10
1.7	New contributions to knowledge.....	11
1.8	Potential value of the research.....	12
1.9	Conclusion.....	13

## Chapter 2: Literature Review

2.1	Introduction.....	16
2.2	E-learning.....	16
2.3	Blended learning.....	20
2.4	Rationale for higher education institutions using e-learning.....	22
2.5	OERs, OCW, MOOCs and Internet portals .....	27

2.5.1	OERs .....	30
2.5.2	OCW .....	35
2.5.3	MOOCs .....	37
2.5.4	Internet portals.....	40
2.6	Curation of digital data.....	44
2.6.1	The definition of digital curation.....	45
2.6.2	The use of metadata in digital curation.....	47
2.7	The educational portal developed in this study.....	47
2.8	Conclusion.....	51

### **Chapter 3: Research Orientation**

3.1	Introduction.....	53
3.2	Overview of critical realism.....	53
3.3	Key Concepts in critical realism.....	55
3.3.1	Separation of ontology and epistemology.....	55
3.3.2	Transitivity/intransitivity .....	56
3.3.3	Stratification.....	56
3.3.4	Mechanisms.....	56
3.3.5	Emergent properties .....	57
3.3.6	Social Structure.....	57
3.4	Critical realism in social science research.....	59
3.5	Rationale for choosing critical realism as research orientation.....	61
3.5.1	The critical realist principle of practical application of theory.....	61
3.5.2	Use of technology to solve a social problem .....	62
3.6	Critical realist research into use of ICT/IS.....	63
3.7	Curriculum transformation reflecting realist principles.....	67
3.8	Conclusion.....	68

### **Chapter 4: Research Methodology**

4.1	Introduction .....	69
4.2	Levels of stratification in the methodology.....	69
4.2.1	The morphogenetic cycle.....	70
4.2.2	Innovation development.....	71
4.2.3	Artefact design.....	71
4.3	The morphogenetic approach.....	72
4.3.1	The traditional action research cycle .....	73
4.3.2	Advantages of using the morphogenetic action research cycle.....	74
4.4	The morphogenetic action research cycle.....	75
4.5	The morphogenetic cycle in innovation development.....	81
4.6	Artefact design.....	84

4.7	Specific methods used in the morphogenetic cycle.....	86
4.7.1	Personal observation.....	87
4.7.2	Formal and informal interviews and discussions .....	87
4.7.3	Formal surveys.....	87
4.7.4	Collating data for formal and informal reports and reviews.....	91
4.7.5	Case studies.....	92
4.7.6	Field trips.....	93
4.8	Conclusion.....	93

## **Chapter 5: Developing the Internet Portal**

5.1	Introduction.....	94
5.2	Investigating the pre-existing conditions .....	94
5.2.1	Systemic conditions for potential harm .....	96
5.2.2	Critical factors which emerged.....	100
5.3	Exploring the option of using multimedia resources in blended learning delivery.....	100
5.3.1	Offline resources available at DUT.....	102
5.3.2	Visits to photographic trade exhibition and educational institutions.....	107
5.4	Developing the artefact in a pilot study.....	112
5.4.1	Staff development programme run for Photography .....	112
5.4.2	Development of a prototype website.....	113
5.4.3	Setting up of online ordering of DUT Graduation photographs.....	115
5.5	The prototype multimedia portal .....	120
5.5.1	Insights gained from visiting other educational portals.....	120
5.5.2	Setting up the prototype multimedia portal.....	121
5.5.3	Multimedia and writing resources for the curated portal.....	123
5.6	Conclusion.....	129

## **Chapter 6: Prototyping the Internet Portal**

6.1	Introduction.....	130
6.2	Results of First-year student survey.....	131
6.2.1	Demographics of First-year survey participants.....	132
6.2.2	Results of First-year Pre-Tests 1 and 2 .....	133
6.2.3	First-year students' responses on general Internet use.....	135
6.2.4	First-year students' responses on Internet use for teaching/learning .....	135
6.3	Results of Second-year student survey.....	140
6.3.1	Demographics of Second-year survey participants.....	141
6.3.2	Results of Second-year Pre-Tests 1 and 2.....	143
6.3.3	Second-year students' responses on general Internet use.....	144
6.3.4	Second-year students' responses on Internet use for teaching/learning .....	153
6.4	Conclusions on First- and Second-year student surveys.....	154



6.5	Results of Case Study 1: Online ordering of DUT Graduation photographs.....	156
6.5.1	Linking WIL projects to the Photography curriculum .....	156
6.5.2	Creating subject-specific resources for the Internet portal.....	160
6.5.3	Providing hands-on experiential learning and faculty interaction.....	161
6.5.4	Conclusions on Case Study 1 .....	164
6.6	Results of Case Study 2: Online tutorial .....	165
6.6.1	Online digital assignment.....	165
6.6.2	Narrative exercise.....	167
6.6.3	Conclusions on Case Study 2.....	169
6.7	General feedback from users.....	169
6.8	Conclusion.....	173

## **Chapter 7: Morphogenesis vs. Morphostasis**

7.1	Introduction.....	176
7.2	Development at the level of the morphogenetic cycle.....	177
7.2.1	Historical background to present day era .....	177
7.2.2	Morphogenesis vs. morphostasis in the context of the Photography Programme.....	179
7.3	Development at the level of innovation.....	181
7.3.1	The systemic conditions pre-existing the change.....	182
7.3.2	The situational logics.....	185
7.3.3	The social interactions among actors.....	186
7.3.4	Emergent properties for structural elaboration.....	188
7.4	Development at the level of the artefact.....	189
7.4.1	Design as an artefact.....	189
7.4.2	Problem relevance.....	189
7.4.3	Design evaluation.....	189
7.4.4	Research contributions.....	189
7.4.5	Research rigour.....	190
7.4.6	Design as search process.....	190
7.4.7	Communication of research.....	190
7.5	Conclusion.....	191

## **Chapter 8: Conclusions and Recommendations**

8.1	Introduction .....	192
8.2	The extent to which the research aim and objectives were achieved.....	192
8.2.1	The extent to which the research aim was achieved.....	192
8.2.2	The extent to which the specific objectives were achieved.....	193
8.3	Delimitations of the study.....	195
8.4	Recommendations .....	195
8.4.1	Recommendations for the development of the portal .....	196

8.4.2	Recommendations for further development of portal technology.....	197
8.4.3	Recommendations for further research.....	198
8.5	Concluding thoughts.....	199

## Appendices

Appendix A	Technological developments leading to the formation of the Internet.....	200
Appendix B	Technological developments in photography.....	218
Appendix C	At risk students .....	245
Appendix D	Programme review.....	248
Appendix E	Photography staff development workshop .....	266
Appendix F	Letter of staff Information and staff questionnaire .....	272
Appendix G	Ethics statement .....	275
Appendix H	Resources for the prototype portal .....	279
Appendix I	First-year student survey .....	295
Appendix J	Second-year student survey .....	303

<b>References</b>	.....	312
-------------------	-------	-----

## List of Figures and Tables

Figure 2.1	Contrast between random Internet groupings and those within a curated portal (Figure 1 in Woukeu <i>et al.</i> 2003: 350).....	44
Figure 2.2	The online educational portal as semantic web .....	47
Figure 3.1	Structurational model of technology (Orlikowski 1991: 17).....	65
Figure 4.1	Levels of stratification in the methodology.....	70
Figure 4.2	Timeline of the wider cycle involved in educational innovation.....	70
Figure 4.3	The spiral action research cycle (Kemmis and McTaggart 2005: 564).....	73
Figure 4.4	The rapid prototyping process (Cerejo 2010: [1]).....	74
Figure 4.5	Archer's basic morphogenetic cycle with its three phases (Archer 1995: 157)...	76
Figure 4.6	Structural and cultural configurations generating morphogenetic cycles in society (Archer 1995: 323).....	79
Figure 4.7	Structural and cultural configurations reproducing morphostatic cycles in society (Archer 1995: 309).....	79
Figure 4.8	Preconditions for morphostasis or morphogenesis (Figure 3.7 in Reddy 2014: 42, adapted from Archer 1995: 295).....	80
Figure 4.9	Archer's morphogenetic cycle in innovation design (Wong 2005:13).....	82
Figure 4.10	Model of artefact design (Figure 2 in Hevner <i>et al.</i> 2004:80).....	84
Figure 5.1	Systemic conditions for potential harm (adapted from Keats 2012:41).....	98
Figure 5.2	Lecture note illustrating how colour balance may vary per voltage standard.....	106
Figure 5.3	Photo and Film Expo, Epson printers (Bhorat 2011).....	109
Figure 5.4	Homepage of the Photography Virtual Office .....	114

Figure 5.5	Example of a topic leading to digital resources on the portal .....	114
Figure 5.6	Digital resources on the portal .....	115
Figure 5.7	Minutes of meeting where loan was approved for digital equipment.....	116
Figure 5.8	Home page for placing orders of Graduation photographs.....	117
Figure 5.9	Test environment: simulation (Bockaert 2001: 538).....	126
Figure 5.10	Image underexposed by moving to higher shutter speed.....	127
Figure 5.11	Image overexposed by moving to slower shutter speed.....	128
Figure 5.12	Behind the scenes of a Disney shoot (Leibovitz 2014).....	128
Figure 6.1	Pre-Test 1: Techniques I - Explain the camera symbols .....	134
Figure 6.2	Pre-Test 2: Techniques I - Aperture and shutter speeds.....	134
Figure 6.3	Pre-Test 1: Techniques II - Explain the camera symbols.....	142
Figure 6.4	Pre-Test 2: Techniques II - Explain the following terms .....	143
Figure 6.5	Student responses on the use of multimedia as teaching tools.....	147
Figure 6.6	Extracts from minutes taken during debriefing session.....	148
Figure 6.7	Theory of Photography II – 2011 Digital questions .....	150
Figure 6.8	Marking memorandum to digital questions in Theory of Photography II – 2011.....	151
Figure 6.9	Suggestion for stage setup for Graduation photographs (from Figure 5.1 in the Student's BTech Report).....	159
Figure 6.10	Digital unmasking - ripping one's face (Carbonera 2009:[1]).....	165
Figure 6.11	Online assignment briefing (du Plessis 2010: [1]) .....	166
Figure 6.12	Identity-1 (Second-year students 2010) .....	166
Figure 6.13	Identity-2 (Second-year student 2010) .....	167
Figure 6.14	Researcher's email to potential user group.....	170
Figure 6.15	User query about location of resources .....	170
Figure 6.16	Interchange of emails about accessing resources.....	171
Figure 6.17	Interchange of emails suggesting further resources .....	172
Figure 6.18	Interchange of emails with webmaster about guest access.....	172
Figure 7.1	Overview of the levels of stratification in this study (See Figure 4.1 for details).	176
Figure 7.2	Morphogenetic progression followed in innovation design (adapted from Wong 2005: 13).....	181
Figure 7.3	Strategy in terms of bargaining position, social receptivity and negotiating strength (inset from Figure 7.2).....	187
Figure A.1	Internet timeline (Interaction Blog 2011).....	201
Figure A.2	Cloud computing trends (Meeker 2010: Slide no 13).....	201
Figure A.3	New computing trends (Meeker 2010: Slide no 18).....	202
Figure A.4	Frictional electrical machine (Russell 2000: 31) .....	203
Figure A.5	Bush's proposed memex (Bush 1945b: 123).....	204
Figure A.6	Prototype mechanical QWERTY keyboard (Figure 1 in Kroemer 2001: 100)....	205
Figure A.7	Nelson's depiction of hypertext (Nelson 1974: 45).....	207

Figure A.8	Merging of web technologies with semantic technologies (Hawke 2010: Slide no 3).....	213
Figure A.9	World Health Organisation (World Health Organisation 2011: 41).....	216
Figure B.1	Williamson photosphere (Munro n.d.: 5).....	220
Figure B.2	Untitled (Friedman 2010: [1]).....	222
Figure B.3	Scanner and image (Kirsch 1957: [2-3]).....	223
Figure B.4	Lunar camera (Greenfieldboyce 2009: [3]).....	224
Figure B.5	Lytro Light Field camera (Cheng 2011: [1]).....	226
Figure B.6	Conceptual schematic camera (Ng et al. 2005: 2).....	227
Figure B.7	Rescue planning and endoscopy procedures (Allen 2009: [4]) .....	228
Figure B.8	Computational photography (Efros, Collet and Trutoiu 2010: Slide no 30).....	228
Figure B.9	Computational photography (Efros, Collet and Trutoiu 2010: Slide no 40).....	229
Figure B.10	Pinhole photographs a. (Menezes 2011) and b. (Armendariz 2010).....	230
Figure B.11	Find the hidden image (Friedman 2007: [1]).....	231
Figure B.12	Retro-histo: making an image fit your histogram (Millard 2007: [2]).....	231
Figure B.13	Untitled (Shirley 2004: 141).....	235
Figure B.14	Concepts and styles (Gropius 2012: [3]).....	237
Figure B.15	The children of <i>Born into brothels</i> around 1995-2006.....	240
Figure B.16	Bigshot camera (Phillips 2009b: [1]).....	243
Figure B.17	Bigshot's polyoptic wheel (Phillips 2009a: [1]).....	244
Figure H.1	Exposures and apertures (Bockaert 2001: 31).....	280
Figure H.2	Camera Raw principle (Bockaert 2001: 537).....	281
Figure H.3	Setting the aperture (Sharboneau 2011b:14).....	282
Figure H.4	DSLR basics: aperture, shutter speed and ISO (Sharboneau 2011a).....	283
Figure H.5	Processing photo (Krishnan, Smith and Linh 2009: [1]).....	284
Table 2.1	Model of blended learning delivery (Table 2, Gutteridge 2006: 6) .....	21
Table 2.2	Characteristics of OERs, OCW, MOOCs and Internet portals .....	29
Table 2.3	Comparison of key aspects of MOOCs (Table 1 in Yuan and Powell 2013: 8)..	39
Table 3.1	Bhaskar's three domains (Bhaskar 1978:56).....	54
Table 4.1	Subsections of artefact design from Hevner et al. ....	72
Table 4.2	Timeframes for morphogenetic cycle (adapted from Luckett 2012: 342).....	78
Table 4.3	Innovation design for the DUT Photography Programme within the wider morphogenetic cycle.....	83
Table 4.4	Design science research guidelines (Table 1 in Hevner <i>et al.</i> 2004: 83).....	86
Table 5.1	Chapter 5 sections dealing with research objectives 1 to 3.....	95
Table 5.2	Freely available digital resources .....	124
Table 6.1	Chapter 6 sections dealing with research objective 4.....	130
Table 6.2	Demographics of the First-year survey participants.....	132
Table 6.3	First-year student results on general Internet use.....	135
Table 6.4	First-year questions on use of Internet for teaching/learning.....	136

Table 6.5	First-year students' responses in support of traditional lectures.....	139
Table 6.6	First-year students' comments on multimedia based lectures.....	140
Table 6.7	Demographics of the Second-year survey participants.....	141
Table 6.8	Second-year student results on general Internet use.....	144
Table 6.9	Second-year student results on fluency in the use of digital media.....	146
Table 6.10	Second-year questions on internet use for teaching/learning.....	153
Table 6.11	Students' comments on WIL Project.....	157
Table 6.12	Students' suggestions to improve WIL Project .....	158
Table 6.13	Student response to narrative exercise.....	168
Table 7.1	Time frames leading up to present day context (T1 to T3).....	178
Table 7.2	Preconditions for morphostasis or morphogenesis (from Njihia 2000: 98) .....	180
Table 7.3	Elements of structural conditioning at the outset of the morphogenetic innovation cycle.....	184
Table 7.4	Situational logics in response to programme delivery problems.....	186
Table A.1	Seven eras of development in mobile computing.....	215

# **CHAPTER 1: INTRODUCTION**

## **1.1 Introduction**

Chapter 1 first looks at the context of the research, showing how the concept of setting up an educational Internet portal developed. The general aim and specific objectives of the research are then given, as well as an overview of the project. Key terms or concepts are then defined, the first two, e-learning and curation, being important in terms of the fact that the portal is a type of e-learning application, and curation is a necessary process for discipline-specific selection of educational resources. Critical realism is briefly defined, as it is the orientation for this study. The terms morphogenesis and morphostasis refer to changes in social structure, and, as will be shown in this thesis, are relevant in terms of the shift towards e-learning which is envisaged as occurring in higher education. Technology is also a critical concept in terms of its being viewed as inextricably intertwined with human social development. The main themes of the research are then identified, the chief one being integration of information and communication technology (ICT) enhancements into teaching and learning, which is a necessary part of setting up an educational portal. Causality is a key theme in determining the root causes of the pedagogical concerns the portal was designed to address. Social structure and the role of technology in social structure are also key issues in determining whether ICT artefacts such as the portal are likely to gain acceptance. The artefact design method adopted in this study is shown as combining the main themes of the research. After suggesting what new contributions to knowledge are made, and the potential value of the research, the chapter concludes with an overview of subsequent chapters.

## **1.2 The context of the research**

This research is set in the context of a multi-campus, multicultural UoT with a majority of English Second Language (ESL) students, mostly educationally disadvantaged learners, owing to the legacy of apartheid education policies. The study deals with the teaching and learning of the academic programme, Photography, via the medium of a multimedia portal with curated educational

resources. The curated portal resources will not only deal with traditional lesson content and methods, but will also introduce students to cutting-edge technological advancements in the field of Photography using multimedia. While the importance of face-to-face interaction with students is acknowledged, a multimedia portal offers Durban University of Technology (DUT) students some of the following benefits:

- time and cost economy (i.e. over print study materials, real time classes and travel);
- ease of access;
- continual updates in a field where technology changes rapidly;
- reinforcement at a number of levels of the current global digital multimedia aspect of photography by using the digital multimedia aspect of online tuition;
- photographic skills learned as part of multimedia communication rather than being compartmentalised in different sections of the curriculum; and
- entrée into an online community of practice where most cutting edge developments are shared.

The portal also has the potential to provide an online educational resource (OER) for members of the public, or to be further developed into a massive open online course (MOOC) which might be used to offer higher degrees courses to local and overseas students.

The researcher's masters (Bhorat 2006) dealt with introducing a multimedia centre which would produce in-house teaching and learning materials. However, current trends, such as the introduction of e-books, as well as the financial exigencies of universities in South Africa, suggest that a multimedia portal would be a more viable option, giving the above advantages. Moreover, the increasing numbers of under-prepared students entering universities mean that foundational tuition might be made accessible on the multimedia portal with very little additional cost (e.g. of staff, venues, equipment and hard print materials). Research has suggested that ESL learners experience less

inhibition in participating in online discussions and forums (Pratt 2005: 108-110), which means that learning is more participative. Finally, promoting DUT as a centre which uses cutting-edge multimedia tuition might better establish connections with Industry (one of the core functions of a UoT) as well as attract international academics and students.

Use of an Internet portal is, in fact, an innovative project at DUT in being a departure from the more usual conceptualising of e-learning as being a series of “set” courses or course modules (i.e. rather than programme resources). At the time of this study, Moodle was already being used as the learning management system (LMS) for research capacity building in terms of providing open educational resources (OERs, see Pratt 2014). However, most e-learning projects, up until the portal project, took the form of separate online or mixed-mode academic subject courses. This is confirmed by a personal communication from DUT’s Vice Chancellor and Principal, who commented that the model prevalent at traditional universities consisted of “a unit that helped academics to produce courseware”:

This had at least four negative impacts. It was hugely expensive with the ‘experts’ that it had. Then it prevented people from searching for material that was already available out in the ‘marketplace’. It attracted ONLY those people who saw themselves as experts or people who wanted to be experts as courseware developers. And it undermined the notion that courseware development was about the every day class. My experience in the US was very nearly the exact opposite (Bawa 16 November 2012).

### **1.3 Aims and objectives**

The aims and objectives of the research are as follows.

#### **1.3.1 General aim of the research**

The general aim of the research was to provide DUT staff and students with an educational Internet portal providing access to multimedia resources curated so as to be relevant to a specific degree course (in this case, the Photography Programme). The intention was that these resources might be used during and/or after lecture periods in much the same way as the resources found in



hard print book resources such as text books or references books (i.e. in a blended learning approach, see Chapter 2). Given the cost of books and the rapid developments in digital technology in the field of Photography, however, online resources would give faster, cheaper and wider access. The portal would be designed so as to make sense of both the discipline involved and the instructional programme (i.e. it would have a vertical design, see Eboueya and Uden 2007: 75). It was intended to be used together with traditional methods of tuition in some form of blended learning approach.

### **1.3.2 Specific research objectives**

To achieve the aim, the following specific objectives were formulated, namely:

- 1) to establish the pedagogical needs e-learning might serve in the context of the DUT Photography Programme;
- 2) to investigate the e-learning options available in terms of finding the most suitable format for the intended pedagogical purpose and target audience;
- 3) to develop the e-learning option which the results of addressing objectives 1 and 2 suggested as being the most suitable option; and
- 4) to test out this option in terms of its pedagogical purpose and target audience.

## **1.4 Overview of the project**

The project was limited to the Photography Programme, the researcher's discipline, as a start-up model for future applications. Part of further development and application would involve educating the various users in the expertise needed for various specialist multimedia as well as the principles and practice of sound pedagogical application in various learning contexts, but this would fall outside the scope of this study. In the course of this study, the researcher designed a prototype multimedia portal, set up online on the Moodle<sup>1</sup> learning management system (LMS). It was aimed at introducing,

---

<sup>1</sup>Moodle (Modular object oriented dynamic learning environment) is freely provided as an Open Source software package for producing Internet-based courses and web sites. It is a global development project designed to support a social constructionist framework of education.

augmenting and reinforcing various aspects of the DUT Photography Programme at undergraduate and postgraduate level, dealing with practical photography and academic writing skills. Curation of the digital contents ensured that the portal provided a benchmark example of resources appropriate to the Photography Programme at DUT. This meant that these resources could be used as standard materials not only for the DUT Photography Programme but, at a later period, by members of the public who wished to ascertain the nature of a degree programme or use the resources for non-degree purposes.

The portal was designed to contain electronic texts; animated simulations of various camera principles, technology and techniques; and links to original authors and relevant websites (following Di Paola and Teall 2007: 1161). During the prototyping process, the proposed portal content was tested out in an academic setting by obtaining feedback from various participants, including academic staff. The intention was to test out not only the viability of developing such a project but also its impact on different levels of users.

## **1.5 Key terms or concepts**

Brief definitions of terms and concepts are provided in the Glossary (p. v) and these will be defined in more detail in the chapters in which they feature. However, key terms and concepts are briefly defined below to pre-empt the sense in which they are used in this and following chapters.

### **1.5.1 E-learning**

It is acknowledged that e-learning could be viewed as a wider category than online learning (or web based learning) as some definitions of e-learning found in the literature include learning by means other than the Internet (Moore, Dickson-Deane and Galyen 2011: 130). In this thesis the term “e-learning” is used for information and instruction delivered primarily over the Internet (or intranet) using computer network technology (Welsh *et al.* 2003: 246). The terms e-learning, online learning and web based learning are used synonymously in this account, as, in fact, they are in much of the literature (Moore, Dickson-Deane and Galyen 2011: 130). Different genres and

variations of e-learning (including blended learning) will be discussed in Chapter 2.

### **1.5.2 Curation**

The term “content curation” is attributed to Bhargava (2012), who describes various models of content curation. The two models that will be used in this study are (1) aggregation, the act of curating the most relevant information about a particular topic into a single location; and (2) distillation, the act of curating information into a more simplistic format where only the most important or relevant ideas are shared (Bhargava 2012: 23).

### **1.5.3 Critical realism**

Critical realism is a post-positivist approach (Guba 1990: 20-23) which is growing in popularity as a research orientation in social science (Buch-Hansen 2005: 59). It is not, however, a paradigm, but a philosophy developed mainly by the British philosopher Roy Bhaskar (1978; 1986; 1989; 1998b). Broadly speaking, critical realism argues that there is a real world and that objects exist independently of one’s perception of them (Jefferies 2011: 4). Key concepts in critical reality are causality, as well as the mechanisms which are thought to be the causes of events, which Bhaskar describes generally as the “essence” of things (1978: 88). Another key concept is that of social structure, a type of mechanism comprising the system of relationships which both contextualise and motivate human social behaviour (Porpora 1998: 344). The critical realist philosophy is particularly appropriate for this project, as it emphasises the practical application of theory to improve the quality of life (Bhaskar 1986: 169). The domain of real, which comprises mechanisms, events and experiences, can be interpreted as an exemplar of an evolutionary process with emergent properties, thus mirroring the development of e-learning.

### **1.5.4 Morphogenesis and morphostasis**

Archer’s (1995: 5) term “morphogenesis” relates to changes in social structure, with its opposite, “morphostasis”, referring to maintenance of the status quo. As Dobson points out, Archer’s (2012: 76) morphogenetic model reflects underlying critical realist assumptions, which are as follows:

- Social structure pre-dates the action of human agency.
- Time is an important factor in social analysis.
- There is a need to separate structure from agency in analysis.
- Agents do not simultaneously create the social structures in which they operate.

As social structure pre-dates the actions of present agents, Archer advocates analysing structure and agency separately, a process which she terms “analytical dualism” (1998b: 367). These concepts are discussed in more detail in both Chapter 3 (Research orientation) and Chapter 4 (Methodology).

### **1.5.5 Technology**

According to Lawson (2008: 9), technical activity is “activity undertaken to harness the intrinsic powers of material artefacts in order to extend human capabilities”. However, as Aunger (2010) suggests, technology cannot be viewed as a convenient “add-on”, but is inextricably interlinked with human development. According to Orlikowski (2008: 9): “technology only comes into existence through creative human action and is sustained by human action through the on-going maintenance and adaptation of technology”.

## **1.6 Main themes of the research**

The overall theme of the research was the issue of how to integrate ICT enhancements into the teaching and learning of an academic subject (Photography) to address specific pedagogical concerns. In pursuing this inquiry process, the critical realist philosophy, and how it could be applied to improve the lot of staff and students, provided the focus. Causality, a major focus of critical realism, thus became a major theme, in probing the causes of the programme delivery problems experienced in Photography. The realist conception of social structure, and its relevance to teaching and learning, then also became a major theme, as did the associated theory of morphogenesis. The latter revealed both the complexities and the systemic regularities in social stagnation and change, suggesting ways in which the move to e-learning was occurring and could best be further accommodated. Technology and its role in

social structure and thus, human development, was another major theme underpinning this inquiry. The final major theme of the study was artefact design as a means of integrating ICT enhancements into the Photography Programme. Artefact design combined the themes of teaching and learning, and realist concepts of social structure and technology in achieving the production of an e-learning application, an educational Internet portal.

### **1.6.1 Integrating ICT enhancements into teaching and learning**

The specific pedagogical concerns to be addressed by integrating ICT enhancements into the Photography Programme were the students' difficulties in using digital technology for Industry-related purposes and the degree of literacy required at tertiary level. The concept underpinning the research project grew out of observing the frustration of students struggling with basic camera techniques and their inability to analyse and write coherent reports on their photography. The researcher looked at using technological methods of providing material through the use of a multimedia portal to introduce visual learning in the traditional classroom and to introduce students to cutting-edge technology using multimedia. A themed content package was designed to offer a new perspective. The portal technology could be seen as an effective way of enabling academics within a programme to share data and manage their content from a specific Internet location (Eboueya and Uden 2007: 75). By pooling essential resources into a unique location, users might have all the information they need at their fingertips, as well as a greater opportunity to communicate and collaborate. The introduction to online visual learning would support studio work, and might allow larger groups to be accommodated in the Photography Programme. Adding visual representations and animations of the latest multimedia technology to the portal (i.e. in a process of ongoing curation) had the potential of introducing students to cutting-edge technology. The Photography curriculum tends to be technology driven (Council on Higher Education 2014), which is in keeping with both the syllabus requirements and the students' need to accommodate Industry requirements.

This theme is explored in some detail in the literature review, Chapter 2, in terms of how e-learning and blended learning can provide effective and efficient

solutions to teaching issues. It is also explored in the ethnographic investigation of teaching/learning in the DUT Photography Programme, in Chapters 5 and 6.

### **1.6.2 Causality**

Critical realism emphasises causality, which is largely attributed to the mechanisms driving natural and social phenomena (Bhaskar 1989: 187). While these mechanisms are often configured in layered and complex systems (Pratt 2011: 18), identifying the causes of the status quo offers a means of dealing with them. In this context, finding the causes of the current situation was seen as more fundamental than applying artefact design rubrics, which do not explore the deep structure of the mechanisms bringing about the status quo. The causes of the “malaise” in the Photography Programme were identified in the “funnel of potential harm” which is described in Chapter 5, and which showed that the situation was not only negative but spiralling out of control. The Internet portal was suggested as a possible solution to the pedagogical problems identified.

### **1.6.3 Social structure**

Social structure can be seen as a mechanism affecting pedagogy in the sense that the system of relationships governing teaching and learning shapes the form it takes in specific contexts. An aspect of social structure which is problematic when introducing e-learning is the fact that Internet technology has not yet been “normalised” as everyday part of teaching and learning (Bax 2003: 23). This is the case at DUT, in spite of the frequent everyday use of the Internet by students - and staff - for recreational social purposes. The concept of social structure is introduced in Chapter 3, but is dealt with in much more detail in Chapter 4, along with Archer’s theory of morphogenesis, which relates to social change and continuance.

Archer’s substantive theory of morphogenesis complements Bhaskar’s critical realist philosophy by suggesting how social structure acts as the driving mechanism for social change and/or continuance (Mutch 2010: 507). However, Archer herself has not dealt with the role of ICT/IS technology in social structure

(Mutch 2010: 510). This account will suggest that exponential changes in ICT and IS technology have paved the way for technical enhancements in teaching and learning, such as the educational Internet portal developed in this study. While an increasing number of IS/ICT studies have used Archer's morphogenetic approach (Njihia 2008; Horrocks 2009), very few studies in e-learning are currently available, apart from those by Gutteridge (2009) and Reddy (2014). Archer's substantive theory of morphogenesis and its relevance to this study are described in some detail in Chapter 4.

#### **1.6.4 The role of technology in social structure**

Rather than seeing technology as an "external" force used by societies (Orlikowski 1992: 398), this study takes the view argued by Aunger (2010: 763), that technology should be seen as an "evolutionary phenomenon", and an intrinsic part of human development. According to Aunger, the fact that we live in techno-environments and use techno-systems as part of our everyday lives has made technology part of the natural landscape of modern life. We have, therefore, become users rather than creators, which obscures the fact that humans gradually created increasingly complex systems of artefacts over the centuries (Aunger 2010: 779). The Internet is one such techno-system, comprising multiple layers of development over wide eras of time in many different fields (Aunger 2010: 775). According to Lawson (2008: 6), technical objects are "social" in that they are imprinted with human social aspirations as well as becoming part of existing social relationships. Lawson adds that artefacts may then transform the nature of these relationships, as it is hoped will happen in the social structure of teaching and learning in the Photography Programme.

#### **1.6.5 Artefact design**

In artefact design, the themes of social structure, technology development and teaching/learning are combined. Design science also ties in with the critical realist theme. Researchers are becoming increasingly aware of the fact that computer systems are not "closed systems" (Hill 2009: 127). Moreover, even though computers possess a material reality (Fleetwood 2005: 2), they are

designed for and used in social systems (Lawson 2008: 5). The roles they play thus become part of the relationships forming social structures (Dobson 2012).

## **1.7 New contributions to knowledge**

Photography is Industry-driven, and the Photography curriculum is technology-driven to a greater extent than is the case in most academic subjects at DUT. While cutting-edge photography is currently found on blogs, the DUT Photography Portal has been designed as an academic site, curated and collated in a vertical structure to make sense of the discipline and curriculum. This has not been done before in the field of Photography, which previously relied on text books and videos (Zucker 2007). Moreover, this is thought to be one of the first educational Internet portals providing access to resources which have been curated to fit an academic programme in a specific local context. Other discipline-specific portals can now be found on the Internet (see medical portals at <https://meded-portal.ucsd.edu/index.cfm>; <https://www.med.qub.ac.uk/portal/>). However, this study is the first one such to ground portal development in an ethnographic study into specific local pedagogical concerns. It is also one of the first to align the portal content with the curriculum of a specific academic programme by using vertical structure in the portal design.

This study goes beyond the traditional blog, learning object repository (LOR), or OER in using the principle of curatorship to sift through digital resources for their relevance to a specific academic programme at the requisite levels. This will give students easy access to digital resources, and create more instances of start-up information in a context which is not yet available in the university library. While the DUT library is starting to acquire digital resources such as e-books, it is a long way from acquiring specialist digital resources other than books or journals, particularly in view of the complex copyright issues attendant on these, as well as the fast-changing technology involved.

This study is also thought to make a new contribution to knowledge in the field of e-learning in that it locates the proposed e-learning artefact in the context of its social structure, drawing on Bhaskar's critical realist philosophy and Archer's



substantive theory of morphogenesis. Growing numbers of Information Systems (IS) researchers are using a critical realist approach to organizational programming and data-capturing. Only two e-learning studies using morphogenetic theory within a critical realist approach have been identified thus far, those of Gutteridge (2009) and Reddy (2014). To the researcher's knowledge, this approach has not been used before in the development of a discipline-specific Internet portal. Finally, the method used for artefact design is also original in combining concepts of social structure, design science and e-learning pedagogy within a critical realist approach.

### **1.8 Potential value of the research**

The potential value of the research is thought to lie in making complex photographic principles, technology and procedures accessible to both staff and students online, using the latest digital techniques and multimedia. In a sense, the multimedia portal is an exemplar, as in itself and its workings it models what is being learned. While the use of digital multimedia in teaching and learning is well illustrated in the YouTube video by Nayar (2009b), its particular value in this study is its specific application in the Photography Programme at a multicultural UoT to cater for ESL learners who are educationally disadvantaged, albeit multimedia "literate" (i.e. through exposure to mobile phones and tablets). Currently, the development of new digital technology in photography means that not only techniques but also general photographic principles need to be re-examined continually to keep abreast of innovations in the field (such as metadata) and to be competitive in the marketplace. The multimedia portal project thus goes some way towards addressing two of the core principles of a UoT: exemplary teaching and learning, and fulfilling Industry-related needs. It is the application of digital multimedia technology in this specific context which is thought to make a new contribution to the knowledge in the field.

It is hoped that this study will serve as a model for developing educational multimedia portals which direct users to specific online resources in any given subject area. The World Wide Web (WWW) has so much information about

various topics that it can become confusing and time consuming for students to sift through the information and select data pertinent to their studies. This can result in use of misleading information - or incorrect use of relevant information - by students. It was observed that many students were inexperienced in accessing existing and free databases of information, or the sources were not well used (Appendices I and J for student surveys, 2011). More and more “under prepared” Net Generation students were turning toward the Internet for information first rather than using conventional books. This has resulted in a decline in traditional library book usage, as revealed in the Photography Programme Review (2010: 7). The DUT library offers remote access to digital textbooks, but not all the necessary electronic books are available through the library, a possible reason being the difficulty librarians experience in interpreting ambiguous copyright rules for digital resources.

The value of the research, then, will be to afford photography staff and students the opportunity to use specific digital technology through the multimedia portal to access educational materials and research publications, including research articles, dissertations and theses, as well as online research websites. The benefits of digital text and imagery are their accessibility and the saving in time and cost, and their potential to make many subject areas more approachable and less intimidating.

Finally, the portal is in alignment with DUT’s e-learning policy of making more courses available online. In the future, the educational Internet portal could also be developed further into an educational resource (whether in MOOC or OER form). This would fit in with one of DUT’s core functions, community development, in supporting lifelong learning both locally and internationally.

## **1.9 Conclusion**

A brief overview of the rest of the thesis chapters is given, as follows.

Chapter 2 (Literature Review) reviews the e-learning genres available for effective campus learning delivery, and explores and debates the issues

relating to the curated Internet portal developed in this study.

Chapter 3 (Research Orientation) gives an overview of the critical realist orientation, explaining some of the key terms and concepts, including that of social structure. The application of critical realism in other studies is discussed, as well as the researcher's rationale for using a critical realist approach.

Chapter 4 (Methodology) gives an account of the research methodology, based on Archer's (1995) morphogenetic approach, showing how the morphogenetic cycle differs from other forms of action research. The processes of morphostasis (social reproduction) and morphogenesis (social elaboration) are described, as well as Wong's (2005) adaptation of the morphogenetic cycle for innovation development. At the level of artefact development, a design science model (Hevner et al. 2004) is shown to have commonalities with Wong's model.

Chapter 5 (Developing the portal) deals with the results of attempting to fulfil research objectives 1 and 2. Objective 1 is tackled by investigating the pre-existing conditions in the Photography Programme. Objective 2 is addressed by exploring the option of using multimedia resources in blended learning delivery.

Chapter 6 (Prototyping the portal) shows how the Internet portal was tested out in terms of its intended audience and purpose during the prototyping process. This was done by means of surveys and case studies conducted with First- and Second-year students, as well as by obtaining general feedback from a selected user group.

Chapter 7 (Morphogenesis vs. morphostasis) arrives at a prognosis for the adoption of the portal for academic use, based on the potential for morphogenesis at the following levels: the general social level (Archer 1995), the level of innovation development (Wong 2005) and the level of artefact development (Hevner *et al.* 2004).

Chapter 8 (Conclusions and recommendations) looks at the extent to which the research objectives were achieved, describes modifications to the portal suggested during the prototyping process, and makes recommendations for further development and research.

## CHAPTER 2: LITERATURE REVIEW

### 2.1 Introduction

This chapter reviews the e-learning genres available for effective campus learning delivery, and, in the process, explores and debates the issues relating to the curated Internet portal developed in this study. Firstly, the meaning of the terms e-learning and online learning are interrogated, showing how divergences in definitions appear to be linked to uncertainty about which area of technology is involved. Next, the definition of e-learning adopted in this study is specified, and a blended learning approach is suggested as being an effective option for college and university instruction. The chapter then looks at the e-learning or blended learning options currently in vogue in tertiary education. These are identified as follows: open educational resources (OERs), open courseware (OCW) massive open online courses (MOOCs), and Internet portals. The pros and cons of these options are discussed, as well as any similarities/differences with the curated Internet portal developed in this study. The issue of digital curation is then discussed. The chapter concludes with a brief overview of the educational portal developed in this project, as well as the rationale for adopting this genre.

### 2.2 E-learning

E-learning is generally considered to refer to the use of electronic media and information and communication technology (ICT) in education, and is often used synonymously in the literature with the term online learning. There is disagreement about the precise definitions of e-learning and online learning (Ennew and Fernandez-Young 2006; Moore, Dickson-Deane and Galyen 2011). As Nawaz, Hussain and Zaka (2013: 425), comment: “The term [electronic-learning] is applied arbitrarily to almost any learning activity which has even the most marginal link with the internet”. According to the review on nomenclature by Moore, Dickson-Deane and Galyen (2011: 130), “authors will provide either no clear definition or a very vague reference to other terms such as *online course/learning*, *web-based learning*, *web-based training*, *learning objects* or

*distance learning* believing that the term can be used synonymously". Their observation is borne out in the literature. For example, Garrison and Anderson (2003) do not actually define e-learning in their book, even though, according to the title,<sup>2</sup> it is the subject of the book. Clark and Mayer (2008), amongst others, use the terms "e-learning" and "online learning" synonymously.

The problem with nomenclature and definitions relating to e-learning, according to Moore *et al.* (2011), is caused by authors not knowing which technologies should be used to reference the various terms. This is further complicated by the fact that currently there is a state of convergence in electronic media (Dede 2005; Fuchs 2008) which is fast rendering distinctions between formerly distinct types of technology meaningless. For example, there are now smart TVs with computer and Internet function, tablets and mobile phones with computer-like processing power and applications, streaming video on a number of different devices, high-end digital cameras with email facility ("tethering"), and spectacles (e.g. Google Glass) and watches with computer and internet function. The use of wireless technology in education can be seen as accelerating these convergences (Dede 2005: 15.16).

Clark and Meyer (2008) include more detail in their definition of e-learning in the context of organizational performance:

We define e-learning as instruction delivered on a computer by way of CD-ROM, Internet, or intranet with the following features:

- Includes content relevant to the learning objective
- Uses instructional methods such as examples and practice to help learning
- Uses media elements such as words and pictures to deliver the content and methods
- May be instructor-led (synchronous e-learning) or designed for self-paced individual study (asynchronous e-learning)
- Builds new knowledge and skills linked to individual learning goals or to improved organizational performance (Clark and Mayer 2008: 10).

---

<sup>2</sup> *E-learning in the 21st Century: a framework for research and practice*

On closer inspection, it can be seen that the bulleted points do not refer specifically to learning “delivered on a computer by way of CD-ROM, Internet, or intranet” but to any form of instruction. The inclusion of features of learning and teaching in some definitions of e-learning can possibly be attributed to its mainly asynchronous nature, and the fact that the online pedagogical framework needs to be set up in advance of instruction. This obliges course designers to think through the nature of their programme, and how it can be achieved, more carefully than in face-to-face instruction (Ennew and Fernandez-Young 2006: 427; Nawaz, Hussain and Zaka 2013). They thus tend to focus more consciously on the nature of learning and teaching than they would if engaged in traditional forms of learning, where these principles would still be important, but might remain implicit and be addressed in an ad hoc fashion as/when relevant. Moore, Dickson-Deane and Galyen point out that, no matter what the characteristics of the various terms are, “what is clear is that all forms of e-Learning, whether they be as applications, programs, objects, websites, etc., can eventually provide a learning opportunity for individuals” (2011: 130). This sentiment is supported by Toles (2009). According to Toles (2009: 7), the use of not only the Internet, but also media such as overhead projectors, DVD players, PowerPoint presentations, online video and graphic software will improve students’ learning experiences.

The discrepancies in definitions noted by Moore, Dickson-Deane and Galyen (2011) are found throughout the literature in the field. However, it is considered important to contextualise this study by giving readers some idea of the nature of the application (i.e. the Internet portal) envisaged. Therefore, an attempt will be made in the following sections to provide definitions of relevant terms, particularly those which are related to the current project. For the purposes of this study, e-learning is defined as “the use of computer network technology, primarily over an intranet or through the Internet, to deliver information and instruction to individuals” (Welsh *et al.* 2003: 246). The term e-learning will be used synonymously with the terms online learning and web-based learning. It is, however, acknowledged that electronic enhancements to learning may include features such as tape recorders, video machines, overhead projectors and CD-ROM, which may be used in combination with more recent digital

developments. Some definitions of e-learning include not only the Internet (or Intranet) and CD-ROM but also “audio- and videotape, satellite broadcast and interactive TV” (Moore, Dickson-Deane and Galyen 2011: 130). Technically e-learning is the wider term if it is viewed as including electronic technologies other than the Internet. In this study, however, the electronic enhancements to learning discussed here are those associated with information and computer technology (ICT), and specifically those involving e-learning.

In the field of modern tertiary education, there has been much debate regarding the impact of online teaching and learning. Discussions among academics regularly result in the conclusion that students do not appear to perform any better with the use of technology (Russell 2006 cited in Greyling 2007: 15). However, there is the undeniable fact that many students entering universities are part of the technologically literate “New Millennium”, and institutions need to tap into this emerging phenomenon to cater for them. In addition, in recent years, nearly all universities in South Africa have been subjected to student demonstrations, often violent, causing disruptions to the academic calendar (Newman and Gifford 2010: [1]). If students were provided with online instruction, they would be able to continue with their studies in “distance learning” mode until classes resumed. However, the introduction of technology is not necessarily meant to replace the “face-to-face method” traditional classroom or the physical campus infrastructure. As Toles (2009: 2-7) points out, it would be absurd to imagine campus classrooms becoming empty owing to large numbers of students deciding to “go virtual”. The point is that far more courses might be offered to larger numbers of students (including overseas students) if virtual college facilities were to be increased.

Ennew and Fernandez-Young (2006: 148) identify two basic models of online learning used by colleges and universities, namely:

1. a campus-based model, which views the online medium as a complement to traditional delivery; and
2. a distance-based model, which views online learning as a substitute for traditional forms of delivery.



Ennew and Fernandez-Young see the latter as consisting of either blended learning (but in its wider sense, see 2.3 below) or entirely online delivery.

The Internet portal described in this research is along the lines of the campus-based model, but has the potential for development into a distance-based model. This will be explained in the course of this chapter, along with an account of the variations in the above currently available to students at college and university level. It is first necessary, however, to clarify how blended learning is defined in this study.

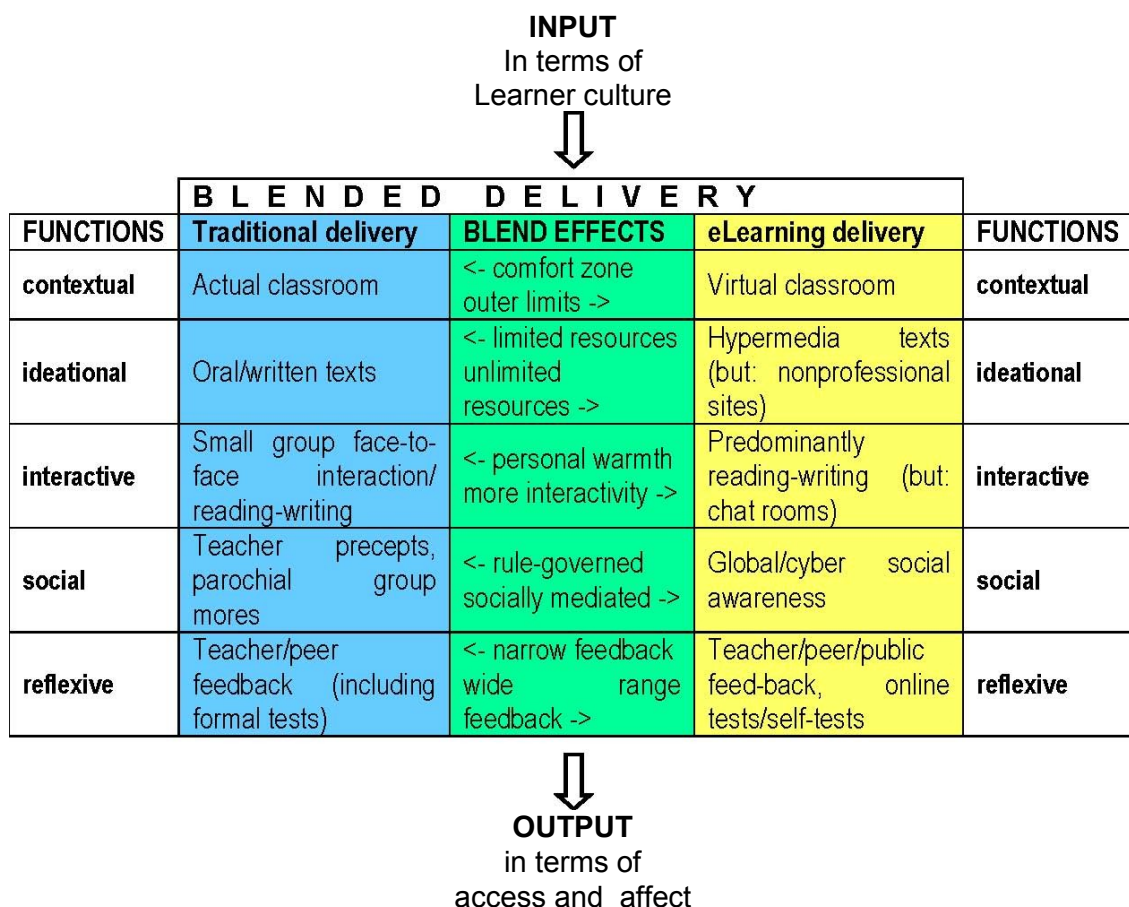
## **2.3 Blended learning**

Blended learning can refer either to the use of mixed media, for example, print, CD-ROM and DVD (Wang and Hwang 2004: 410; Ennew and Fernandez-Young 2006: 148) or to a mixture of traditional delivery and online delivery (Barone 2005: 14.15; Goodyear and Ellis 2007: 342; 2010: 102; Nawaz, Hussain and Zaka 2013: 428). It is used in the latter sense in the learning programme involved in this study, as it involves supplementing traditional delivery with curated Internet resources, which was considered to be the most effective delivery option for the DUT Photography Programme. As Gutteridge's (2006: 6) model of blended learning delivery (Table 2.1) suggests, blended learning is contextualised in the virtual, as well as the actual classroom, so that learning initiated in the classroom can continue at any time in any place where there is Internet access.

While the actual classroom is in the student's "comfort zone", the "outer limits" of the vast number of Internet resources in the "virtual classroom" are more demanding and can potentially extend the student's capacity for learning. As Pratt comments:

The virtual context of the Internet, while it is a cyber "space" reflecting the real world, is not just a landscape, but a communicative matrix, filled with text, graphics, animations, links – its very nature draws one on to further discoveries (2004: 1742).

Table 2.1 Model of blended learning delivery (Table 2, Gutteridge 2006: 6)



Online communication is mainly by texts, but there are also online discussion forums to generate ideas. Again, there are more resources available via the Internet and thus more data in which ideational content can be “spawned” (Shaughnessy 1977: 245). The face-to-face communication of traditional instruction is more immediate and personal, but there are actually more options for interaction online. As most of these options involve reading and writing, academic literacy can be fast-tracked, provided that the interactions are geared towards academic purposes (Pratt 2004: 1743; 2005: 96). By “social”, Gutteridge does not mean social in the recreational sense, but the social mores or conventions governing knowledge construction. The Internet extends these from parochial mores in local contexts to those of the global learning community. Finally, use of the Internet affords students a far wider range of feedback on their academic performance.

## **2.4 Rationale for higher education institutions using e-learning**

Welsh *et al.* (2003) identify some of the benefits for higher education (HE) institutions provided by e-learning. They point out that e-learning has the potential to:

- (1) provide consistent, worldwide training;
- (2) reduce delivery cycle time;
- (3) increase learner convenience;
- (4) reduce information overload;
- (5) improve tracking; and
- (6) lower expenses (2003: 247-248) .

Ennew and Fernandez-Young (2006: 149) expand on (1) as follows: “It allows universities to access the mass international market, particularly in Asia, without requiring costly investment in a campus infrastructure”. They add that it is an efficient form of course delivery, supports a diversity of pedagogical approaches, is more flexible than traditional delivery and gives increased opportunities for interaction. They also make the point that e-learning is a means of “mass personalisation” of educational delivery. In other words, it offers the prospect of the “personalised learning opportunities” which Mason (2005: 100) sees as a key future trend in e-learning. It must also be remembered that this is not “personal” in the traditional sense, but in the sense of the techno-mediated personal interactions of the “Net Generation” (Oblinger and Oblinger 2005b: 2.5-7).

Ennew and Fernandez-Young (2006: 150) divide the reasons for HE institutions adopting e-learning into commercial, pedagogical, or a mix of the two. Commercial reasons relate to cost and revenue. Lowered costs are incurred because tuition - and course materials - can be delivered to larger groups without the concomitant expense incurred by physical infrastructure. Online communication can be accomplished more quickly and in a more focused manner than face-to-face communication, and learning objects, once developed, can be “repackaged” in different combinations to suit different target audiences and purposes. As far as revenue is concerned, some subjects (particularly Business-related courses) are in high demand, and e-learning can

assist HE institutions to access mass world markets. This is because e-learning enables international students who do not have the time and/or money for overseas travel and subsistence to register at overseas HE institutions. Ennew and Fernandez-Young (2006: 150) also claim that there is evidence of a “strong market demand” for e-learning tuition at HE institutions.

The pedagogical benefits include the option of using more varied multimedia resources, the ability to use a wider variety of pedagogical studies, and the opportunity for more personalisation and interaction than is possible in mass traditional lecturing. In particular, Ennew and Fernandez-Young (2006: 150) stress the value of students interacting “across national and cultural divides”; of having access to tutors whenever needed, wherever they may be; and having the opportunity to work at their own pace and set their own goals. Finally (as mentioned above), they point out that designers of online materials need to think through the pedagogical aspects of an academic programme more carefully than is usual in face-to-face delivery, which may well result in superior learning experiences.

The value and potential of educational portals are already beginning to be acknowledged internationally in countries such as Scotland, Holland and Kenya (Pynoo *et al.* 2011: 1308). Pynoo *et al.* cite various studies involving portals as a supportive rather than instructional tool in the classroom (Ottenbreit-Leftwich, Glazewski, Newby and Ertmer 2010 and Russell, Bebell, O'Dwyer and O'Connor 2003, cited in Pynoo *et al.* 2011: 1308). Pynoo *et al.* (2011) conducted a study on teachers' acceptance of portals using the KlasCement portal (created by the Flemish Ministry of Education) as the basis of their online research questionnaire. The resource based portal allows users to download and upload documents, articles, websites, software, exercises, video links and access other educational projects on various topics. According to Pynoo *et al.* (2011:1314), the educators' attitude was the main factor in motivating portal use, and not perceptions as to its usefulness, which had a minimal influence. Manduca, Fox and Iverson (2006) describe their team's efforts in building educational portals linked to digital libraries. They comment that it is a complex process, and not just an issue of importing Internet data into digital libraries.

Much of the data required by users is not yet available in digital libraries, and requires the development of web-authoring tools to import new materials and create new metadata.

However, in spite of the many anticipated benefits, Ennew and Fernandez-Young (2006) report that e-learning has not lived up to its promise in HE institutions. Adoption of e-learning delivery has been “limited”, and significant resistance has been shown by students. Ennew and Fernandez-Young cite the example of “the UK’s high-profile £62m investment in online learning,” which, they report, failed, and conclude that the anticipated high demand for e-learning HE courses has failed to materialise. Two main reasons are given for this: (1) the fact that the nature of e-learning is innovative, and students, therefore, perceive a higher degree of risk; and (2) the fact that not all governments recognise distance learning qualifications (Ennew and Fernandez-Young 2006: 150). Research by Mahdizadeh, Biemans and Mulder (2008: 142-143) confirms that, despite its potential, computer based learning is not used as regularly as traditional methods. In a study carried out in the Netherlands, it was noted that computer use was limited to information searches, although there was high Internet use by university students. Mahdizadeh *et al.* emphasise the fact that technology implementation is a complex problem which is shaped by pedagogical philosophies and curriculum requirements.

According to Bax (2003: 23), the relatively slow adoption of e-learning in formal education is because it has not yet been “normalised” for educators or students, who see networking in social and recreational rather than educational terms. As Bax points out, pens and books are a form of technology, yet we do not speak of “PALL” (pen-assisted language learning, or “BALL” (book-assisted language learning). Bax questions the fact that educators still refer to computer-assisted language learning as “CALL”, when computers are just as “normal” in everyday institutional use as pens and books. According to the teacher feedback obtained by Lam (2000), educators are not inclined to use ICT unless it serves a pedagogical purpose more efficiently and effectively than the means currently used. Points gleaned from Bax (2003) and Lam (2000)

suggest that ICT technology is more likely to be used for teaching and learning when the following conditions are met:

- Educators perceive it as serving a pedagogical purpose;
- The resulting teaching and learning methods can be shown to be more efficient/cost-effective than previous or existing methods;
- The relevant infrastructure is set in place to support the use of ICT technology (including training in its use);
- The technology fits seamlessly into course design and course delivery; and
- Use of ICT in pedagogy becomes “normalised” (this includes management approval, staff acceptance and integration into institutional curricula).

There is also the issue of how different generations work together in institutions. Sharp (2010) suggests that educational managers need to learn how each generation is defined and sees itself before attempting to get individuals from different generations to work together.

Oblinger and Oblinger’s (2005a) work, *Educating the Net Generation*, contains a wealth of knowledge about the learning preferences of the young people currently registering in colleges, as chapters by the following contributors show. Research by Hartman, Moskal and Dziuban (2005) suggests that it is misleading to assume that younger students of the Net Generation have a strong preference for technology in contrast to adult educators. Studies carried out with students reveal that younger learners are more interested in interactions with faculty members and hands-on learning than technology (Kvavik 2005; McNeely 2005; Roberts 2005; Windham 2005). Ramaley and Zia (2005) suggest that the preference for experiential, hands-on learning is, in fact, a distinguishing feature of Net Generation learners. Brown (2005) considers the implications of Net Generation learners’ preference for experiential learning, team work and social networking, and concludes that the activities in which students engage are more important than the actual technology they use.

It is the researcher's experience that students are cautious about use of online resources through an understandable fear of being left at the mercy of huge online resources without guidance from, or ongoing interaction with lecturers or mentors. According to Baggaley (2013), this is actually what happens when online learning is outsourced to technology experts with little academic guidance. Moreover, this is the main criticism against the "massive open online course": that it does not scaffold learning for students or offer feedback on their progress. If the information on the Internet portal is not carefully structured to show how it is organised, not only in the course of the learning process, but also in the relevant disciplinary matrix, the student's experience is that things are "all over the place" (Baggaley 2013: 372).

Bax (2003) recommends a detailed ethnographic approach to assess learners' and educators' needs and to design an effective e-learning programme which would not only benefit students but which would be seen by educators as serving pedagogical ends effectively. This approach has been carried out in this study by way of a detailed investigation of user needs in a specific educational context, the DUT Photography Programme. A theory is also required which shows how technology might become integrated into everyday teaching practice (or "normalised" in Bax's terms). In the case of this study, Archer's (1995, 1998b) substantive theory of morphogenesis has been used.

There is a growing body of literature supporting use of this theory in ICT/IS studies, for example, those by Carlsson (2003b, 2005a, 2005b), Dobson (2001, 2002, 2005, 2012), Horrocks (2006, 2009) and Mingers (2000, 2004). However, as Lin, Wu and Tsai (2005) point out, research into information systems is focused on organizational activities such as decision-making and corporate operations, both of which severely limit the user's choices. This is very different from the focus in educational use of online resources, where users have much wider options and are influenced by individual needs and preferences (Lin, Wu and Tsai 2005: 683). Even within the educational field, it cannot be assumed that application of ICT is necessarily similar in different disciplines, and that users all respond to the use of ICT in the same way (Hennessy, Ruthven and Brindley 2005: 160-161). So far, only two studies have been identified which

have applied Archer's morphogenetic theory to e-learning, that of Gutteridge (2009), in the case of testing out set OCW (a blended learning Communication Course), and Reddy (2014), as applied to developing a language learning object repository (also OCW focused). This current study is the first instance, to the researcher's knowledge, in which Archer's theory has been applied to the development of an educational Internet portal for use in an academic discipline.

## **2.5 OERs, OCW, MOOCs and Internet portals**

There are elements of the following e-learning applications in the online curated portal developed in this account: OERs, OCW and MOOCs. The curated portal itself is of a genre referred to as "Internet portal" (Bax 2007: 98). The characteristics of OERs, OCW, MOOCs and Internet portals will be discussed, with reference to how these fit in - or contrast - with the Internet portal project described in this study. To sum up the options briefly:

- OERs (or open educational resources) refer to resources freely available on the Internet, usually provided by academics, with no attempt to curate, organise or structure them. They were launched around 2009 (Yuan and Powell 2013: 5).
- OCW (or open courseware) refers to free and openly licensed college courses available on the Internet, and may include course planning and assessment material (Downes 2007b: 1-2). They were the precursors of MOOCs, which pre-dated them by about 10 years, and were first introduced in 2011 (Sandeem 2013: 5).
- MOOCs (or massive open online courses) refer to online courses usually generated by corporate educational providers in collaboration with universities (Yuan and Powell 2013: 7-9).
- Internet portals are gateways providing a single access to information which is considered useful to groups of people (Eboueya and Uden 2007: 75). They are usually dedicated to specific or specialist areas (Di Paola and Teall 2007: 1161).



There is considerable overlap between the terms, and, as Daniel and Uvalić-Trumbić (2013: 22) point out, the definition of items such as “MOOC” have become even more “fuzzy” as more and more different organisations compete to provide them. MOOC is not the only term where the definition poses problems, as some categories are subsumed by others. For example, OCW is a type of OER (but there are other types of OERs), and while OCW was the precursor of the MOOC, both exhibit marked differences. MOOCs are corporate business enterprises aimed at the commodification of knowledge (Ancori, Bureth and Cohendet 2000: 257), while OCW is an altruistic service provided by universities to ensure that knowledge is *not* commodified (Barrett *et al.* 2009: 31-32). In spite of this distinction, MOOCs usually offer free tuition, *unless* the student wishes to obtain certification from a university. Even in this case, costs are greatly reduced because of sponsorships and the economy achieved by using e-learning.

While an attempt has been made to categorise the various genres (see Table 2.2), it is the contention of this study that it is not so much the issue of who provides the various options, and at what cost or for what purpose. These, of course, are issues which cannot be ignored. However, the way in which the various options are applied in specific instances is thought to be the key issue in establishing how effective they will be as pedagogical tools. Permutations and combinations of OERs, OCW and MOOCs can be put to good use in e-learning, but the teaching and learning needs of the specific context in which they are to be applied need to be well researched (Hodgkinson-Williams 2010: 10), as was the case with this study.

These genres will be discussed in more detail below, in order to establish what e-learning trends are currently observable in colleges and universities, and to clarify which aspects of these are also found in the curated portal project. Comparisons might also highlight the portal’s potential for a wider target audience (e.g. for overseas marketing of academic programmes, as a client-friendly LMS, Moodle, has been used). An overview of the above-mentioned is given in Table 2.2, which is the researcher’s summation of the genres. As suggested above, the Internet portal category includes online resources which

are not necessarily for educational use per se (e.g. Art galleries, museums, scientific data repositories, research databases). As this study deals with the development of an educational Internet portal, this section will be discussed after the others. At first, an overview will be given. Later, after the issue of curation has been discussed, a more detailed account focussing on the educational use of such portals will be provided.

Table 2.2 Characteristics of OERs, OCW, MOOCs and Internet portals

	<b>OERs</b>	<b>OCW</b>	<b>MOOCs</b>	<b>Internet portals</b>
<b>COST OF PROVIDING</b>	Provided free by academics at universities	Contributed by universities	Funded by corporations (Yuan and Powell 2013: 8)	Free/funded
<b>COST OF ACCESS<sup>3</sup></b>	Free to all users	Free to all users, with controlled access	Free to users except for HE certification (Sandeem 2013: 5)	Usually freely accessed
<b>PURPOSE</b>	Altruistic: to make knowledge available to all, particularly the marginalised (Coroles <i>et al.</i> , in Hodgkinson-Williams 2010: 5)	Altruistic: to give the whole world access to high quality college courses	To use e-learning instead of traditional delivery for college courses	To give access to aesthetic educational or research resources (Moore <i>et al.</i> 2011: 129)
<b>SUPPORT</b>	Ad hoc volunteerism	Corporate or HE institutional support	Corporate /HE collaboration	Research institutes, libraries or foundations
<b>CURATED</b>	Not curated. (Baggaley 2013: 2)	Set up in advance (regular updates)	Set up in advance (regular updates)	To suit purpose and users of collection
<b>INSTRUCTORS</b>	Not provided	Usually provided	Instruction built into the course	Not provided
<b>USABILITY</b>	Patchy	Consistency dependent on producers	Consistent	Consistency dependent on producers
<b>DESIGN</b>	Horizontal	Vertical	Vertical	Vertical

<sup>3</sup> “Free” for use does not imply that there are no restrictions or obligations on the part of the user besides cost.

### 2.5.1 OERs

OERs have been defined generally as “digitised materials offered freely and openly for educators, students and self-learners to use and re-use for teaching, learning and research” (Hylén 2006: 49). A more comprehensive and later definition of open educational resources is provided by Hylén *et al.*:

Open Educational Resources are digital learning resources offered online (although sometimes in print<sup>4</sup>) freely and openly to teachers, educators, students, and independent learners in order to be used, shared, combined, adapted, and expanded in teaching, learning and research. They include learning content, software tools to develop, use and distribute, and implementation resources such as open licences. The learning content is educational material of a wide variety, from full courses to smaller units such as diagrams or test questions. It may include text, images, audio, video, simulations, games, portals, and the like (2012: 18).

Another way of defining OERs is in terms of what functions they are designed to perform. According to points taken from Downes (2007a), Hylén (2006), Johnstone (2005) and Mora (2007), the open educational resources posted online are those designed to:

- assist learners (e.g. with courseware, content modules, full courses, learning objects, learner-support and assessment tools, online learning communities, collections, journals);
- support teachers (e.g. with tools and support materials to enable them to create, adapt, improve and use OER, as well as training materials for teachers and other teaching tools: software, learning management systems and content development tools);
- enable and facilitate implementation (e.g. with intellectual property licenses to promote open publishing of materials, design-principles, and localization of content); and
- assure the quality of education and educational practices (e.g. by promulgating online exemplary content and best practice courseware, as

---

<sup>4</sup> The “print” aspect is not dealt with here, in terms of the fact that genres of e-learning are the focus of this chapter.

well as the use of shared forums, staff/student feedback and evaluation tools).

Wilson (2008) refers to OERs as “shareable assets”, and provides the following background:

The idea of sharing content is not new. The Massachusetts Institute of Technology’s (MIT) course materials have been available to the world through its Open CourseWare (OCW) initiative since September 2002. Other institutions have followed this lead (e.g., John Hopkins Bloomberg School of Public Health, Rice University Connexions, Utah State University, Sharing of Free Intellectual Assets, Open Learning Initiative from Carnegie Mellon, China Open Resources for Education Initiative and Japanese OCW Alliance, among others). The Open University in the United Kingdom, a well-known and respected distance-learning institution, has joined the OER arena (2008: 3).

OERs are produced by universities, but, as Wilson points out, the shared content is often not designed and stored with easy access in mind.

To sum up, the general characteristics of OERs (as compared to other genres) are as follows. OERs are:

- Freely available, donated by academics, mainly, who believe knowledge should be freely shared;
- Not catalogued or curated;
- Horizontal in structure;
- Without instructors; and
- Copyright free.

OERs are not designed to provide degrees or diplomas (although the content may well be accessed for such purposes in much the same way as that found in libraries and other offline collections or repositories. They are often represented as altruistic attempts to make knowledge freely available worldwide, in line with academic tradition (OECD 2007: 11), thus preventing the commodification of knowledge (Blackler 1995: 1026; Cohendet and Meyer-Krahmer 2001: 1563).

OERs can thus contribute to lifelong learning and improve the human condition, promoting the worldwide sharing of knowledge to facilitate the development of intellectual capacity (Johnstone 2005: 16). Downes (2007b: 2) echoes these sentiments when he comments that, while the world's knowledge is entrusted to universities, it does not belong to them but to all people. According to Johnstone (2005: 15), one of the main reasons for sharing local resources is to improve the quality of life for those who are less fortunate. Wilson points out that OERs offer opportunities for lifelong learning to those who would otherwise be unable to do so:

They provide the possibility of increasing the range and type of learning opportunities available for those who are:

- From non-traditional educational backgrounds
- Travelling extensively
- In employment
- And from under represented groups such as:
  - The vulnerable
  - Those with disabilities
  - The house bound
  - Those with family dependents
  - Those on low incomes or with no income
  - Those from low socio-economic groups
  - Those seeking refuge from another country
  - The elderly
  - Those from minority ethnic groups
  - Those in prison (Wilson 2008: 2-3)

It was envisaged that not only learners but also instructors would benefit from the resources freely available on OERs. This was because OERs contained not only learner resources, but also teacher resources. These would include web tools and resources to facilitate creating, adapting and using OERs, as well as teacher training materials (Johnstone 2005: 15). Initially, OERs were used in campus-based institutions with a large amount of lecturer participation. However, in some of the more recent OERs used in distance education (e.g. The Open University), the online resources have “built in” instructor functioning added in the form of self tests and reviews, and the materials have been designed to be used without actual lecturer intervention (Wilson 2008: 4). While OERs are acknowledged to be a fast growing trend for HE institutions (Johnstone 2005: 17-18), there is yet much research to be done on how and

why specific instances of OERs work or not (Richter and McPherson 2012: 1). In view of the relatively small proportion of academics using any kind of online learning (Ennew and Fernandez-Young 2006: 149), it is important also to know what factors (see below) influence their use by academics.

OERs may contain curated resources, but these might have been selected for a specific audience and purpose and may not serve all users' needs. Richter and McPherson (2012: 1-2) add the caveat that OERs, no matter how high the standard, will not be of value for learners unless they are applicable to the learners' specific context and can thus be re-used or at least adapted for that context. The idea of curation of scholarly resources (journals, digital books and reference guides) for individual use is advocated by Hodgkinson-Williams *et al.* (2013). The University of Cape Town received a \$100,000 USD grant in 2007 from the Shuttleworth Foundation to start an 18 month research project into OER. Their findings included the fact that a lack of metadata hindered the easy search option. They decided to host resources using Flickr as the portal rather than hosting content through a university portal, as most teaching material was already online (Hodgkinson-Williams *et al.* 2013: 36). The use of Flickr, popular though it might be with young people, actually represented a regression from the benefits of using curated resources. In particular, it hindered the ability to find context-specific resources speedily, and thus runs contrary to Bhojaraju and Buck's (2007) "law of least effort". According to this "law", users tend to waste as little time as possible when seeking information and may well lose interest and leave a website if more than two mouse clicks are needed (Bhojaraju and Buck 2007: 654).

Hodgkinson-Williams *et al.* (2013: 40) suggest that some multimedia would need to be produced in-house, and the researcher's master's study (Bhorat 2006) highlighted this option. However, with the ability to curate information, this need not be the case. Hodgkinson-Williams *et al.* highlight the need for further research into what kinds of resources students and academics would like to have available. One of the resources they mention as needing more investigation is the option of an institutional directory with a repository model (Hodgkinson-Williams *et al.* 2013: 43). The resources on such a portal would

be built up through the process of aggregation, as suggested by Bhargava (2012: 23). Hodgkinson-Williams *et al.* appear unsure as to whether the creation of OERs would actually improve pedagogy, and suggest that long-term studies in specific educational contexts would be needed to establish this.

D'Antoni (2009: 7) notes the following OER issues as being priorities which need attention:

- awareness raising and promotion;
- communities and networking;
- capacity development (i.e. to educate university staff in their use);
- sustainability;
- quality assurance; and
- copyright.

While D'Antoni lists these in order of priority, it can be seen that sustainability (linked to capacity development), quality assurance and copyright are all serious issues in terms of fitness for long-term use, whether local or worldwide. Moreover, if OERs are to become an integral part of HE instruction, this aspect of capacity development, in particular, will need to be investigated. This will involve identifying both the incentives and barriers involved for academics contributing materials for use in OERs (OECD 2007: 3). However, most online initiatives are in some way or the other accredited to the Academic Commons Attribution, which provides free access to using resources.

The Internet portal developed in this study has similarities with OERs in being campus-based, with the support of lecturing staff, and contains resources designed to improve the quality of both teaching and learning in the Photography Programme at DUT. It also contains freeware resources and copyright has been secured for those which are not freely accessible to users. The design is vertical, to show how the various elements of the Photography as well as course tuition are logically scaffolded. It is not an OER in the primary sense of being freely available, as it can be accessed only by university staff and fee-paying students. However, it has the potential to be developed into an

OER type website. If more instructor support were built into it, it could be made freely available worldwide to users who might want to learn Photography for aesthetic, recreational or professional (including entrepreneurial) purposes. It would also require funding to support regular curation and upgrading.

### **2.5.2 OCW**

OCW, or open courseware, like the OER, is based on the principle that knowledge is “the shared property of all members of society” (Johansen and Wiley 2011: 370), and has been hailed as “one of the most successful emerging initiatives in the way to Open Content” (Piedra *et al.* 2012: 17). OECD defines open courseware as:

[E]ducational material organised as courses and typically distributed as PDFfiles, as well as smaller chunks of learning, often referred to as learning objects. The content may involve websites, simulations, text files, images, sound or videos in digital format, some only for use and others open also for adaptation and reuse (2007: 10).

OCW can range in scope from course notes saved as text files to PowerPoint (or MP3) presentations or even educational software. It might be posted online as a “stand alone” learning application on the Internet, or various examples of OCW might be collated and organised to form the educational content of OERs. OCW is, in fact, a type of OER (but OERs can include other elements besides OCW).

Long would take exception to the above definition of OCW as courses or educational content. As Long comments:

OCW is a process - not a set of classes. This process is intended to make ... course materials that are used in the teaching of almost all undergraduate and graduate subjects available free online to any user in the world (2001: 1).

Downes (2007b: 2) also makes reference to processes in reviewing the OCW Consortium, in which “Share” and “Support” sections show novice users how to create OCW projects and ways to support such initiatives. Long was, in fact, referring specifically to the MIT OCW, which is mentioned in most accounts of



OCW and OER, for example, those by D'Antoni (2009), Downes (2007b, 2007a), Hylén *et al.* (2012), Hylén and Schuller (2007), Johansen and Wiley (2011), Johnstone (2005), Mora (2007), OECD (2007), Piedra *et al.* (2012), Renaud (2007), Richter and McPherson (2012) and Wilson (2008).

In these accounts, it is documented that “MIT OpenCourseWare”<sup>5</sup> was launched by the Massachusetts Institute of Technology (MIT) in order to make its undergraduate and post graduate courses free and openly available to anyone, anywhere in the world, by putting these online. There was the understanding that all institutions which later contributed to these resources, by so doing, granted anyone free access to their courses. According to Mora (2007: 2), the MIT OCW initiative encouraged other academic institutions to make their course materials available as OERs. According to Johansen and Wiley (2011: 369-370), since MIT launched the OCW project in 2002, materials from over 1,900 of its undergraduate and graduate-level courses have been made freely available. Johansen and Wiley report that more than 200 institutions worldwide have come together to form the OCW Consortium, and have published over 8,000 courses in a wide variety of languages. For the online portal developed in this study, the researcher himself has located freely available digital material from various universities, including MIT and Harvard Extension School (see Table 5.2 in Chapter 5).

OECD (2007) reports rapid growth in the number of OER projects, the number of people involved and the number of resources which have been made. In January 2007, OECD identified over 3,000 OCW courses, available from more than 300 universities throughout the world. Mention is made of repositories such as MERLOT, Connexions, and OpenLearn, with the claim that “there are hundreds of thousands of pieces of content or materials representing thousands of freely available learning hours” (OECD 2007: 10). OECD also reports that the translation of resources now caters for more language diversity and has resulted in an increase in global use of repositories.

---

<sup>5</sup> The term “OpenCourseWare” (instead of “open courseware”) is used with reference to a specific open courseware initiative, as in the “OpenCourseWare Consortium”, although some authors use it as the generic term.

Not all reviews of OCW projects are positive, however. Downes (2007b: 2), while allowing that the OpenCourseWare Consortium site is useful because it describes a rapidly developing and important initiative, criticizes it for having an atmosphere of exclusivity. Noting that the OpenCourseWare Consortium site can be accessed only by email, Downes refers to this as a “barrier” to access. As Downes suggests, this might pose a contradiction to the principle of making knowledge accessible to all. A more serious barrier to “universal sharing” is identified by Piedra *et al.* (2012), who point out that the diverse organisation, structure and technological backing of OCW projects lead inevitably to the heterogeneity of current OCW repositories. This can lead to interoperability and accessibility problems being experienced in using open content both amongst and within institutions (2012: 17). Piedra *et al.*, therefore, emphasise the need to find a quick and easy way to access and share OCW and other OERs.

The relevance of OCW to the Internet portal developed in this study is that the portal makes use of OCW, but not so as to make it freely available to all users worldwide. The Photography portal has been designed to improve the teaching and learning resources in a cash-strapped university of technology where over 75 % of the students are economically and educationally disadvantaged. In that sense, it provides an altruistic service, which is not cost free, however. If the Photography studio work could be set up as OCW, more students could be accommodated in the course, particularly students who could not afford the travel or accommodation costs of studying overseas.

### **2.5.3 MOOCs**

According to Siemens (2013: 8), the MOOC, or massive open online course, offers a “middle ground for teaching and learning between the highly organised and structured classroom environment and the chaotic open web of fragmented information”. Attempts to differentiate MOOCs from other online education initiatives are complicated by the fact that there is a fair amount of overlap, and the terms are often not applied rigorously. MOOCs are generally considered to have the following characteristics, namely, that they are:

- Freely available, provided by a corporate supplier, but may be supported by donations or foundations (actual registration at the host university for degree purposes is not necessarily free);
- Collated in the form of courses (i.e. curation takes place);
- Geared towards leading to student graduations (but very little degree completion takes place);
- Supportive (it is claimed) of worldwide lifelong learning;
- Without instructors (or possessing very few); and
- Copyright free.

Bárcena *et al.* comment on the difficulty of characterising MOOCs:

....the difficulty with MOOCs starts with the term itself, which can cause confusion since a number of courses offered as MOOCs actually violate at least one of the letters in the acronym, while others have caused a number of hyponyms to arise (TOOCs, SOOCs(2), etc.) (2014: 11).

Bárcena *et al.* (2014) also question the student numbers a course must accommodate to qualify as a MOOC, whether entrance is, in fact, entirely free of *all* charges, and whether face-to-face instruction (thus making the MOOC a form of blended learning) must be excluded entirely. Finally, they question whether MOOCs need to be used only for independent learning activities with clearly defined goals.

The general picture which emerges from the literature is that MOOCs are curated online courses, generated by corporate educational providers and not universities. They are “student facing”, designed for student consumption, that is, not “teacher facing”, or designed for educator needs (Koper 2005: 1; Yuan, Powell and Olivier 2014: 3). MOOCs are used by universities to register students for under- or postgraduate courses, free of charge, but with limited or no instruction (i.e. apart from what is pre-provided in the course). However, it must be remembered that actual registration for the degree offered by the host university for certification purposes is not necessarily free. While there is no

limit to the numbers catered for, there is generally a massive dropout rate (Lewin 2013: [1]; Agarwala 2013 cited in Sandeen 2013: 7; Stein 2013: [1]). Table 2.3 shows that individual offerings differ in which of the characteristics of MOOCs they evince.

Table 2.3 Comparison of key aspects of MOOCs (Table 1 in Yuan and Powell 2013: 8)

Initiatives	For profit	Free to access	Certification fee	Institutional credits
eDX	x	✓	✓	x
Coursera	✓	✓	✓	x ✓
Udacity	✓	✓	✓	x ✓
Udemy	✓	x ✓	✓	x ✓
P2PU	x	✓	x	x

Key

x Not a feature

✓ Feature present

x ✓ Features partially present

MOOCs have been found to be generally unpopular with university faculty staff (McCluskey and Winter 2013: 92). There are also mixed reactions as to their success rate. Media coverage, initially positive, has recently criticised MOOCs for being “massive” mainly in their failure to deliver (Lewin 2013: 1-3). However, there are some notable exceptions, for example, Sheffield University, which personalises its courses by using face-to-face orientation, and which has instructors who regularly interact with students on weekly webinars (Clonan 2013: [1]). But then, as Bárcena *et al.* (2014: 11-12) have pointed out, it is debatable whether Sheffield’s offerings qualify as MOOCs, given the defining criteria above.

In terms of the relationship of MOOCs to the Internet portal developed in this study, the latter is clearly not a MOOC, for the following reasons:

- Only DUT staff members and students registered in the Photography Programme portal have access to the portal;
- Use of the portal is not, therefore, “open” or “free”;
- Student membership is relatively small, and not at all “massive”;
- The portal resources are there as an adjunct to traditional learning delivery, not to replace it (i.e. a blended learning approach is used); and
- The portal is not copyright free.

It must be noted that, while copyright is not free, it has been catered for by purchasing or using available DUT resources and/or freeware, and the course content is curated, as with MOOCs, and presented in a vertical structure.

The relevance of MOOCs to the portal project is that DUT does offer its higher degree courses virtually free of charge. Provided that a way of dealing with studio work online without face-to-face instruction could be found, the portal could well be marketed as a Sheffield-type MOOC, materially increasing student registration and graduation figures. One possible solution catering studio work is the use of animated online tutorials. Examples of these are the tutorial on portrait lighting, as well as the online version of the Stanford Bigshot Camera project. Some form of student orientation and regular interactivity, both key “success” features of Sheffield’s MOOCs, would need to be used, however.

#### **2.5.4 Internet portals**

Stevenson (2007) suggests that the purpose of portals is to provide a focused resource to make the use of the internet more effective (cited in Di Paola and Teall 2007: 1161). One way of grouping information for users so that it is not only speedily accessible but also intelligible (i.e. in terms of the use/s to which it is to be put) is use of vertical or horizontal structuring (Eboueya and Uden 2007: 75). According to Eboueya and Uden, vertical portals give access to information (and services) dealing with a specific particular area of interest to the users; by contrast, horizontal portals (termed “megaportals”) are aimed at

the whole Internet community. This section briefly reviews some of the types of online portals currently available, and their uses. The following broad categories can be observed in the literature, although there may be some overlap in the actual examples:

- Online databases and data repositories (usually specific to a scientific study, field or area, e.g. the mouse genome);
- Museum or Fine Art repositories; and
- Educational sites, usually containing teaching/ learning objects. These range from the more general educational to portals dedicated to specific subject areas or disciplines.

*a. Online databases and data repositories*

These originated mostly as the result of specialist scientific research, which produced data which then could be disseminated more easily. They are, in a sense, curated, in that the data was selected. However, this was as a result of the initial researchers' aims, and not necessarily for a general audience. An example of one such research repository is provided by the MouseBook portal, which draws data from various independent sources, such as the United Kingdom based Medical Research Council in Harwell (Blake *et al.* 2009). The MouseBook portal integrates curated information from the MRC Harwell stock resource and other Harwell databases, with information from external data resources to provide value-added information above and beyond what is available through other routes such as International Mouse Stain Resource (IMSR). MouseBook can be searched either using an intuitive Google style free text search or using the Mammalian Phenotype (MP) ontology tree structure.

The infrastructure underlying MouseBook has been designed to be extensible, allowing additional data sources to be added and enabling other sites to make their data directly available through the MouseBook Project. Based on a Google style search engine, the search can reveal various genes or strain identifiers. The MouseBook portal is assisted through an automated process, similar to that used in the *Storytelling in an automated environment* project (Brenner and Mihalega 2006: 124). The use of this approach in the Biosciences

saw the development of many databases which are linked through computational access via web services. The data is subsequently organised as catalogues.

*b. Museum or Fine Art repositories*

The interview by Woodward (2013) with Bajac<sup>6</sup> illustrates the gradual transition of modern museums into their future role of collecting and collating image files designed specifically for websites. Woodward emphasises the vast number of images available, with almost 250 million photographs being posted on social media sites such as Facebook for permanent collection in the museum. This is one example of the overabundance of images which makes digital curation a prerequisite, in order to avoid “information overload” for those browsing such sites.

*c. Educational sites*

Curated portals may be linked not only to collections (e.g. museum or art), but also to curricula, as in the current project, which involves the development of a multimedia educational portal. Bates (2000: 40-42) suggests that multimedia technology affects both teaching and learning in three ways; presentation, interaction and structure. He points out that one of the least researched elements of multimedia is the impact on the “structure” or organisation of knowledge. According to Bates, one feature of good teachers is their ability to identify structures in what could otherwise be chaotic elements, the goal being to develop the ability in students to understand an area of study. He suggests that a multimedia lecture designed in the form of a CD-ROM or website, if structured well, can lead students to access information in a linear manner. Furthermore, teachers can share this “structuring” by providing links between sections of the CD-ROM or hypertext based websites. He concludes that the ideal future will be a balanced one in which teacher, the learner and technology will complement one another (Bates 2000: 41). However, a balance will need to be maintained between face-to-face and technology based learning. He cautions us that many skills cannot be learned solely through technology,

---

<sup>6</sup>At the time Bajac was the new curator at the Museum of Modern Art in New York.

although technology based education can be taught effectively. Bates' paper could be viewed as laying the foundation work for a curated portal where the content specialist will guide users through the portal to collate information from various resources, quickly and efficiently. Examples of exemplary educational sites which are already well established are the Athabasca site (Siemens 2013) and the Generic Learning Centre (Armitage and O'Leary 2003).

The World Wide Web gives educators and learners access to a wide variety of educational resources. This is true across all academic fields and areas, and thus the Internet has become a key tool for education. Yet these resources are often not interlinked in ways which would clarify relationships as to their applicability in real world situations. Woukeu *et al.* (2003) comment on the problems posed by variations in quality, as well as the issue of uncertainty as to the actual origin of various resources (i.e. their provenance). They identify the main problem as being weaknesses in linking the resources. This is because resources tend to be linked in ways which do not reflect their real life relationships so as to make these clear to users and facilitate information seeking. Traditional web portals do not address this problem, as they are uncomplicated groupings of links to online resources. Woukeu *et al.*, therefore, recommend that resources should be linked in more complex ways so that the subject domain becomes clearer, thus facilitating the sharing of knowledge with users. Wokeu *et al.* (2003: 4) also point out that traditional knowledge categories or disciplinary areas have not been widely used to group information in ways which might facilitate navigation in the design of educational systems. The contrast between the more or less random grouping of resources on the Internet and that afforded by the "meta layer" of ontological groupings is shown in Figure 2.1. One way of grouping information for users so that it is not only speedily accessible but also intelligible (i.e. in terms of the use/s to which it is to be put) is in terms of vertical or horizontal structuring (Eboueya and Uden 2007: 75). According to Eboueya and Uden, vertical portals give access to information (and services) dealing with a specific particular area of interest to the users; by contrast, horizontal portals (or "megaportals") are aimed at the whole Internet community.



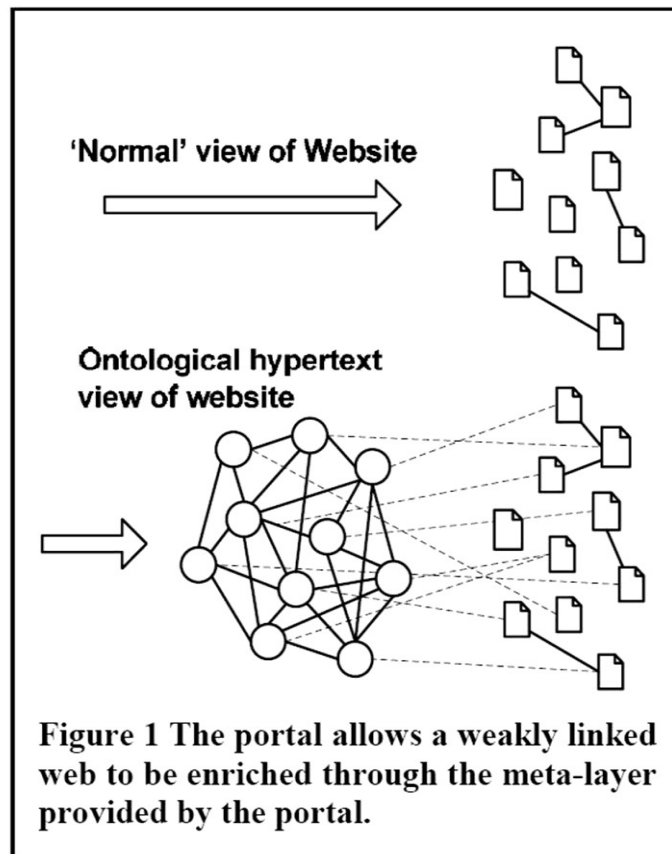


Figure 2.1 Contrast between random Internet groupings and those within a curated portal (Figure 1 in Woukeu *et al.* 2003: 350)

Sampson (2007: 376-377) identifies four key elements of web portals in terms of linking Internet content and making it accessible to users. These are content, design, personalization and community support. This means that the portal should be constructed so that it contains accurate, reliable information which is properly integrated; is easily navigated and updated with minimum disruption; can be adapted to the users' preferences and equipment; and contains the communication tools necessary to strengthen community bonding.

## 2.6 Curation of digital data

The overview of Internet portals (above) highlights the need for curation of digital data in terms of the vast resources on the Internet which are grouped on the whole randomly. The curation of scientific and research data is not a new

activity, but has only recently been applied to digital data, which means that the discipline of digital curation is still relatively new (Ball 2010: 4). However, this emerging discipline possesses a wealth of experience developed by various specialist practitioners in the field.

### **2.6.1 The definition of digital curation**

The term “digital curation” was first coined in 2001 at the *Digital Curation: Digital Archives, Libraries and Science Seminar* (Beagrie 2006: 4). The primary objective of the seminar was to bring together international speakers to discuss leading edge developments in the field of data curation and digital preservation. The existing use of the term curation was generally applicable to museums and libraries, and mostly represented physical artefacts. Laughton (2011: 37) explains that curation comes from the Latin word *curare*: “to care for”, and comments that a considerable amount of effort is usually required to capture data and regularly update it in databases. He also emphasises the fact that curation is necessary to ensure that the stored data is “fit for discovery and reuse” (2011: 37). According to Yakel (2007: 337), digital curation can be viewed as “the maintenance and adding of value to a trusted body of digital information (processed data) for future and current use”.

The new term “digital curation” incorporated aspects of the existing concepts “data curation” and “digital preservation”, the former being used by scientific communities, the latter by digital library communities (Beagrie 2006: 4). According to Beagrie (2006: 5), the term “digital curation” was used “to explicitly transfer existing curatorial approaches to digital collections, and also to highlight some of the changes that are needed in approaches to curation of digital as opposed to analogue artefacts”. In spite of the differences, it is easier to perform digital curation in data centres which have already been established for non-digital resources (Ball 2010: 4).

According to the “working definitions” provided by Lord and Macdonald (2003), the term “archiving” should be added to “curation” and “preservation” as one of the three “key terms” involved in data curation. Lord and Macdonald define these terms as follows:

**Curation:** The activity of managing and promoting the use of data from its point of creation, to ensure it is fit for contemporary purpose, and available for discovery and re-use. For dynamic datasets this may mean continuous enrichment or updating to keep it fit for purpose. Higher levels of curation will also involve maintaining links with annotation and with other published materials.

**Archiving:** A curation activity which ensures that data is properly selected, stored, can be accessed and that its logical and physical integrity is maintained over time, including security and authenticity.

**Preservation:** An activity within archiving in which specific items of data are maintained over time so that they can still be accessed and understood through changes in technology (2003: 12).

The term “data curation” has traditionally been used to refer mainly to document storage, but, as Ball (2010: 5) states: “in recent years there has been a tendency to treat data curation (documents) to the broader concept of digital curation which would include images, videos and audio”. Giaretta (2007: 2) suggests that the term “documents” should be broadened to refer to “rendered objects”, which would accommodate images, videos and audio digital objects.

One of the earliest systems of digital data curation is the Open Archival Information System (OAIS), which was developed by the Consultative Committee for Space Data Systems (CCSDS) in 1982. The primary aim was to standardise the functions of a digital archive. The standard achieved has now become accepted internationally as the ISO standard (ISO 14721: 2003) and is referred to as the “OAIS functional model”. In addition, the Metadata Encoding and Transmission Standard (METS) was designed to encode all varieties of digital objects within a digital library environment, such as texts, images, videos and audio (Kjeldskov 2013: 6-7).

Other models that subsequently emerged are the World Data Centre for Climate (WDCC) and the Digital Curation Centre. Academic studies by Raeburn (2008), Moore (2010) and Laughton (2011) have evaluated the OAIS reference model as a long-term digital preservation model. Locally, Maharaj, founder of Oval International colleges, produced an online interactive multimedia portal for the benefit of Grades 10-12 (Payet 2013: 15). Maharaj foresaw the calibre of

students entering tertiary institutions and designed the portal to improve the quality of matriculants. It took Maharaj two years to create the portal, which is now supported by more than fifty international bodies including universities, publishers and subject advisers.

### **2.6.2 The use of metadata in digital curation**

One of the challenges involved in portal design is the organising and storage of data within the Internet portal through the use of metadata (i.e. description of key details of the stored data). Minimally, metadata will ensure that no copyright laws are infringed. The practical implications are explained by Brenner and Mihalega (2006: 122-131), who introduce the topic of metadata by pointing out that mere keyword searching and uncomplicated browsing may not be immediately useful for many visitors. Their paper, entitled *Storytelling in an automated environment*, was based on a series of interactive web pages that would include “short narrative text to provide historical context” (2006: 124). The two year project involved collaboration of several institutions on the Pittsburgh Image Collections. Emphasis was placed on the building up of guidelines that included a display of images, secured coherently with a story. The investigation revealed the importance of appropriate design and the function of the pages with the inclusion of descriptive metadata. This provided a means of selecting comparable images from across numerous collections with similar terminology, and thus being able to accommodate ongoing additions.

## **2.7 The educational portal developed in this study**

Online educational portals fall within the category of educational sites, as the overview given above has suggested. The definition of educational portals provided by Di Paola and Teall is congruent with its use, as described in the DUT Photography Programme project:

Educational portals are Web portals designed to give users a resource for locating and navigating to Web-based resources that support educational endeavours. These resources may include links to Web pages and files with information provided for a specific educational exercise, links to external Web sites (Web sites that are not part of the educational portal), illustrations of concepts including animations, means for accessing software, communication tools, and

other electronic resources employed in teaching and learning (2007: 1161).

It can be seen that it is no longer an issue of creating subject content or designing e-learning courses (OCW concerns), as has been the focus at DUT since 2001 in the Pioneers Staff Induction Programme (Peté *et al.* 2002). It is now a matter of designing learning systems or structures using ICT to access, by means of a curated portal, subject content already freely available online. This is just as much a “pioneering” endeavour as that carried out in the Centre for Higher Educational Development (now the Centre for Excellence in Learning and Teaching) Pioneers Induction.

In order to be clear about the nature of the introduction of an educational portal as a multimedia resource into the DUT Photography Programme, an attempt was made to conceptualise it as follows. It was found that there were three main strands in the development of the online educational portal, which, in a sense, constitutes a “semantic web” (World Wide Web Consortium 2011: [1]). The semantic web provides a common framework that allows data to be shared and reused across application, enterprise, and community boundaries. Figure 2.2 depicts the envisaged online educational portal as a semantic web created (and curated) by the lecturer-researcher, made possible by the state of development reached by the Internet, and containing resources for Photography as subject content of an academic programme.

As Figure 2.2 suggests, there are three strands in the development of the online educational portal described in this study:

- developments in the technology of the Internet which have made the online educational portal possible in its current form (see Appendix A);
- developments in the field of photography which have impacted on the ways in which its theory and application are learned (see Appendix B); and
- the teaching/communication skills of the curator of the online educational portal.

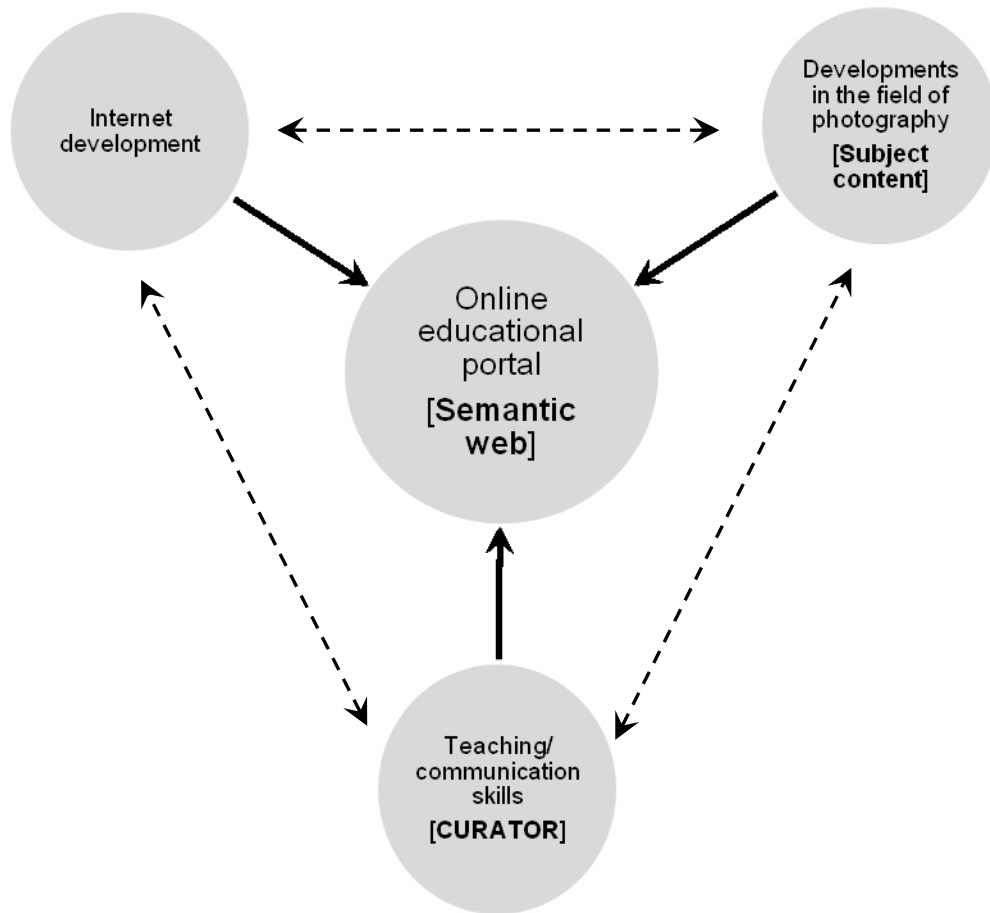


Figure 2.2 The online educational portal as semantic web

The first strand is critical for the project involved in this study, as the historical “wave” of change transforming the social structure of teaching/learning with the advent of computers and the Internet has come to the point of optimum conditions for a change to multimedia learning, as will be discussed in Chapter 4, when dealing with the morphogenetic approach. The proposed multimedia portal is then not just a “bandage” to patch up a specific teaching/learning problem, but part of a wider historical phase of overall educational change towards accessing online multimedia on computers or mobile devices. The second strand emphasises the digital nature of photography today, requiring more sophisticated methods and media for learning. The third strand includes not only the computer mediated learning techniques discussed in this chapter, but also traditional offline method. The online educational portal is not meant to

replace face-to-face tuition but to supplement it. The dotted lines in Figure 2.2 illustrate the inter-connectedness of these strands. Advances in digital technology have fed into Photography and vice versa, and both have impacted (and have been impacted upon) by learning techniques, whether online or offline.

While they are prerequisites for such a project, the actual developments in the technology of the Internet (strand 1) and photography (strand 2), which have made the online educational portal possible in its current form, will be dealt with in Appendix A and B, respectively. This has been done to separate the historical account of their complex, layered development from the implications for teaching and learning (i.e. strand 3), which have been argued in this chapter. As Bax (2003: 14) points out, an account of the development of computer mediated learning “needs to be more than a mere recounting of supposed facts concerning software and hardware developments”.

In spite of the level of sophistication of digital multimedia and ICT, it is the *curator* who is the creator of the semantic web, not the technology of the Internet. This is because technology is not yet capable of replicating the complex choices made by a human instructor, nor can it replicate the complex forms of human interaction involved in the learning process. In fact, as the section above has indicated, technology can become a barrier as well as a means of access to learning resources in terms of the huge volume of resources available online.

The literature reviewed in this chapter has laid the foundation for the use of either hybrid lectures and/or after hours support provided by curated digital resources. The need for content curators has also emerged, in order to ensure that the educational resources provided are usable, organised, current, and relevant to the instructional programme. An ongoing preoccupation will be to ensure that usability is uniform and that the curated data relates to real world objects on the students’ syllabus. The portal facility will allow the students to start off their research from a single database, then move through an unending

set of hyperlinked and prescribed databases, including adequate metadata and ultimately reducing valuable time spent on irrelevant Internet searches.

## **2.8 Conclusion**

In Chapter 1, it was stated that the general aim of the research was to design and test out with DUT staff and students an online multimedia portal containing resources to be used to facilitate teaching and learning in the Photography Programme at DUT. Due to the rapidly changing nature of digital photography (Morrison 2012), and the fact that technology is acknowledged to drive the Photography curriculum (Council on Higher Education 2014), a curated Internet portal is thought to offer the best way to:

- assist lecturers, as well as students, to keep up with innovations (as will be shown in the empirical work); and
- reconcile the lecturers' lack of digital and ICT technical expertise with students' reasonable expectations of mastering cutting edge technology ("reasonable" in terms of Industry requirements).

The literature reviewed suggests that the curated Internet portal option chosen would be the most suitable option for the following reasons:

1. A curated portal designed with vertical structure would be the most accessible option for staff and students in terms of ease and speed of access to specialist disciplinary knowledge.
2. The vertical structure would make sense of not only the disciplinary hierarchy but also its structure as a programme in a specific university curriculum.
3. Resources are either contributed locally by faculty or freely available from other institutions (i.e. in terms of the Academic Commons Attributions).
4. Faculty support is available in terms of lecturer engagement and interaction.



5. A specific individual course (i.e. an OCW course) would not be suitable as it would not accommodate lecturer pedagogical preferences or individual teaching styles (the portal option allows greater flexibility of use in a university setting where academic autonomy is valued).
6. A specific individual course (i.e. OCW or set course) does not cater for students' different levels of ability or preparedness, or individual learning styles.
7. Subject content is more quickly revised and updated and reconfigured for use on an Internet portal with resources than on a set course.
8. If the artefact is ultimately to become an open course for lifelong learning both in the community and globally, the Internet portal option is a more flexible option for accommodating individual learning needs.

This study reflects an institutional shift of focus. An early preoccupation in DUT staff induction to e-learning was with this issue: "How do we design online learning programmes?" This focus has changed to: "How do we manage online multimedia resources?" This study is also in line with the emerging trend towards posting open educational resources online noted by Hodgkinson-Williams (2010: 6). This study also follows Hodgkinson-Williams' (2010: 7) example in using Archer's realist social theory in understanding the emergence of online educational resources. A considerable body of literature has emerged using Archer's morphogenetic theory in information system (IS) and ICT research (as explored in Chapter 3). However, so far only two examples of Archer's theory being applied to actual e-learning applications have been found, in studies carried out by DUT staff members, Gutteridge (2009) and Reddy (2014). The next two chapters will explore the critical realist orientation (Chapter 3) and Archer's morphogenetic theory (Chapter 4).

## **CHAPTER 3: RESEARCH ORIENTATION**

### **3.1 Introduction**

This chapter first gives an overview of the critical realist orientation, explaining the historical origins of the term “critical realism” and its philosophical basis. Next, some of the key terms and concepts are explained, including the realist definition of social structure, which is observable only in social human interactions, but which is considered by proponents such as Bhaskar and Archer as crucial in explaining both society and human social behaviour. This leads on to a discussion of the application of critical realism in social science research in general, and in this study in particular. The researcher’s rationale for using a critical realist approach is then discussed, based on its use in ICT research, as well as being congruent with the researcher’s own beliefs and values. The chapter concludes by showing how the critical realist approach informed curriculum renewal in the Photography Programme.

### **3.2 Overview of critical realism**

The British philosopher, Roy Bhaskar, is best known as a significant proponent of the philosophical development of critical realism (1978, 1989, 1994, 1998b). Bhaskar’s approach emphasizes the importance of distinguishing between epistemological and ontological issues. His work has been supported and extended by other contributors, notably Rom Harré (1979, 1986) and Margaret Archer (1982, 1995, 1998b, 2010). Bhaskar’s philosophy has been criticised for providing the broad basis only for investigation without giving the specific research methods to be used. However, it has been hailed as the “underlabourer”, or meta-theory which clears the way for more specific disciplinary approaches (Dobson 2012: 66-76), the latter being categorised as “substantive theories” (Mutch 2010: 507).

Mutch identifies Archer’s (1995) work on the morphogenetic approach (discussed in Chapter 4) as one such substantive theory which has been developed in order to show how Bhaskar’s philosophy could be applied to

specific investigations in Social Science. The development of such substantive theories is necessary, as critical realism does not deal much with methodological matters (Alvesson and Sköldberg 2009: 43). As an overarching philosophy, it cannot determine how the investigation of structures and mechanisms should take place in specific studies, but provides a general frame of reference only (Alvesson and Sköldberg 2009: 44). Bhaskar (2010: 18) himself refers to critical realism as “the philosophy of meta-Reality” to support research. The term “critical realism”<sup>7</sup> was not initially used by Bhaskar, who used the term “transcendental realism” to reflect explicitly its Kantian heritage as applied to the philosophy of science, and “critical naturalism” when extending his work into the social sciences (Jefferies 2011: 4). According to Jefferies, the main difference between Kant’s and Bhaskar’s perspectives is that Bhaskar asserts the existence of structures and mechanisms which are not an accessible part of human knowledge.

Bhaskar’s main contribution is considered to be his work on ontology, which shows reality as operating at three different dimensions, namely, the domain of real, the domain of actual and the domain of empirical (see Table 3.1).

Table 3.1 Bhaskar’s three domains (1978: 56)

	Domain of Real	Domain of Actual	Domain of Empirical
<b>Mechanisms</b>	√		
<b>Events</b>	√	√	
<b>Experiences</b>	√	√	√

Table 3.1 provides the ontological assumptions of Bhaskar’s critical realism by showing the domains in which mechanisms, events, and experiences are situated (Carlsson 2003a: 12). The domain of real should not be viewed as necessarily containing material objects. According to Kaboub (2001: 1), the

<sup>7</sup> The doctrine of an earlier independent, but relatively short-lived realist approach, “American critical realism” (Bisman 2010: 8), is described in some detail in the work of Drake *et al.* (1920). The earlier approach shared affinities with Bhaskar’s critical realism, notably in pre-empting concepts such as transitive/intransitive dimensions, the epistemic fallacy, and the notion that things have “essences” which are not directly observable. However, according to Verstegen (2000), this approach was not followed up by Bhaskar or his supporters.

critical realist ontology holds that an entity is real if it can cause observable consequences: “In other words, in critical realism something is real if it is casually efficacious (e.g. unemployment, a magnetic field, poverty)”. The ontology represented in Table 3.1 shows that, while experience is a “real” phenomenon, the residue of such experiences exists only in the “domain of empirical”. Moreover, our perceptions of events (i.e. our “experiences”) are often “out of phase” with the real structures causing these events (Bhaskar 1978: 2). This means that we are not likely to perceive clearly the deep level causes (i.e. mechanisms), but only the surface occurrence of the events they bring about.

### **3.3 Key Concepts in critical realism**

The key concepts in Bhaskar’s philosophy can be seen to arise from his unique conceptualizing of reality in a tripartite ontology, and, in particular, the distinction he draws between ontology and epistemology (Bhaskar, 2010: 1). As will be discussed in more detail below, the following are all related to the central issue of “re-thematising ontology” (Norris 1999: [1]):

- separation of ontology/epistemology;
- transitivity/intransitivity;
- stratification;
- mechanisms;
- emergent properties; and
- social structures

#### **3.3.1 Separation of ontology and epistemology**

The epistemic fallacy refers to the tendency to conflate ontology with epistemology (Bhaskar 1998a: xii). In critical realist terms, ontology is distinct from epistemology and cannot be reduced to it (Bhaskar 2010: 1). It is, in fact, the interest in the operation of mechanisms at a deeper level than what is superficially observable which sets critical realism apart from other orientations (Alvesson and Sköldbberg 2009: 40). Critical realists do not believe that it is possible to reduce the world only to objects and facts which are observable (as

in the positivist tradition), which brings us to the next key concept, that of transitivity/intransitivity.

### **3.3.2 Transitivity/intransitivity**

The transitive dimension refers to the object of thought, while the intransitive dimension refers to a reality which exists independently of thought. For critical realists, reality exists independently of researchers' ideas and descriptions of it (Jefferies 2011: 4). Critical realists thus emphasize reality as being distinct from conceptions of it (Alvesson and Sköldbberg 2009: 41). Bhaskar (2010: 1) sees his ontology as "the necessity, accordingly, to think science in terms of two dimensions, the intransitive dimension of the being of objects of scientific investigation and the transitive dimension of socially produced knowledge of them". This is in contrast to social constructionism, which conflates social phenomena with our perceptions of these (Alvesson and Sköldbberg 2009: 41). As real structures have an existence which is independent of our perceptions of these (Bhaskar 1978: 2), our experiences may reflect very little - and thus explain very little - of the total reality. In particular, they may not reflect unseen aspects, such as the mechanisms which are hypothesised as causing events.

### **3.3.3 Stratification**

Stratification, or layering from less complex levels to more complex ones, is a common theme in critical realism. According to Irwin (1997: [7]), "stratification is associated with a vertical analogy Bhaskar deploys throughout his works and is related to causal structure". It can be seen that Bhaskar's ontology itself is stratified, ranging from the surface view shown in the domain of empirical to the deep-structure view offered in the domain of real (Palermo 2003: 405; Dobson 2012: 63-81). Bhaskar (2008: 160) also shows how the inquiry process can be stratified, with the surface layer containing formulaic expressions, and deeper layers showing a more complex theoretical level.

### **3.3.4 Mechanisms**

Mechanisms are the unseen forces which cause events to occur and are apparent only in their effects: their existence is "real" but can be hypothesised only. Bhaskar (1989: 187) defines generative mechanisms as "the ways of

acting of a thing". The term is by no means clearly defined, however: Mahoney (2003:14-15) lists twenty-seven different definitions of a social mechanism in its use in social science. According to Pratt and Gutteridge (2006: 4): "Bhaskar appears to be talking about the formal aspect - or system of relations - of a mechanism only (see Franck, 2002: 234) rather than its applied aspect (i.e. an event or thing)". Danermark (2001: 4) stresses this formal aspect, claiming that generative mechanisms, in fact, constitute the "regularity" involved in producing events.

### **3.3.5 Emergent properties**

Bhaskar's ontology shows reality as being complex, dynamic and as having emergent properties. Alvesson and Sköldberg (2009) make the following points:

- Complex relations are involved in the operation of mechanisms.
- Causality may exist on many different levels.
- Mechanisms generate tendencies rather than predicting universal conditions.

They add that mechanisms may be examined in terms of:

- their different effects and events;
- the forces and characteristics produced; and
- the complex connections between different levels (2009: 42).

Examining the features which give causality its complexity makes it possible to isolate the factors involved. Alvesson and Sköldberg (2009: 42) conclude: "Causality should thus not be understood in terms of universal, predictable patterns, but rather as contextual and emergent, in changeable societies". Thus, while social reality may be slow to change, it is still "emergent and varied" as a result of the complex, diverse processes whereby it is produced.

### **3.3.6 Social structure**

Social structure is a central concept in sociology and yet there is considerable disagreement about what it actually means (Porpora 1998: 339). Bhaskar

himself admits that, in *The possibility of naturalism*, he used the term social structure in a “doubly ambiguous” way. This is because social structure is used “to refer to both the abstract form or type and the particular concrete instantiation or token of it” (Bhaskar 1998b: 187). Bhaskar also admits to having shown a tendency to use the terms “structure” and “generative mechanism” synonymously. Social structure itself is clearly “a causal mechanism constituted by relationships among social positions that accounts for social phenomena in terms of tendencies, strains and forces inherent in the nexus of those relationships” (Porpora 1998: 343). However, as Manicas (1998) explains, social structure has a different kind of existence from the laws governing the natural sciences. This is because society exists only in the “practices and products” of the people comprising it, and can be perceived only in its activities and products: “It is medium and product, enabling as well as constraining” (Manicas 1998: 318). Thus social structure becomes observable only in the social interactions of individuals, to whom it offers various positions and practices (Bhaskar 1998c: 221), in that sense motivating, enabling and constraining social behaviour.

The relationship between culture, social structure and human agency is complex. Vandenberghe (2003: 231), commenting on Archer’s work, states that, while cultural systems can influence - and be influenced by - social structures, this happens indirectly through the various constraints and enablements put in place. Moreover, this process is affected by the social position of the agents involved, and their projects, in a kind of probable causality only. Competing groups act to protect their vested interests and to achieve their desired ends. In so doing, they transform or reproduce the actual structural and cultural influences which affect their actions. However, as Vandenberghe explains, in this process they themselves are being transformed from agents whose actions are initially driven involuntarily by their placement, into actors and individuals who are able to re-define their roles and experience personal development. Archer (1995: 186) terms this process “double morphogenesis”.

### 3.4 Critical realism in social science research

Critical realism differs from positivist and constructivist approaches to social science research in distinguishing between “ontological realism and epistemological fallibility” (Luckett 2007: 5). According to Luckett, Bhaskar confirms our “common sense experience” of an external world comprising intransitive entities which exist independently of our knowledge of it. Our knowledge of that external world is, however, tentative and open to revision, and thus knowledge is transitive. Baëhr (1990: 7) acknowledges the role of critical realism in helping to guide empirical investigations into the structures which generate social phenomena. Archer *et al.* (1998: 12) describe critical realism as “an elaboration of a philosophically informed ontology, which can help students and researchers produce empirically grounded knowledge”. According to Archer *et al.* (1998: 1), critical realism helps to build up an explanation that deals with the real issues and provides useful starting points for researchers in conceptualising their studies and setting up productive and valuable research designs.

Carlsson (2003b: [1]) describes critical realism as “starting from an ontology that identifies structures and mechanisms through which they are generated as being fundamental to the constitution of our natural and social reality”. He stresses the role of critical realism as the underpinning philosophy for realistic Information System evaluation research. Carlsson’s work has been advocated by Hill (2009) as part of the latter’s Design Science business model to correct defects in customer information. While offering a more “scientific” stance to research in the social sciences, critical realism recognises the importance of the meanings ascribed by individuals, and attempts to incorporate these into research (Hill 2009: 28 citing Layder, 1993). Carlsson (2003a: 12) states that critical realism assists us to identify the “events and discourses” of society, which enables us to understand and thus be able to change the social world. He emphasises Bhaskar’s (1978: 2) point that the observable patterns in events do not immediately reveal the structures at work, which can be identified only through theoretical and empirical research. The advantage of using a critical realist research approach is that it can provide us with as an alternative



framework for “transforming undesirable social realities” (Egbo 2005: 267). Social transformation is seen as an “essential outcome” of social science research and emphasises the importance of agency.

According to Archer (1982: 464-471), social structure and agency are the key to understanding society and are thus important in social science research. This is because social structure has a real (though unseen) existence (i.e. it is intransitive) as a powerful mechanism which can lead to both stasis and/or transformation in terms of its emergent properties. While set in place by the activities of the “long dead” Archer (1995: 143), social structure resists individual attempts at change, but can transform rapidly in response to materially changed situations (e.g. the advent of computers and the Internet). Archer’s morphogenetic theory relating to social structure and change will be discussed in more detail in Chapter 4.

While critical realism is a philosophy, it stresses the need for empirical inquiry to confirm the hypothetical workings of the universe. Ibn al Haytham,<sup>8</sup> who invented the first Camera Obscura or the pinhole camera (Vallely 2006: [1]), is credited with being the first man to shift physics from a philosophical activity to an experimental one. He issued several statements on the growth of scientific knowledge (Sabra 2003: 2). According to Sabra (2003), Haytham saw the necessity of rigorously interrogating the “truth” in terms of divesting basic precepts of the human bias which meant that the reality was “immersed in uncertainties”. This is in much the same way that Bhaskar distinguishes between the intransitive real-world and transitive knowledge of it. Haytham’s preoccupation with a rigorous scientific approach, which critically interrogates findings, is echoed centuries later in the critical realist orientation:

Thus the duty of the man who investigates the writings of scientists, if learning the truth is his goal, is to make himself an enemy of all that he reads, and, applying his mind to the core and margins of its content, attack it from every side. He should also suspect himself as

---

<sup>8</sup> A 10<sup>th</sup> century mathematician involved with astronomy in the Middle East and Asia.

he performs his critical examination of it, so that he may avoid falling into either prejudice or leniency” (Haytham cited in Sabra, 2003: 2).

### **3.5 Rationale for choosing critical realism as research orientation**

There were two main reasons for the researcher for using critical realism as the research orientation for this project:

- The critical realist principle emphasising the importance of practical application of theory to improve the quality of life in specific contexts, as well as its emphasis of causality.
- The realisation that a technical solution to a pedagogical problem needed to take into consideration the social context in which it is applied.

#### **3.5.1 The critical realist principle of practical application of theory**

The approach of using critical realism as a scientific and technology option in the classroom was envisaged in the context of a multi campus, multicultural UoT with the majority of English Second Language students. The realist approach was adopted in an attempt to fast track teaching and learning in the Photography Programme by means of an educational Internet portal. It was thought that the timing was right. A survey published in the *Daily News*, 30 November 2012, reported that profiles of Internet users were changing, and that the web was being used for social networks, employment and information. According to Barbeau (2012), South Africa’s fixed-line communication infrastructure was not a deterrent. People were gaining Internet access through mobile phones, and through computers in secondary and tertiary institutions as well as in Internet cafés (Barbeau 2012: 8).

Evidence from this investigation revealed that first-year photography students preferred the use of technology in a real-life classroom situation using hybrid technologies than mere Internet instruction. This preference emerged during the Photography Student Feedback (Student Survey 2011: 6). Students’ views suggest that attending a resident university is starting to appear more as a correspondence college course. The students’ comments also imply that the

goal of online or the Internet based lectures is to make the academics' task easier, with a corresponding decrease in personal delivery and live communications. This is by no means the case: proactive academics regularly seek various means other than the Internet to sustain student interest in the classroom and improve lecture delivery methods.

### **3.5.2 Use of technology to solve a social problem**

A lifetime use and love of visual communication technology prompted the researcher to use technology-assisted learning, that is, e-learning, to solve a social (i.e. pedagogical) problem. As evident from Chapter 2, use of ICT in education is very much dependent on the social context, the different groups involved and their various projects and desired outcomes. This is also apparent in the review of the literature given in Chapter 2, and further reading helped to explain the essentially social nature of technology.

According to Lawson (2007: 9), technical activity is “activity undertaken to harness the intrinsic powers of material artefacts in order to extend human capabilities”. He suggests that technical objects are “social” in two ways:

1. They are imprinted with the values and intentions of their human designers, which translate the social into material form. This means that the social achieves a different mode of existence by virtue of being captured in material objects (2007:5).
2. They are included in existing social relationships in ways which transform the nature of these relationships (2007: 6).

Aunger (2010: 782) describes technology is an “evolutionary phenomenon” in which the evolution of highly complex artefacts has taken place through a sequence of developments over wide eras of time. This suggests that technology does not just involve incidental and occasional use of artefacts as optional “add ons”, but has become an intrinsic part of human nature (Aunger 2010: 779). Complex developments, such as the World Wide Web, represent a final development, or culmination of modern day developments, in which different categories of technological products have become interconnected. It is

difficult to characterise the nature of techno-systems such as the Internet, as they share the following characteristics (Aunger, 2010: 775), that is, they:

- have developed over historical periods of time;
- are “embedded” in existing configurations of artefacts; and
- they possess very different components at various levels.

Techno-systems such as the Internet can be used more effectively for learning/teaching if the artefacts embedded in them - or the role/s they play - are integrated into the social structure of learning/teaching in that specific educational context. Pratt (2013) suggests that Fleetwood’s (2005: 3) categorisation of artefacts as having a material, ideal and social reality can be used to integrate artefacts such as computers and the Internet into the social structure of learning/teaching in specific educational contexts. She suggests a threefold pedagogical strategy, involving:

- the material presence of computers and access to the Internet during course delivery;
- the use of these in actual learner group interactions (i.e. in a blended learning approach); and
- the conceptualising of these artefacts as appropriate for the purposes of the given learning situation (Pratt 2013: 859-860).

While the concept of social structure has been introduced in this chapter, it is explored in more detail in terms of its use by ICT/IS researchers in Chapter 4.

### **3.6 Critical realist research into use of ICT/IS**

There is a growing realisation amongst ICT researchers that computer systems are not “closed systems” (Hill 2009: 127), and that even though they possess a “material reality”, they are designed for and used in social systems, and thus become part of the relations in various social structures (Dobson 2012: 67-68). According to Dobson (2012: 75), computer systems which are too narrowly conceived can cause rigid allocations of power and unequal access to resources; on the other hand, people can use programs in ways in which they were not designed for or even thought of. For example, at DUT, the Research

Information Management System (RIMS) is being piloted as a database of output use for Higher Degree tracking system, using forms which can be entered online (Sokufudumala 2012: [1]).

As Mutch states: “critical realism does not offer a ready-made ‘tool-kit’ of concepts but rather a set of resources for the development of domain specific concepts” (2010: 517, citing Cruickshank 2003 as the source). Mutch discusses the relevance of Archer’s morphogenetic approach, derived from the philosophy of critical realism, for research into the use of information and communication technology in organisations. According to Mutch (2010:517), Archer’s morphogenetic approach can assist to show the role played by organizations and technology in organizational analysis. This process requires theoretical insights as well as empirical work.

The critical realist approach has also been used in the context of using information and communication technology (ICT) in teaching and learning:

In an eLearning environment critical realism aims to expose the working of the processes with which the *actors* must engage. The researcher, then, seeks to determine what works best for whom in which environment, the designer implements (builds) the suggestions (hypotheses), while the learner interacts with the course as an eLearning environment (Gutteridge 2006: 59).

Gutteridge (2009: 70) suggests that a central feature, when applying critical realism in an ICT setting, is that an understanding of the underlying mechanisms allows a researcher to work towards transformation.

Carlsson (2003a) discusses the application of critical realism for the evaluation of an information system (IS). His research involved investigating the potential of applying a realist approach to IS evaluation in organisations, and establishing the various mechanisms available for overcoming any problems identified. Hill’s (2009: 33) organisational inquiry employed the design science artefact presented by Hevner *et al.* (2004: 83) as a business model to correct defects in customer information.

According to Horrocks (2009), a large number of informatisation studies continued to focus on the relationship between technology and institutional and organisational structures and policies, and the computerisation of government facilities. For this reason, in spite of Horrocks' suggestion that the abbreviations IS and ICT can be used synonymously, he chose to use the former, as IS research was already showing evidence of being influenced "by theories of the social construction of technology" (2009: 39). In this respect, Horrocks makes particular reference to Orlikowski (1992), who provides a theoretical framework in which information technology is used in organisations as part of a socio-technological phenomenon. This was because Orlikowski (1992: 404-405) saw that use of ICT involved the application of computer technology as deployed within organisations to mediate human work tasks, and not merely as a collection of inanimate artefacts. Orlikowski's structuration theory (see Figure 3.1) describes technology as a product of human action which both constrains and enables social practices, as well as reflecting and influencing the institutional properties of organisations.

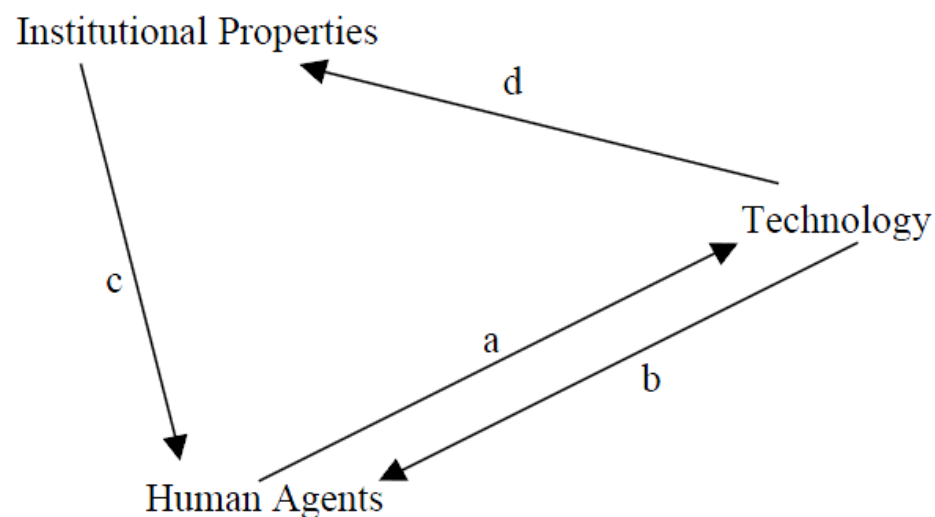


Figure 3.1 Structurational model of technology (Orlikowski 1992: 410)

A study by Carlsson (2003b) supports Orlikowski's (1992) work on applying structuration theory to the use and development of IS in organisations. Carlsson investigated the potential of applying a realist approach to IS evaluation in organisations and establishing the various mechanisms available for overcoming any problems identified. This work emphasises the relationship between technology, human agents and institutional characteristics, as suggested by Orlikowski's structuration theory.

While Horrocks (2009) focuses on the changes in organizations brought about by implementation of ICT, Njihia (2008) stresses the point that implementation of ICT needs to be geared to the context in which it is to operate. This might require changes or adaptations in the actual technology, rather than vice versa. While Njihia is referring to developing countries, it can be seen that, even in "First World" contexts, where advanced ICT is a given, implementation of ICT needs to be context-specific in terms of being adapted to the situation in which it is to be used. For example, mobile phone providers need to plan technical developments carefully to recapture old markets or make inroads into new ones which are already highly contested by competitors (see LaFraniere 2005: 3; and the acquisition by Microsoft of the Nokia mobile business, in Wingfield 2013: 1).

According to Njihia (2008: 1-2), in developing countries features of the local context make successful implementation of ICT technology unpredictable. The outcome can be affected not only by poverty and other problems experienced by indigenous people, but also by contextual factors such as relations between overseas donors and local governments, as well as the effects of what he terms "grand corruption" (Njihia, 2008: 2). Moreover, Njihia comments that, in developing countries, staff members responsible for overseeing successful implementation may well be excluded from key strategic decisions while ICT projects are being conceptualised and designed. Njihia's study suggests that social context is so significant a factor when introducing ICT in developing countries that ICT should be reconceptualised as "Information and Communication Technologies for Development (ICT4D)" (2008: 1).

Like Horrocks, Njihia used a morphogenetic approach in an attempt to understand the overall structural implications of ICT4D and to link these to specific social contexts and outcomes. However, while Horrocks' research took the form of a longitudinal case study in a (mainly) monocultural First World setting, Njihia used Q-Factor analysis to arrive at the "discursive environment" underpinning the implementation of e-governance in a developing country with a multicultural mix. Njihia's (2008: xv) findings suggest "an alternative approach to strategy analysis in situations of rapid political and institutional change", using "political leaders and development agencies as mediators and interpreters of the strategic context". Horrocks' (2009: 60-61) case study approach produced "a detailed and nuanced analytical narrative was produced of the history of 'where, when, who and how', as Archer aptly puts it, of a range of examples of IS development and organisational change".

### **3.7 Curriculum transformation reflecting realist principles**

This project exemplifies the kind of transformation through practical application of scientific principles – with the end results being improved or simplified technology – which is inherent in Bhaskar's critical realist philosophy. It is an example of how individuals (e.g. managers, researchers, staff and students) can become part of a powerful human agency in triggering social change. The actual resources mentioned in the projects might be invaluable to DUT's own Photography Programme, especially in terms of the Amnesty International curriculum guide (Garvie, Khemchandani and Robinson 2007). The curriculum guide could be used as a hypertext resource to assist with improving writing and analysis skills, especially with ESL students.

As a starting point for the proposed curriculum transformation for the Photography Programme at DUT, the researcher's master's study revealed the following (Bhorat 2006):

- Multimedia communication at DUT existed in a limited manner.
- It could become effective if a multimedia policy was implemented.



- It was established that adequate training was lacking in the preparation and use of multimedia.
- A new in-house digital multimedia production facility was necessary.

Based on the researcher's prior research into DUT multimedia needs, there was sufficient motivation for the investigation and design of a curated online multimedia portal for DUT. It must be noted that the new investigation is not a replica or clone of establishing a multimedia production facility, but rather an osmotic process of developing a curated online technological model/artefact which will see the co-ordination and facilitation of specially designed multimedia communication via the Internet and administered by the researcher. The critical realist philosophy is particularly appropriate for this project, as it emphasises the practical application of theory. In this case, the artefact (multimedia portal) is "real" (Fleetwood 2005: 199) and offers a feasible alternative for promoting learning which addresses the causes of the problem in ways which the methods already in use do not.

### **3.8 Conclusion**

This research project is concerned with developing a model for an online multimedia portal, with the emphasis on producing an artefact that is useful to staff and students at a UoT. Critical realism provides an overview which is both philosophical and practical, and, as such, is congruent with the researcher's own beliefs and values. Critical realism is philosophical in exploring the nature of the world and its complex systems, yet practical in insisting that the causes of things can be fathomed in order to suggest workable solutions to immediate social problems. Based on these understandings, one needs to recognise existing problems, identify established structures, work within constraints and gradually evolve a model into a user-friendly artefact. While Bhaskar has been criticised for being vague about the specific methodologies to be used in different disciplines, his focus was on ontology, or the nature of being, leaving it up to individual researchers in the disciplines to forge their own field-specific methodologies. The next chapter provides an account of the methodology used in this study, based on Archer's (1995) substantive theory of morphogenesis.

## **CHAPTER 4: METHODOLOGY**

### **4.1 Introduction**

Chapter 4 gives an account of the research methodology used, namely, Archer's (1995) morphogenetic approach, and shows how it has been applied in this study. Firstly an overview is given of the layers of stratification involved in the methodology, namely, Archer's morphogenetic cycle, and its use in innovation development and artefact design. Archer's morphogenetic action research cycle is then discussed in more detail. It will be shown how it differs from other forms of action research, and how it can facilitate transformation in education by focusing on the various factors involved in morphostasis (social reproduction) and morphogenesis (social elaboration). Morphogenesis involves introducing changes into the social structure which have the potential to facilitate transformation. Next, Wong's (2005) adaptation of the morphogenetic cycle for innovation development will be described in terms of introducing the innovation of the multimedia portal. The model of artefact design used (Hevner *et al.* 2004) will be shown to have commonalities with the elements involved in both Archer's and Wong's models, illustrating how elements of artefact design are relevant to the critical realist approach adopted in this study. Finally, the methods used to gather data will be described.

### **4.2 Levels of stratification in the methodology**

There are levels of stratification involved in the research methodology (see Figure 4.1). Archer's morphogenetic action research cycle is the broader methodology used in this study. Nested within this overall methodology are the subsets of innovation development and artefact design. As can be seen in Figure 4.1, there are common elements at each level. The adaptation of Archer's morphogenetic action research cycle for innovation development was supplied by Wong (2005), and the model of artefact design was constructed by Hevner *et al.* (2004: 80). While the approach of Hevner *et al.* is positivist, it shares common features with both Archer's and Wong's models. As it operates

at the level of specific methods used, the model of artefact design can be used within a critical realist approach (see Hill 2009).

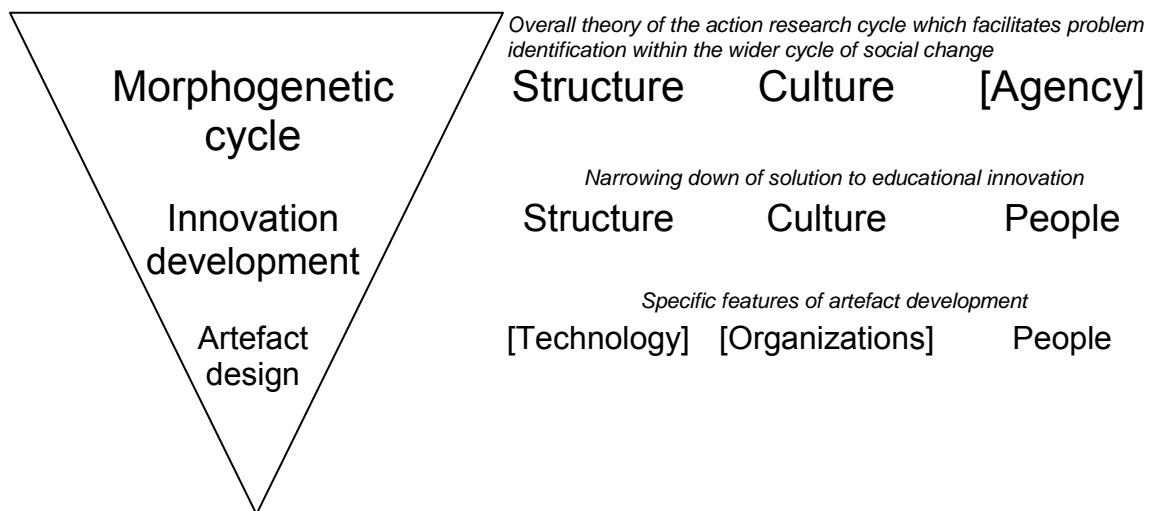


Figure 4.1 Levels of stratification in the methodology

#### 4.2.1 The morphogenetic cycle

At the widest level, the morphogenetic cycle refers to the whole historical “wave” of change transforming the social structure of education with the advent of computers and the Internet on a historical scale, as shown in Appendix A (as summarised in Figure 4.2).

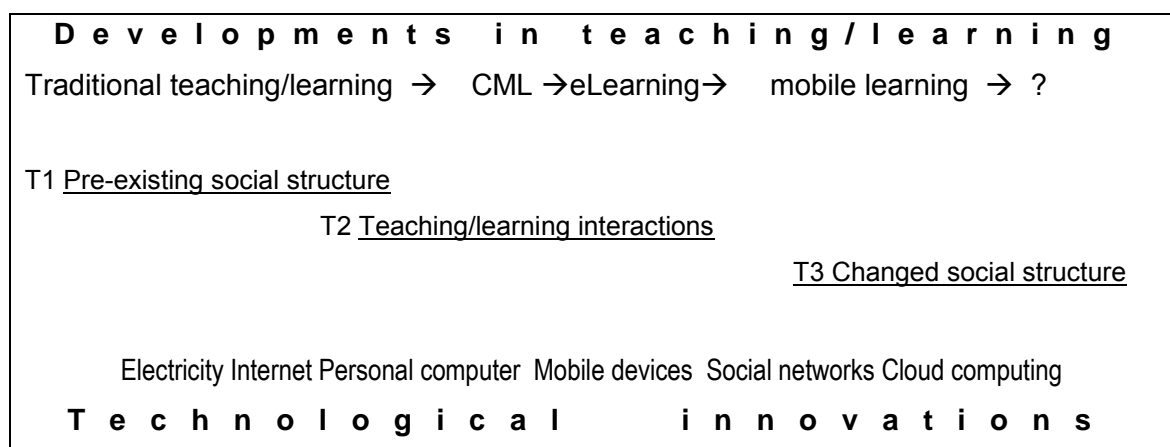


Figure 4.2 Timeline of the wider cycle involved in educational innovation

This study thus takes place at a critical stage where digital multimedia are being introduced into academic programmes, which is even more urgent in the DUT academic context, where many students are under-prepared and from newly literate communities, yet very much technology-literate (e.g. in being familiar with cell phones, Facebook/Twitter, iPads).

#### **4.2.2 Innovation development**

At this level, the issue was what form the innovation (i.e. using digital resources for learning) should take. In this case, the innovation was designed to address a specific problem and cater for an urgent pedagogical need (see Chapter 5). It also, however, went further than a specific solution in providing curated resources for a department in a way which modelled that facility for other departments.

#### **4.2.3 Artefact design**

The artefact took the form of a curated digital multimedia portal which both offered online resources and modelled teaching skills. Artefact design, piloting and modification took place within a smaller action research cycle within the larger cycle of transforming social structure. It can still be termed “morphogenetic” in the sense of contributing to the combined efforts of the “agency” of Internet resource providers, culminating in the “rich media” available online today. Highlighted in Table 4.1 are the similarities subsumed under the main headings used by Hevner *et al.* (i.e. for artefact design), as given in Figure 4.1.

The levels of stratification in the methodology became apparent over time, and the need for innovation, in the form of digital artefact, emerged in response to findings at various phases on the action research cycle. These findings will be discussed in Chapters 5 and 6. The methodology will be presented so as to fit within the levels of stratification shown in Figure 4.1. Firstly, the rationale for using a morphogenetic approach will be given. The next section will deal with Archer’s (1995) morphogenetic action research cycle, and the following section with Wong’s (2005) interpretation of it for innovation development.

Table 4.1 Subsections of artefact design from Hevner *et al.* (2004:80)

<b>ARTEFACT DESIGN</b>		
<b>[Technology]</b>	<b>[Organizations]</b>	<b>People</b>
<b>Structure</b>	<b>Culture</b>	<b>People</b>
Processes	Strategies	Roles
Infrastructure	Processes	Capabilities
Applications	Processes	Characteristics
Communications architecture		
Development capabilities		
(People's)		
roles		
capabilities		
characteristics		

### 4.3 The morphogenetic approach

Bhaskar's ontology provides the philosophical overview for research in the social sciences, but does not provide a "substantive theory" per se in any field or area (Mutch 2010: 508). This means that researchers operating under the philosophical overview provided by Bhaskar must provide their own discipline-specific theories and associated methodologies. Archer's morphogenetic approach is one such theory. Archer explains her choice of the term "morphogenetic" as follows:

The 'morpho' element is an acknowledgement that society has no pre-set form or preferred state: the 'genetic' part is a recognition that it takes its shape from, and is formed by, agents, originating from the intended and unintended consequence of their activities (1995: 6).

While Archer's morphogenetic action research cycle has been used mainly for close analysis of specific eras in social science research, it is used in this investigation to suggest a wider overview of the scope of the project than is afforded by traditional action research. In other words, the envisaged multimedia portal is not just seen as a better option for a specific learner group

at a specific time: it is part of a wider historical phase of overall change to multimedia resources and mobile devices.

#### 4.3.1 The traditional action research cycle

The traditional action research cycle most commonly used in education has been described in great detail by Kemmis and McTaggart (2005), McNiff and Whitehead (2000) and Zuber-Skerritt and Ryan (1994).

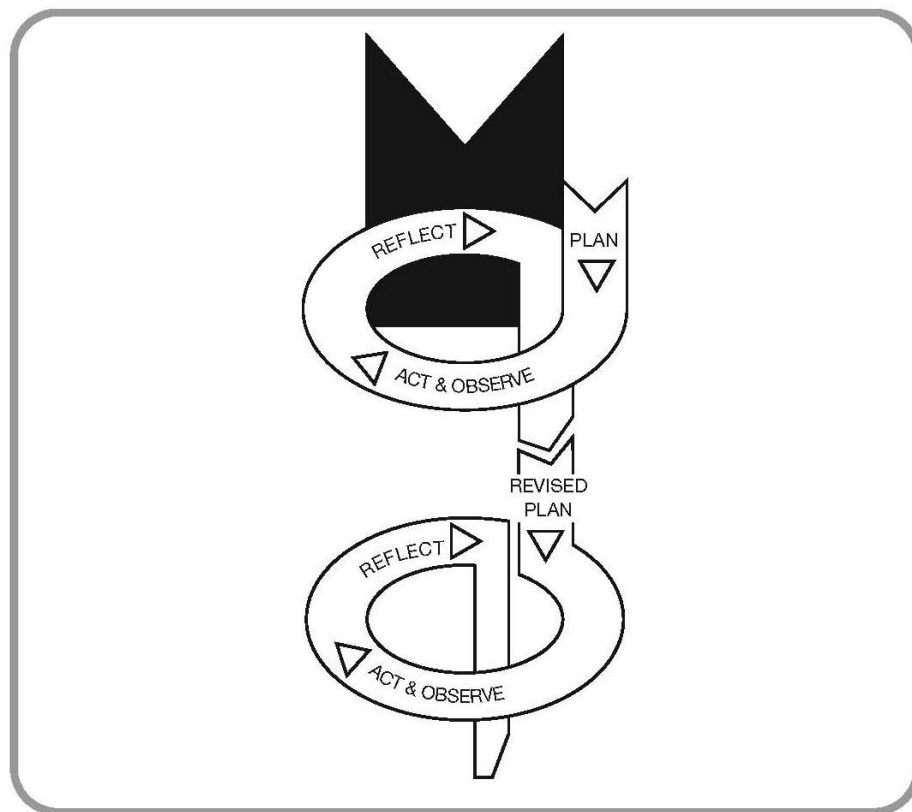


Figure 4.3 The spiral action research cycle (Kemmis and McTaggart 2005: 564)

In the traditional action research cycle (see Figure 4.3), each cycle could be seen to involve more than one sub-cycle, completing the series of cycles needed for action research. In the case of artefact development, action research usually involves artefact review, identification of possible changes, piloting these, and attempting further modifications. A similar process (i.e. prototype, review and refine) is involved in the rapid prototype principle, as shown in Figure 4.4 (Cerejo 2010: [1]).

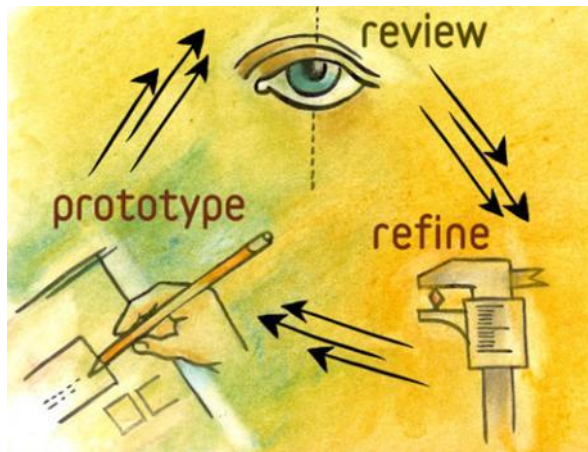


Figure 4.4 The rapid prototyping process (Cerejo 2010: [1])

In view of the fact that educational technology does not exist independently of its social setting (Archer 1995: 5), it was acknowledged that aspects other than the merely technical were involved in artefact development. The traditional action research cycle does, in fact, investigate the influence of social factors on human behaviour (Kemmis and McTaggart 2005: 565-566). However, it does not generally outline its intellectual framework in advance (Blichfeldt and Andersen 2006: 4-5), as was the case in this study.

#### **4.3.2 Advantages of using the morphogenetic action research cycle**

An advantage of using Archer's morphogenetic action research cycle is the realization that the current situation is the result of a social structure which has been set in place previously by various agents. It is thus not the direct result of current actors (e.g. teachers and learners in a specific context), although they may play a key part in sustaining or changing this structure (i.e. for future actors). Archer's (1995: 13) description suggests that social structures are resistant to change by individuals and that it is agency (i.e. action by influential groups) which brings about change or stasis. Moreover, she points out that a highly complex combination of factors - including power relations, and availability of resources, opposed groups and practical constraints - are involved (as she illustrates in Figure 21 in Archer 1995: 342). This signals another advantage of using a morphogenetic approach, in that it emphasizes

the importance of finding the causes (i.e. interplay of factors) of the problems experienced in the existing structure.

The overall stages of this research project within the smaller action research cycle involved the following:

- investigating the pre-existing condition in the Photography Programme;
- exploring the option of using multimedia resources to address causes of poor student performance;
- artefact design and testing/modifying; and
- prognosis for the outcome of the intervention.

The last stage is not conclusive, as Archer's (wider) cycle can be completed only in the sense of making a prognosis only (1995: 167) as to the probable results of the intervention. Moreover, the intervention provides one example only of the possible outcome of the provision of multimedia resources, a key agency involved being providers of such resources. Now that Internet sites have become a familiar educational intervention strategy, there is an effective agency for change in force, not just the random acts of individual agents or actors.

#### **4.4 The morphogenetic action research cycle**

In Archer's development of what she termed a "morphogenetic approach", she has, in effect, provided a "substantive theory" for the specific application of Bhaskar's philosophy in social science (Mutch 2010: 508). Her task was to explain the relationship between social structure and human agency (Archer 1995: 297). The term "morphogenetic" is derived from the combined Greek term, *morphê* (shape, form, outward appearance) and *genesis* (origin, creation (Hoel 2010: 1). In the context of this investigation, it refers to the transformation of social structures and their causal power, fitting in with the focus of Bhaskar's philosophy on social transformation and change (see Bates 2006: 147). When describing causal effects, Archer (1995: 179) uses the example of "an influence of one person on another (such as a teacher on the student)". The morphogenetic model shows that human agency does not





analysis, but also for application in a practical context, for example, in educational change (Archer 1995: 328-343). It is Archer's emphasis on the time factor in social reproduction or transformation which is significant in separating social agency from social structure (i.e. from being a conflated "causal mechanism") and makes it possible to identify the actual causes on the social phenomenon being studied; accurate identification of causes (whether intentional or incidental) is an essential factor in negotiating the social interactions which are to bring about change.

Archer's morphogenetic/morphostatic cycle, with its three phases, has been applied in the area of Academic development by Luckett (2012: 342), who highlights the historical background to the application of change, as shown within a specific timeline. Luckett's application of Archer's theory was carried out in a 2009 study at a South African (SA) university during an internal review process of an Academic Development programme (ADP) across four faculties (Sciences, Commerce, Engineering and the Health Sciences). Archer's morphogenetic/ morphostatic cycle was used to analyse data gathered through assessments of portfolios and review workshops. By using Archer's social realist framework, Luckett was able to design the review methodology and analyse the data gathered from reviews of portfolios and workshops.

Luckett's data analysis first reviewed the significance of past events (Historical background until 1990), such as the admittance of black students into the university and the introduction of foundation courses as remedial and not credit bearing for the new group of students entering the university for the first time. Luckett concluded that, in the mid-1990s to 2009, "structural changes were resisted from within the institution by a return of cultural changes to cultural morphostasis" (2012: 345). An important point highlighted by academics at Luckett's review workshop was that the university's transformation policy set in chain an unintended series of causes and effects (2012: 346). It also led to tensions between the wish to transform and the unrealistic expectations in terms of extra staff work, leading to disillusionment and frustration (Luckett 2012: 346). Luckett's table, "Morphogenetic cycle for the ADP review" (2012: 342), was adapted for use in this study, as it illustrates the way in which

historicity operates in the morphogenetic cycle. Table 4.2 shows the timeframes in the wider morphogenetic cycle in which this study is situated. The relevant historical details supporting the conclusions of this study (i.e. a prognosis for change vs. continuance) will be discussed in Chapter 7 (Morphogenesis vs. morphostasis).

Table 4.2 Timeframes for morphogenetic cycle (adapted from Lockett 2012: 342)

Periodisation	Morphogenesis/Morphostasis
Time 1 (1980s - 1990s) Historical background	Structural/cultural conditioning
Time 2 - Time 3 (2000 - 2014) Period involved in research	Social/socio-cultural interaction
Time 4 (2015 -) Use/further development of artefact	Structural/cultural/agential elaboration

Viewing morphogenesis as a historical process in distinct time phases allows the researcher to separate social structure from social agency, and to determine the role played by each in bringing about the current situation and the possible influence of each in effecting or resisting change (Bates 2006: 147). While Archer sees social structures and social agents as interacting one upon the other, these relations are not simplistic or simultaneous. For example, current structures are set in place - not always intentionally - by the actions of the “long dead” (Archer 1995: 143). Archer (1982: 468) provided an earlier interpretation in Figure 4.6, stating that “the morphogenetic argument that structure and action operate over different time periods is based on two propositions; [and] that structure predates the action that transforms it while structural elaboration postdates the actions”. As shown in Figure 4.6, it is cultural and structural conditioning which are subject to change in terms of cultural or structural elaboration. Morphogenesis, however, results in open-ended changes, while morphostasis result in a closed loop configuration (see Figure 4.7).

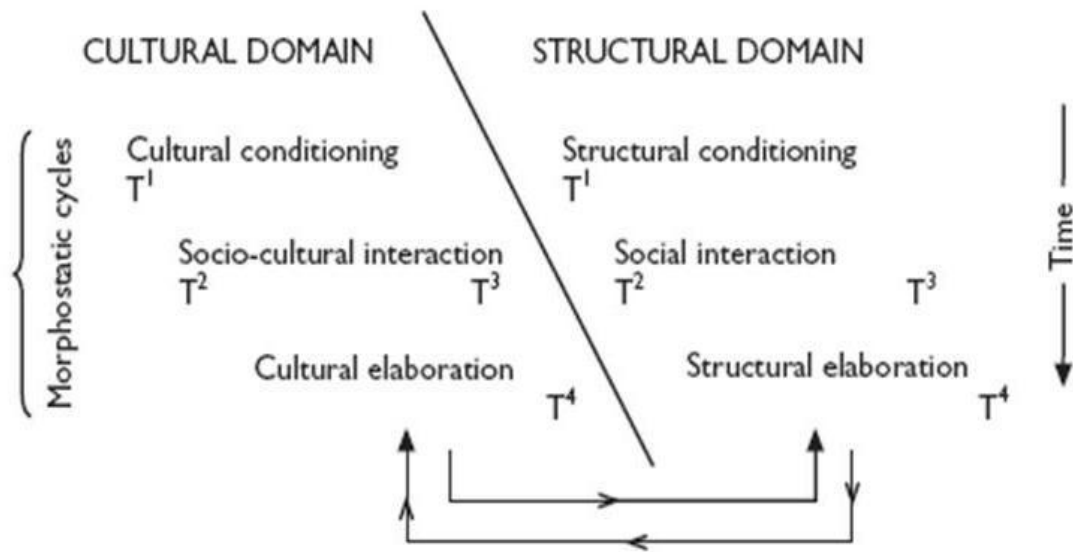


Figure 4.6 Structural and cultural configurations generating morphogenetic cycles in society (Archer 1995: 323)

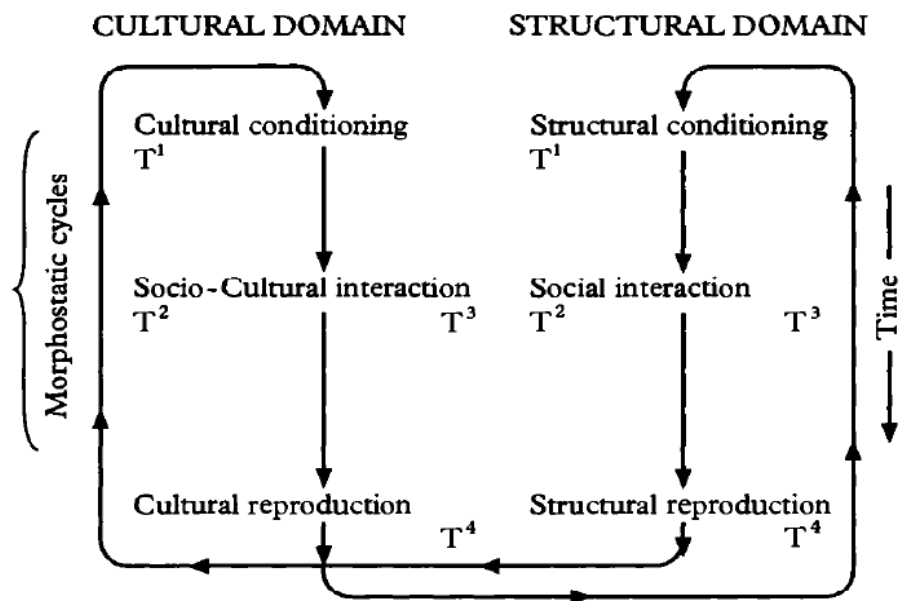


Figure 4.7 Structural and cultural configurations reproducing morphostatic cycles in society (Archer 1995: 309)

Bates (2006: 147) criticises Archer on the grounds that the processes depicted in her diagrams merely describe, and do not explain, the causes of morphogenesis and morphostasis. This is because it is factors within the cycle

(in particular, power relations and resources - see Archer 1995: 75), and not the phases of the cycle itself, which combine to bring about social reproduction or change. Bates (2006: 148) also criticises her depiction of the time phases, which can be accommodated in Figure 4.6 but not in Figure 4.7. In Archer's defence, there is a limit to what can be accommodated in two-dimensional diagrams when one is explaining complex social processes. Bates recommends that time be viewed as circadian, rather than linear, but this is not excluded by Archer's model. Archer emphasises the "historicity" of morphogenesis and morphostasis (1995: 154), and the fact that structure and agency do not necessarily work simultaneously (1998a: 196). Her phases do not, in fact, exclude a cyclical or "circadian" concept of time (e.g. repeating or changing waves in history). To further refute Bates' criticism, Archer does, in fact, provide an explanation as to why transformation or reproduction is more likely to occur (1998b: 360), and has thus provided a basis for analysis. Figure 4.8 summarises the conditions under which morphostasis rather than morphogenesis is likely to occur.

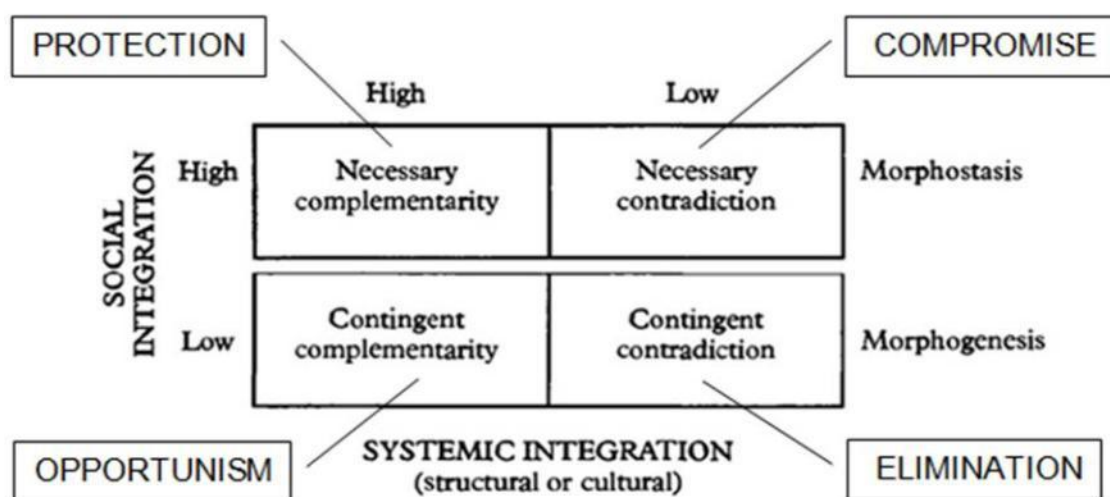


Figure 4.8 Preconditions for morphostasis or morphogenesis (Figure 3.7 in Reddy 2014: 42, adapted from Archer 1995: 295)

Reddy's (2014: 42) adaptation of Archer's (1995: 295) figure is used, as his inserts identify the situational logics which apply in each case (i.e. protection, compromise, opportunism and elimination). According to Archer, systemic and social integration are key issues in determining whether morphogenesis or morphostasis takes place (Figure 3.7). The social integration axis refers to how well various groups are integrated, while the systemic integration axis deals with how well elements of the system relate and thus provide a satisfactory context for human interaction (i.e. with sufficient material resources, and systems which run smoothly). The quadrant labelled "contingent complementarity" marks a context where social integration is low but systemic integration is high. This is not planned, but "contingent" systems just happen to be aligned, not necessarily overall, but for certain projects or courses of action. As Reddy (2014: 41) points out, contingent complementarity offers a "window for innovation". The "contingent contradiction" quadrant is characterised by conflicting forces pursuing vested interests, but elimination is a mindset, not a result, and a compromise may well be reached if negotiation is successful. Morphogenesis or morphostasis are not accidental or inevitable occurrences, but the results of human interactions. Morphostasis is "anchored in vested interest and not mere routinization", and transformation is "rooted in determinate conflicts between identifiable groups who find themselves in particular positions with particular interests to advance or defend" (Archer 1998b: 371).

Archer's framework for analysis has been applied to analyse instances of social change vs. continuance by Horrocks (2009), Luckett (2012), Njihia (2008) and Quinn (2006). However, as Horrocks (2009: 58-59), points out, it is often difficult for researchers to fix on the level of operation involved, to establish the connections between chains of events, and to decide whether apparently "unintended" outcomes were actually planned or the results of deliberate factional opposition. Moreover, it is difficult to be specific about mechanisms and emergent properties which are not directly observable.

#### **4.5 The morphogenetic cycle in innovation development**

Figure 4.9 shows Wong's (2005: 13) adaptation of Archer's morphogenetic

cycle (1995) for organisational innovation development. Wong's representation depicts the interplay of structure, culture and agency at the phase of structural conditioning, and how vested interests and opportunity costs affect the situational logics; these factors, in turn, act as input into the social interaction, which must be strategized to assist negotiation; the interaction thus works to bring about the outcomes which will result in structural elaboration or reproduction.

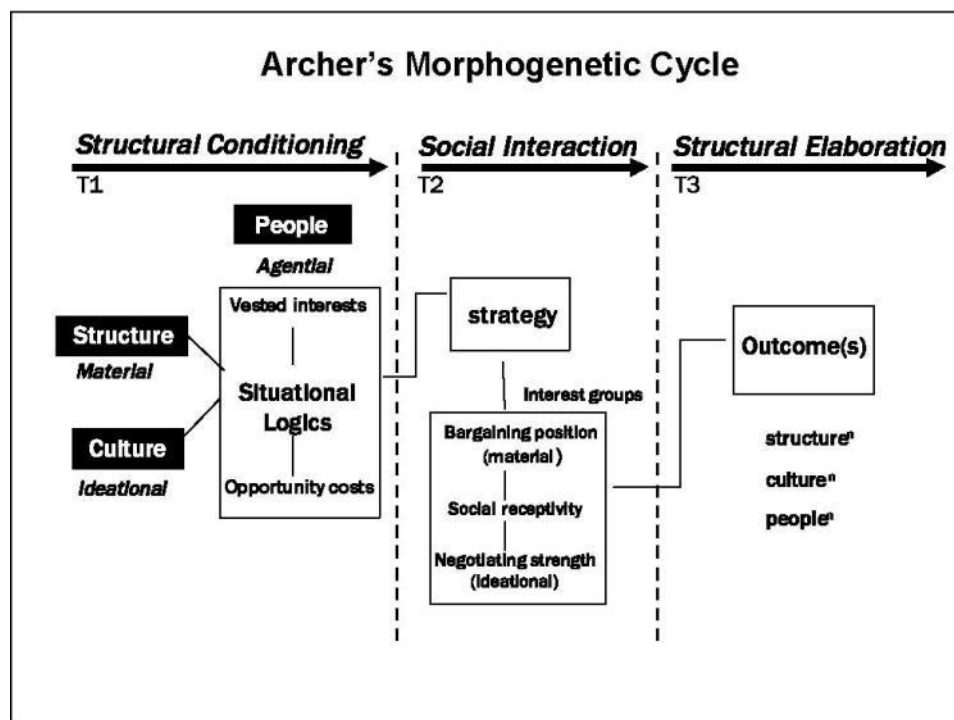


Figure 4.9 Archer's morphogenetic cycle in innovation design (Wong 2005: 13).

As Wong (2005: 5) points out, the morphogenetic approach allows for the modelling of innovation development as a series of socio-cultural cycles which involve interaction between structure, culture and agents over eras of time. In investigating the dynamics of this process, the researcher needs to establish the systemic conditions pre-existing the change, the situational logics arising from the specific configuration of structural and cultural conditions, the social interactions among actors, and the ways in which the outcome reflects the transformation or reproduction of structural, cultural and agential conditions.

Table 4.3 shows how the design of the Internet portal for the DUT Photography Programme fits within the wider morphogenetic cycle. The shaded sections indicate the smaller morphogenetic cycle of innovation development. It thus explains the time frame for this study within the wider historical context.

Table 4.3 Innovation design for the DUT Photography Programme within the wider morphogenetic cycle

	Periodisation	Morphogenesis/Morphostasis
	Time 1 (1980s - 1990s) Historical background	Structural/cultural conditioning
	Technology: Development of the Internet	
	Pedagogy: Digital e-learning not yet developed for everyday teaching/learning use	
	Time 2 - Time 3 (2000 - 2014) Period involved in research	Social/socio-cultural interaction
Chapter 2	Technology: Digital e-learning developing into mobile as well as computer use.	Investigate e-learning genres for effective campus learning delivery (carried out in Literature Review).
Chapter 5	Pedagogy: E-learning is more likely to be adopted if it is seen by stakeholders as serving a real pedagogical need.	Investigate the pre-existing conditions in the Photography Programme to establish pedagogical needs, and develop a curated Internet portal catering for these needs.
Chapter 6	Blended learning solution: A curated Internet portal would provide resources to enhance teaching and learning in Photography.	Test out the curated Internet portal during the prototyping process to see whether it caters for the needs identified.
	Time 4 (2015 -) Use and further development of the portal and similar e-learning initiatives.	Structural/cultural/agential elaboration
	Technology/Pedagogy: The curated Internet portal is used flexibly for blended learning delivery in the Photography Programme and developed to cater for further use.	



The analysis of the results will be presented to fit within this time frame, while, at the same time, attempting to show how the data obtained fulfilled the objectives of the study given in Chapter 1. Table 4.3 also shows how the various aspects of the “Social/socio-cultural interaction” (i.e. the researcher’s interactions with participants) are dealt with in the thesis chapters.

## 4.6 Artefact design

While Wong’s (2005) account deals with introduction of an Information Systems (IS) artefact, he does not deal with specific elements of artefact design. Hill, while using a critical realist approach, adapts the model of Design Science supplied by Hevner *et al.* (2004) as a generic model of artefact design. This is the main reason the researcher decided to use elements of this model for the specifics of artefact design (see Figure 4.10). Hevner *et al.* were not using a critical realist approach, but Hill (2009: 18) found that their model could be applied within a critical realist orientation.

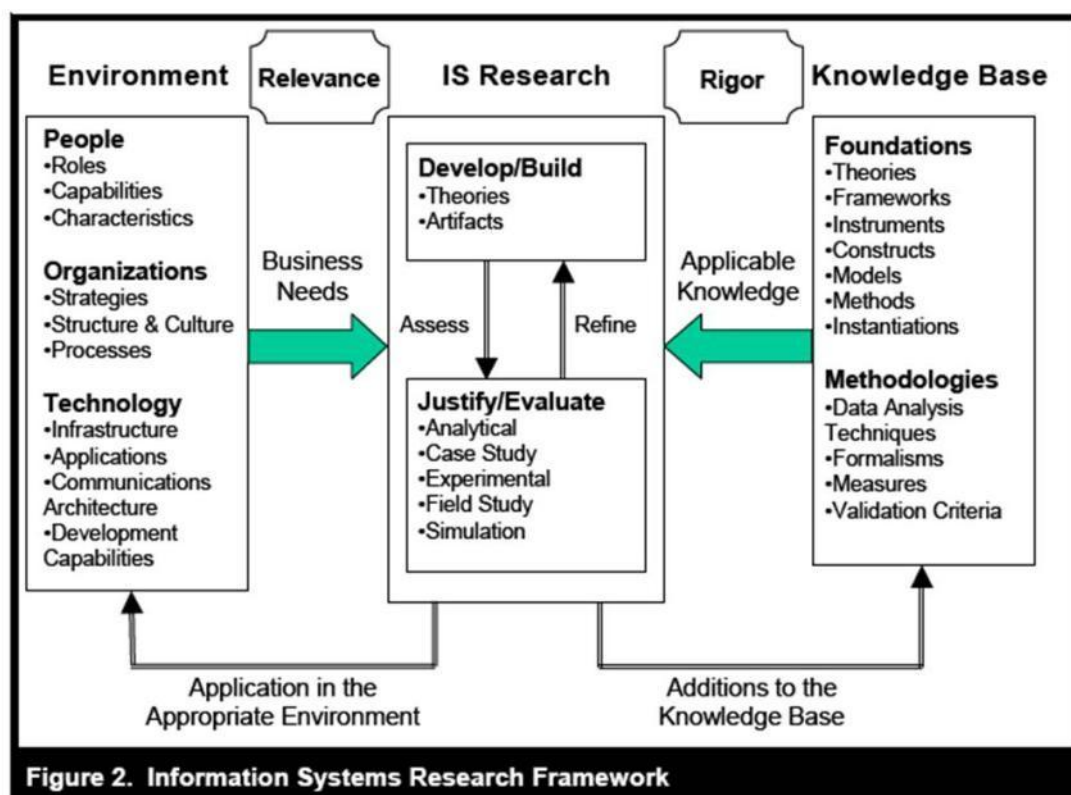


Figure 4.10 Model of artefact design (Figure 2 in Hevner *et al.* 2004: 80)

While the Hevner *et al.* (2004) model is not critical realist per se, it contains elements of the critical factors involved in the morphogenetic cycle, in particular, agency (people), structure and culture, assisting the design process to be congruent with the whole issue of social transformation and change. Thus, while their design principle is a theoretical construct, it is based on real world social functioning.

It became apparent during the early stages of the research that an innovative solution to the problems identified would, in fact, be an artefact, an educational Internet portal. This would not necessarily solve all of the problems identified. However, it would address the issues of (1) staff lack of expertise in the use of multimedia, (2) student apathy and lack of motivation when not provided with the digital training required by Industry, and (3) problems with access to learning resources (i.e. distances in travelling and financial constraints). Thus within the general approach of identifying and refining the solution involved in the morphogenetic action research cycle, a more specific model of artefact design applies. The point to note is that the artefact design took place within a social context, and was not a positivist “solution” to an abstract problem verified by statistical means.

The artefact development, creation and evaluation, then, forms the final spiral of the action research cycle (see T3 Outcomes in Figure 4.6). Thus the artefact design resonates at three different levels with Archer’s (1995) morphogenetic cycle and is congruent with the research orientation adopted. Furthermore, design science takes a wide look at what constitutes an artefact for the purposes of research evaluation and includes models, methods and frameworks, as shown in the seven research guidelines proposed by Hevner *et al.* (2004:83).

The design science principle used in this study was based on the principle proposed by Hevner *et al.* (2004). Design science is seen as a new technology-based approach within the Information System (IS) discipline. Another view on IS research is perceived as an intermediate step linking basic and applied

research as a form of action research (Burstein and Gregor 1999), which could be considered as appropriate for different researchers of digital media. However, it is only through the appropriation of technology by humans that it will exert any influence (Orlikowski 1992: 409). Furthermore, design science takes a wide look at what constitutes an artefact for the purposes of research evaluation and includes models, methods and frameworks as shown in the seven research guidelines proposed by Hevner *et al.* (2004: 83) in Table 4.4. The systematic and formalised design methods are relevant to many design disciplines such as architecture, engineering, medicine and computer science.

Table 4.4 Design science research guidelines (Table 1 in Hevner *et al.* 2004: 83)

<b>Table 1. Design-Science Research Guidelines</b>	
<b>Guideline</b>	<b>Description</b>
Guideline 1: Design as an Artifact	Design-science research must produce a viable artifact in the form of a construct, a model, a method, or an instantiation.
Guideline 2: Problem Relevance	The objective of design-science research is to develop technology-based solutions to important and relevant business problems.
Guideline 3: Design Evaluation	The utility, quality, and efficacy of a design artifact must be rigorously demonstrated via well-executed evaluation methods.
Guideline 4: Research Contributions	Effective design-science research must provide clear and verifiable contributions in the areas of the design artifact, design foundations, and/or design methodologies.
Guideline 5: Research Rigor	Design-science research relies upon the application of rigorous methods in both the construction and evaluation of the design artifact.
Guideline 6: Design as a Search Process	The search for an effective artifact requires utilizing available means to reach desired ends while satisfying laws in the problem environment.
Guideline 7: Communication of Research	Design-science research must be presented effectively both to technology-oriented as well as management-oriented audiences.

## 4.7 Specific methods used in the morphogenetic cycle

The following specific methods were used for identification of the causes hindering/helping transformation, as well as in exploring the option of using

multimedia resources to address causes and enhance student performance, and in the design and testing out of the artefact:

- personal observation;
- formal and informal interviews and discussions;
- formal surveys;
- collating data for formal and informal reports and reviews;
- case studies; and
- field trips.

#### **4.7.1 Personal observation**

Personal observations included those of programme functioning (e.g. staff punctuality and assessment practices, student attendance and observance of assignment deadlines). These were collected in the form of notes, and formed a valuable “background social context” for the study. This is because they made explicit or revealed some of the otherwise hidden enablements and constraints operating in the background environment of the Photography Programme (e.g. students being inattentive during lectures because they were tired from having to get up very early to catch public transport.)

#### **4.7.2 Formal and informal interviews and discussions**

These included personal consultations with staff and students, as well as formal meetings with individual students to discuss issues (e.g. discipline, punctuality, learning difficulties). Industry liaison formed part of the data collection. The staff and student responses at the formal Programme Review (2010) were also noted.

#### **4.7.3 Formal surveys**

Based on design evaluation guideline 5 (Hevner *et al.* 2004), the semi-structured surveys were designed to evaluate the proposed portal content. The surveys took place between May and August 2011 in the audio-visual lecture room used for the Photography Programme. The surveys were carried out with

first and second year Photography students in the presence of two subject leaders. The portal content, which was used as an exemplar for the surveys, was catalogued and collated to ensure information accuracy in compliance with copyright laws. The survey also included questions geared at establishing how students would respond to learning in a digital environment. Both the formal and informal questions were designed to lead to additional stories, anecdotes, constructive criticism and disappointments about changing practices and the perceived needs for the proposed multimedia educational portal. It was hoped that the data obtained from the survey would contribute valuable student-centred input into the final design of the curated online portal.

Before the actual survey, a lecture was given, dealing with the following:

- a thorough explanation of the camera setting symbols;
- an account of the problems arising from incorrect camera settings;
- emphasis on the ability to read and interpret a photograph; and
- the need for appropriate acknowledgment of researched material and referencing techniques;

The lecture presentation was interactive, and included a separate question and answer session at the end of the presentation. It concluded with students answering questions on user satisfaction/experience of the lecture. Data from the responses to the lecturer were used to assess the suitability of this kind of presentation as part of the Internet portal content.

The procedure followed in the actual survey was as follows:

- Students completed a written pre-test on standard camera symbols.
- They were then shown a series of images illustrating photographic principles represented by the symbols.
- This was followed by a discussion about the technical details shown in the images (e.g. lighting, composition, and so on).

- The students were then asked to give a written evaluation of the survey lecture (this was then analysed by the researcher in terms of its use as a portal learning interaction).

After the results were collated and analysed, an informal debriefing session took place with the students and staff. This dealt with the survey results and their possible application as part of the Internet portal.

#### *a. Digital resources used in the survey project*

The digital resources used in the survey project included e-books and new/additional software (editing of e-book material with Camtasia software emerged as a necessity). The e-book content was hyperlinked for playback on Windows Media and Quick Time player. In preparation for the portal project, it was necessary to ensure the compatibility of the presentation tools and to integrate various media which could be viewed seamlessly on any computer. In addition, it was necessary to ensure that information was accurate on both hardcopy and online instructions. The need to accommodate variation in user hardware, and to ensure accuracy of content is stressed by Sampson (2007: 376-377).

#### *b. Privacy and ethical clearance*

Each participant was informed that his/her responses would be quoted anonymously in reporting the project, that no personal details would be released, and that his/her participation in the survey would be voluntary and anonymous. They would not be paid for taking part in the survey and it would take up to an hour of their time. It was made clear that they were under no obligation to answer the questions. However, they were told that the benefits could impact positively on the Photography Programme.

#### *c. Collation of results*

The results from the survey were collated and analysed in terms of positive/negative responses. A study of the data also identified key points that emerged from the survey. These key points were flagged for further discussion in the follow-up meetings with the participants.

#### *d. Feedback*

The feedback sessions (August and November 2011) were presented by the researcher to the entire class in the presence of their usual lecturer. The debriefing meetings were designed to elicit answers which were more detailed, and the class representative for both first and second year students documented the feedback session.

#### *e. Triangulation process*

Triangulation is defined as “the mixing of data or methods so that diverse viewpoints or standpoints cast light upon a topic” (Olsen 2004: 103). The processes involved in triangulation overlap each other, and flesh out issues that may emerge. They can produce a richer and truer account, help to reduce the effects of bias and ensure a balanced research study. Included in the investigation was the necessity to evaluate students’ written answers for cohesiveness from the survey. This was achieved by comparing these answers with the spoken responses and feedback before and after the written survey, and also with the written scripts and digital portfolios produced as part of their annual assessment.

#### *f. Contents of survey*

The first year student survey comprised a written pre-test on the following:

- the most commonly used, universally accepted camera setting symbols (portraits, macro, landscapes, sports, and flash);
- the relationship between shutters and apertures; and
- a discussion illustrating examples related to the camera settings on digital cameras.

The survey concluded with written responses on their evaluation of the presentation. The second year student survey was in a similar format but the subject content was different, as it was based on their syllabus, involving:

- colour balancing a digital camera (also a camera setting question);

- a comparison of “Camera Raw” settings against traditional large format cameras; and
- the use of histograms (commonly found on digital cameras).

The surveys contained qualitative and quantitative questions about aspects of theory and Applied Photography, and was also intended to assess students’ ability to write in a coherent manner. There were also questions about the demographics of the students, as well questions on the most common modes of transport students used to attend classes. The former were aimed at assessing whether the class demographics matched the institution’s equity plan, and the latter, at establishing whether the mode of transport (e.g. in terms of time taken to travel to lectures) might impact on students’ receptiveness to tuition (e.g. through fatigue).

The general questions about demographics and travel modes were placed first so as to give students time to “settle in”. These were followed by questions concerned with identifying camera-setting symbols (i.e. recalling prior knowledge). Students were given fifteen minutes to answer the eight questions. They were then shown fifteen selected (i.e. curated) digital images captured by professionals. The projected images had been selected to illustrate composition rules, lighting principles, and limited and extended depth of fields. The samples were all interrelated to the standard camera-symbol settings. The aim was to organise the learning content into small chunks of information, and thus gradually develop the discrete skills learned into competences which could be used in real life situations. Ultimately, the basic concepts taught in the current photography course are aligned with the output of professional photographers. It was emphasised to the group class that, in order to achieve similar professional results, the students would need to apply theoretical concepts in practice.

#### **4.7.4 Collating data for formal and informal reports and reviews**

Data (mainly hard print data stored in departmental records) were collated for formal and informal reports and reviews, including the official Programme



Review, as carried out routinely in five-year cycles by the DUT Centre for Quality Provision and Assurance (CQPA). The results captured on students' mid-year progress reports were part of this data, as well as the tests, marking memoranda and mark sheets used to compile the reports.

#### **4.7.5 Case studies**

There are differences between a case study approach and action research. Action research generally gives participants a greater role than a case study approach, but is thought to lead to less generalizability in terms of results being used to develop theories (Blichfeldt and Andersen 2006: 4-5). However, it can be argued that action researchers can benefit from using case studies as the latter can add more detailed data for the final analysis (Blichfeldt and Andersen 2006: 3-5). For this reason, two case studies were used to explore the introduction of multimedia resources to address the causes of the problems identified and potentially bring about transformation (see Wong, 2006: 6-7). The first case study investigated the use of a work integrated learning (WIL) project, the digital capturing and online sales of graduation photographs. This project not only involved putting theory into practice in a work-related context: it also set up a method for providing resources for the Internet portal, as well as showing how experiential learning projects could be hyperlinked to the portal. This would help students to see that theory, experiential work and the resources used to develop the necessary photographic competences were all related. The second case study investigated the use of online tutorials as a class assignment, and drew on the collaborative work of three staff members in designing and executing an assignment using curated study material. This tested out one of the types of resources which might be set up on the Internet portal.

The first four methods were used to establish background conditions in the Photography Programme before considering the nature and design of possible interventions. Pre-existing conditions in the Photography Programme were investigated as part of the Programme Co-ordinator's job description, in order to identify "at risk" students and improve the quality of students in the programme by assisting them to work on skills and competences. An investigation of the

pre-existing conditions also served to establish the state of the social structure of teaching/learning in the Photography Programme, and the causes of the existing situation before setting in place interventions which might have the potential for transformation.

#### **4.7.6 Field trips**

Field trips were undertaken to other universities, colleges and photographic trade exhibitions and educational institutions. In mid-October and early November 2011, the researcher visited three established users of digital media. The visits included the annual Photographic exhibition and Film Expo in Johannesburg (13-15 October 2011), external moderation at a University of Technology in the Gauteng region (2 November 2011) and a private Multidisciplinary Art College (11 November 2011). The field trips focused on investigating current trends in increasing or improving the use of existing facilities and planning for the improved use of scarce resources in the proposed multimedia educational portal.

#### **4.8 Conclusion**

In this chapter, the researcher has attempted to show how Archer's morphogenetic action research cycle was adapted as the over-arching methodology, within which methods of organisational innovation and artefact design could be accommodated. As the cycles unfolded, it became apparent that a digital artefact in the form of a curated multimedia portal could address many of the problems identified, which led to the layering of the methodology at further levels involving organisational innovation and, ultimately, artefact design. Following the adopted design science principle (i.e. in the guidelines provided by Hevner *et al.* 2004: 83), the collection of data was conducted via experimental lectures, semi-structured interviews with staff and students, reviewing of moderators and students' reflective reports and observations in live situations. The next two chapters will discuss the results.

## **CHAPTER 5: DEVELOPING THE INTERNET PORTAL**

### **5.1 Introduction**

Chapter 5 first gives the results of the investigation into the pedagogical needs of the DUT Photography Programme. This was done in an attempt to fulfil research objective 1, namely, to establish the pedagogical needs e-learning might serve in the context of the Photography Programme. The e-learning options currently available for campus programme delivery were discussed in the Literature Review, partly fulfilling research objective 2, that is, to investigate the e-learning options available in terms of finding the most suitable format for the intended pedagogical purpose and target audience. The data analysed in this chapter provides more evidence to support the conclusion that a blended learning approach using online multimedia resources to enhance traditional lectures was the option most suited to the needs of the Photography Programme. This chapter next looks at the results of research objective 3, namely, to develop the educational Internet portal to cater for the pedagogical needs identified. Table 5.1 shows how the sections in this chapter are geared towards fulfilling research objectives 1, 2 and 3.

### **5.2 Investigating the pre-existing conditions**

This section fits in with “Problem Relevance”, based on Guideline 2 in Table 4.4, and is the result of using the method of personal observation, backed up with supporting documents, where available. At a theoretical level, investigating pre-existing conditions should be regarded as clarifying the state of the social structure of teaching/learning existing in the Photography Programme. Before attempting any e-learning innovation, it was necessary to establishing the conditions pre-existing change. According to Wong, when planning innovations to address the concerns noted: “The researcher needs to establish the systemic conditions pre-existing the [proposed] change” (2005: 5). At a practical level, the rationale for investigating pre-existing conditions in the Photography Programme was to identify “at risk students” and to improve the quality of programme delivery.

Table 5.1 Chapter 5 sections dealing with research objectives 1 to 3

<b>Objective 1:</b> to establish the pedagogical needs e-learning might serve in the context of the DUT Photography Programme.	
<b>5.2</b>	<b>Investigating the pre-existing conditions</b>
5.2.1	Systemic conditions for potential harm
5.2.2	Critical factors which emerged
<b>Objective 2:</b> to investigate the e-learning options available in terms of finding the most suitable format for the intended pedagogical purpose and target audience;	
Ch 2	The e-learning options currently available for campus delivery were explored in the Literature Review.
<b>5.3</b>	<b>Exploring the option of using multimedia resources in blended learning delivery</b>
5.3.1	Offline resources available at DUT
a.	<i>Interviews with staff</i>
b.	<i>Webinar interaction with staff</i>
c.	<i>Conclusions drawn from interviews and webinar</i>
5.3.2	Visits to photographic trade exhibition and educational institutions
a.	<i>Photo and Film Expo</i>
b.	<i>Visit to a University of Technology in the Gauteng region</i>
c.	<i>Visit to a private college in KZN</i>
d.	<i>Conclusions drawn from visits</i>
<b>Objective 3:</b> to develop the e-learning option which the results of addressing objectives 1 and 2 suggested as being the most suitable option.	
<b>5.4</b>	<b>Developing the artefact in a pilot study</b>
5.4.1	Staff development programme run for Photography
5.4.2	Development of a prototype website
5.4.3	Setting up of online ordering of DUT Graduation photographs
<b>5.5</b>	<b>The prototype multimedia portal</b>
5.5.1	Insights gained from visiting other educational portals
5.5.2	Setting up the prototype multimedia portal
5.5.3	Multimedia and writing resources for the curated portal
5.6	Conclusion

The pre-existing situation was as follows. In May 2009, the researcher requested the preparation of mid-year reports for the qualification (Appendix C). This caused apprehensive reactions from both students and staff, from whom input was gathered informally in 2009. That their apprehension was justified, was confirmed by the content of the official Photography Programme Review and Evaluation Report of 2010. This document (in Appendix D) provides evidence of the general discontent, as well as the reasons for their discontent. Some students admitted that they had performed badly and were anxious not to

inform their parents and/or sponsors of their shortcomings. Academic staff were concerned that their assessments of students' assignments were unfinished. Amidst a flurry of concerns, tears and incomplete marking of assignments, the mid-year progress reports were posted.

### **5.2.1 Systemic conditions for potential harm**

Following the released results of all students in the programme, the third term started with students complaining informally on various administrative and academic issues (see Appendix D, Section 2). Their allegations included claims that that they were not being taught enough about current market-related topics (i.e. digital photography), that feedback was not given timeously and that lecturers were not always on duty. Evidence to support these - and related claims - appears in a memorandum from the HoD to the Dean, as well as in the Photography Programme Review and Evaluation Report (see Appendix D). Some students were apparently not even aware that they were being taught two separate subjects by a lecturer, as the incumbent had combined two different subjects in each lesson. At about the same time, the Centre for Quality Provision and Assurance (CQPA) at DUT requested a review of all study guides within the Faculty (see email from CQPA dated 15 March 2010 in Appendix D, which preceded the actual Programme Review and Review Report). Upon closer examination of the current study guides for the Photography Programme, it was noted that the students' concerns appeared to be justified and merited further investigation by the researcher (this preceded the official investigation, but the reasons for it were confirmed by the latter).

The researcher consulted participants to construct a picture of the pre-existing systemic conditions. To this end, meetings were held with a select group of final year students who provided reflective views. Both First-year and Second-year students spoke personally or informally to the researcher for fear of victimisation (individual complaints were treated as confidential, and did not feature in the official Review Report). A student tutor's concerns were found to be justified on examination of the marking memoranda. These were not used in the assessment, were incorrect or misleading, and/or not in compliance with the Photography Study Guide. Comments by academics in response to student

complaints included attributing students' poor grades to infrequent attendance, as well as to their (i.e. the students) being inadequately prepared for tertiary education.

A view expressed by some staff was that teaching practice in class was geared to - and more appropriate for - inculcating inspiration and establishing social networking systems among students rather than for training students for the current commercial market. This view was at odds with students' comments, where they felt that subjects should be more accessible and less intimidating, particularly in the application of theory to practice. Subjects should also lead to their being better prepared for the business market (see Student Support Findings in Appendix D). Furthermore, an important factor emerged in terms of the advanced technical focus of the subject and how it should be taught and learned. Academic staff appeared to have experienced limited professional development in how to teach, assign, and provide feedback in the use of advanced modern technology. To support this conclusion, there was evidence of lectures being shortened and even omitted. There was also evidence of lecturers who struggled to substantiate their arguments about certain specialist subjects in lectures. It became apparent that this was because their study guides were vague or non-existent on certain key topics, for example, the use of social media as a marketing tool, e-banking for emerging entrepreneurs, and establishing workflows for Applied Photography. Some of the above concerns were discussed during the Programme Review, but not all were documented in the Report, as this might have put individual students - or staff members - at risk. Appendix D provides extracts showing concerns which were documented, in memoranda, informal notes and official reports.

In some instances, these problems could be attributed to the fact that the "downsizing" caused by merging of departments at DUT had left academic Programmes without any effective form of leadership (see Programme Design Findings in Appendix D).

The credibility of programme is negatively impacted because a lack of any meaningful leadership curtails decision-making in the

programme. The university must explicitly define the role of the programme coordinator. This definition must include the relevant authority indicative to this leadership position with incentives attached to such a portfolio.

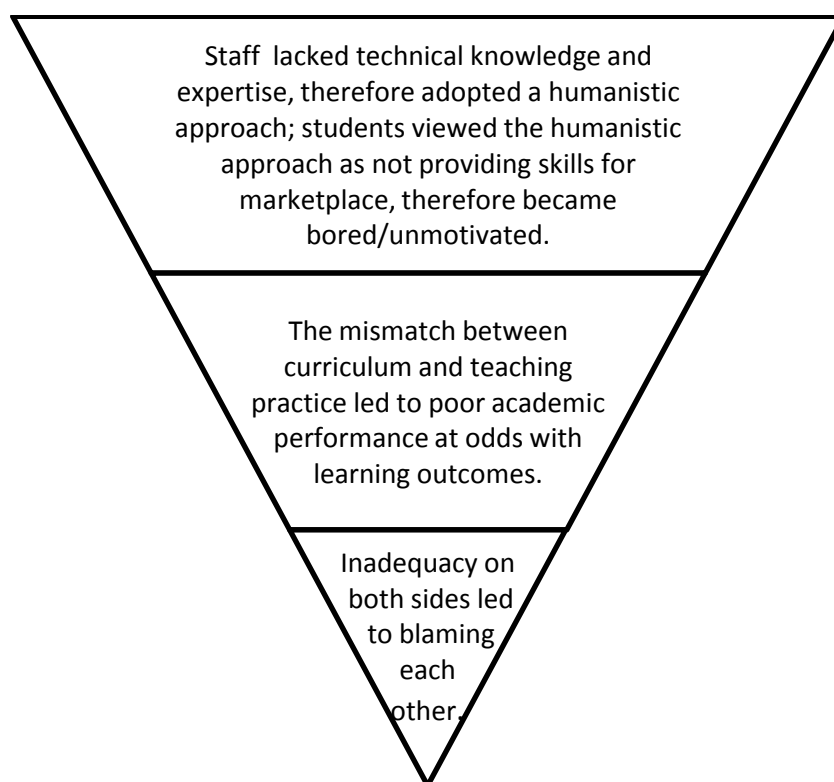


Figure 5.1 Systemic conditions for potential harm (adapted from Keats 2012: 41)

The systemic background conditions that created a “funnel” type effect of potential harm in the Photography Programme are summed up in Figure 5.1. The downward spiral took the following path:

- Staff development was problematic: personal studies affected subject delivery, and staff lacked the advanced technical knowledge and expertise to start catering for the millennial generation (see Programme Review in Appendix D, Section 2).
- Solution: staff adopted a humanistic approach which ignored or played down the issue of using technology in teaching and learning which was the preferred option by the millennium generation.

- Result: mismatch between curriculum (as in study guides) and teaching approach, lecture content and practical application.
- Staff became unmotivated (felt incompetent or inadequate due to the generation divide) and started shortening and or conflating sections of the syllabus.
- Students felt that the humanistic approach was not assisting them to master the technology needed for them to obtain employment immediately or in the near future (Appendix D, Section 2).
- Students, therefore, became bored and unmotivated and did not attend lectures.
- The mismatch (between curriculum - as in study guides - and teaching approach, lecture content and practical application) led to vague or confusing test and assignment rubrics, which were at odds with the outcomes.
- The above led to poor student performance (At Risk students, in Appendix C).
- Staff became further unmotivated, and both staff and students blamed each other.

It must be emphasised that, while the specifics of the above were related to the Photography Programme, they are typical of the “malaise” which affected DUT as a result of the institutional merger in 2002. As Makhubu (2011: 151) states: “the legacy of the merger led to instability at both executive management level and in the DUT Council”. According to Makhubu, this instability was the direct cause of the “university restructuring” (see 2011: 129) which led to the merging of academic departments. The restructuring in turn led to administrative and curriculum problems, and further demoralized staff. The overall causes were then systemic, and not just related to one academic department or programme. As in Lockett’s (2012: 7) case, the present day problems were the results of a university intervention intended to improve conditions.



### **5.2.2 Critical factors which emerged**

Three critical factors emerged from this initial round of consultations and information gleaned through written texts of students' experiences in class assignments. Firstly, some staff appeared to lack advanced technical subject knowledge and expertise, as well as the inability to manage their working time appropriately. Secondly, class test results revealed that the students were struggling with the skills necessary to read and write at university level. Feedback on student performance in the area of Applied Photography revealed the students' inability to manipulate and create commercially viable photographs to meet the ever-changing demands of the photography industry. Finally, the deadlines for submission of assignments by the due dates were inconsistently applied (see Programme Design Findings in Appendix D). The challenge was, therefore, to retain students' interest with new and interesting teaching methods and provide professional development support for academics on the use of technologies that could add value to their teaching as well as their students' learning and eventual professional development and job marketability.

## **5.3 Exploring the option of using multimedia resources in blended learning delivery**

In Chapter 2, the various options for a college e-learning approach were reviewed and evaluated in terms of their suitability for use in this context. The conclusion was that the most suitable option would be a blended learning approach using curated digital resources on an Internet portal. A Moodle server was already in operation at DUT, and had been testing out for online sales of graduation photographs. It was found to be suitable for the kinds of multimedia resources used in the Photography Programme and was user-friendly. For these reasons, this server was used as the learning management system (LMS) to pilot the Internet portal. However, there was still the issue of identifying the various types of offline resources existed at DUT, both for continued offline use in the blended delivery and for future archiving online in digital form.

This primary investigation focused on improving the use of existing resources and/or acquiring alternatives to improve traditional lecturing methods with

technology (this conforms with Guideline 3 of “Design Evaluation” in Table 4.4). This process, in turn, could lead to positive steps in professional staff development, ultimately benefiting the students in the classroom. In a Photography Programme meeting held to address the students’ allegations and concerns, it was suggested that every academic should attempt to transform delivery with the use of technology-based resources. In addition, a virtual teaching approach should be adopted to improve teaching and learning approaches.

This plan also included the following requirements, which are, to some extent, mandatory for effective teaching and learning:

- the preparation of new and detailed lesson plans;
- the requirement that assignment instructions be explicitly described;
- the necessity for compiling and maintaining accurate attendance registers;
- that model answers should be readily available for theory subjects; and
- the proviso that all the above documents be signed by the lecturer and the class representative.

Finally, all documents containing the above planning elements needed to be checked for validity by the Programme Co-ordinator.

It was emphasised that this was a “pilot approach” to dispel the idea that setting this course of action acted as justification or confirmation of either student or staff allegations. Furthermore, the researcher undertook to provide the initial multimedia educational resources to supplement the lecturers’ resources, wherever possible. The digital material would be sourced, produced, and/or acquired for all of the lecturers concerned. It was anticipated that the transition to digital material was not going to be an easy task, as not all staff members were familiar with digital transmission of lectures. However, positive results were also anticipated, for, as Green (2006: 10) emphasizes, “teaching with digital features often leads to discoveries about new ways of teaching”.

It must be emphasised that the suggested improvements were not just in the nature of the “‘common sense’ pragmatic approach” criticised by Luckett (2010: 1). Luckett points out that evidence for improvement is often gathered from people without a consideration of the mechanisms (both cultural and structural, and usually hidden), which created the current adverse operating conditions in the first place. In this case, the researcher had identified the most significant mechanism operating in the background as being the down-spiralling “funnel of harm”. Its most significant feature was the marked mismatch between pedagogical needs and actual educator delivery, this being the main cause of discontent. The identifying of background social and cultural mechanisms is an advantage of using a morphogenetic action research cycle, as used in academic development by Luckett (2010, 2012) and Quin (2006), as compared to the traditional action research cycle. In the latter case, the underlying social conditions, as well as the background in which they developed, are often not considered as being part of the problem to be solved, and participants’ experiences are accepted at face value. In this case, the digital enhancements were envisaged not only as being a “stock” general improvement but also as an effective solution to the cause of the underlying problem. This was that staff members were not keeping abreast with the technological advancements which their students need to master to gain employment (i.e. Industry requirements). There was also a mismatch between their subject content (i.e. advanced digital multimedia) and the preferred teaching methodology (i.e. talk and chalk).

### **5.3.1 Offline resources available at DUT**

In this section, the researcher will discuss the computer based resources available at DUT as part of the specific objectives of this investigation (i.e. both facilities and current use of these) as recognised from interviews and webinar interaction with DUT staff.

#### *a. Interviews with staff*

Meetings were held with the staff of the DUT Centre for Excellence in Learning and Training (CELT) for advice and suggestions on revising the overall syllabus and improving students’ literacy skills. The discussions included a five-day staff

development/retraining workshop, which was held in November 2009 (Appendix E).

As part of the data-gathering exercise, the researcher approached staff from nine departments at the university. The participants were identified as online administrative staff and practitioners, and the exercise was intended to review their use of hypertext and/or multimedia (Appendix F). Seven responses were received from the review exercise. This was followed up with on-campus semi-structured interviews with five respondents. Responses to surveys from service and academic departments tended to be cautious. A probable cause was that several surveys were being conducted simultaneously on various studies at the time of this investigation. However, colleagues who were involved in an earlier e-learning professional development project provided valuable guidance and support to the researcher. These included on-line practitioners from the Engineering and Management Science Faculties. The latter shared web links to various online sites such as the *Adobe Youth*, as shown in Table 5.2.

The Engineering department highlighted the events leading to the fact that numerous staff members were now engaging in several teaching programmes through the Moodle Learning Management System (LMS). It was regrettable that not all respondents participated in the survey, but those who did used the interview opportunity to harness future collaborative student assignments between their individual and Photography programmes, creating synergies across Faculties.

A setback in the drive to use Internet resources was that one online class had to be downsized owing to the loss of a faculty computer laboratory. However, the programme continued online using email transmission. A Support Department provides customised slide templates, graphics and other digitally prepared notes for academics. One half-day and four full-time staff members operate from the department. The *Pioneers* online course run by CELT (DUT's educational technologists) introduces staff members to digital teaching and learning. Staff at all levels (probationary to research) attend the *Pioneers*

course to develop their own discipline-specific applications of both blended and online delivery.

Concerning storage of digital images, answers varied among the consumers; some users archived their resources on either the Blackboard or Moodle servers, external hard drives, DVDs, programme servers, personal computers and/or flash drives. Power Point was the preferred medium of delivering lectures. Lecture delivery and on-line access were usually achieved through dedicated programme computer laboratories. On average, seventy-five per cent of digital resources were sourced freely through the Internet and twenty-five per cent were purchased, as related by one respondent. Technological and content support through various DUT support departments was judged to be excellent. Copyright issues were problematic owing to the apparent ease of copyright infringement and lack of knowledge as to precisely what constituted copyright infringement in specific contexts. Most newspapers granted permission favourably for reproduction while others slowed down the process through bureaucracy and the need to adhere to company policy.

#### *b. Webinar interaction with staff*

Indicators to further resources emerged during DUT's Centre for Excellence in Learning and Training (CELT) in the *DUT eLearning Festival* in 2011. The webinar interaction provided greater information from staff than that given to the questionnaires used in the interviews. It revealed that there were numerous digital interventions already in place by six DUT practitioners, mostly using the Blackboard (LMS). The presenters revealed that many students were pleased with the online services as noted in their student satisfaction surveys. However, one Department presentation disclosed that some postgraduate students were not yet prepared to embrace digital learning. The first-year Photography students in the survey (2011) reflected a similar view.

The presentation by Gabi Witthaus (from the University of Leicester), one of the keynote speakers, dealt with the Open Education Resources (OER) project. Witthaus (2011) commented on the initial project of OER offered through MIT and made available through the Creative Commons Attribution, which could

reduce the concerns of breaking copyright laws. It was also stated that teachers in African countries were happy to use the UK based OERs (in the inception phase). The Vice Chancellor's address reinforced the use of e-books and spoke positively of institutional support to promote digital learning, addressed the issues facing under-prepared students entering university and emphasised the redefining of subject content during the current re-curriculation exercise.

The webinar participants' suggestions for using e-books strengthened the researcher's argument that this is a cost-saving exercise. This is evident with the easy storage of metadata in photography software such as Adobe Lightroom. The researcher's personal experience in having to research through countless books, scan images and wasting hours searching for incorrectly filed information stored somewhere on the computer desktop or the Internet highlighted the importance of curatorship by editing subject content into module form and making it available through the curated multimedia portal. This is a time consuming but achievable task, and is more cost-effective in the long term. However, there were differing views on using unedited learning material from overseas countries allegedly due to lack of a common terminology. Witthaus made the following comment at the *DUT e-learning Festival* in her keynote address:

...I made reference to a paper by Andy Lane at the Open University, who found that in the early stages of OER creation, authors had attempted to transform their materials to make them more appealing to a global audience, but this had been very resource-intensive and there was no evidence to show that it made the materials more usable by others. Research by the TESSA project in fact showed that teachers in African contexts did not mind the "Euro-centricness" of UK-produced OERs – they understood that the materials had been produced for use in a specific context, and that they needed to be adapted and mediated for learners in other contexts (2011: [1]).

However, Murrell (2001), in a personal communication, pointed out that ESL students had problems with American based educational terminology, such as the use of the term "sidewalk" instead of pavement.

The technical example given by Rowse (2011), when discussing the effects of an incorrectly colour balanced digital camera, highlights the importance of editing “factual” information, especially from Internet resources. According to Rowse, when a photograph is captured under fluorescent lights, this results in an overall blue cast to the photographs, while tungsten bulbs add a yellowish tinge (see Figure 5.2). This was at odds with the researcher’s photographic experience, as lighting based on South African voltage standards could be seen to produce a different effect (i.e. a green, not blue cast, under fluorescent lighting).

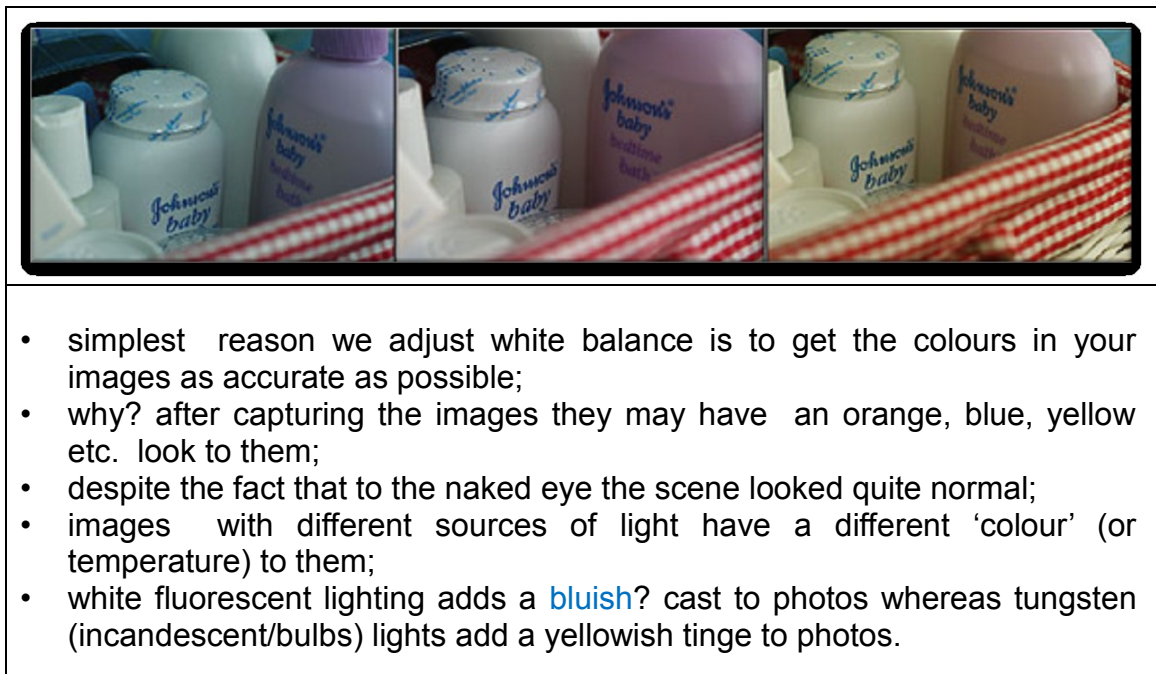


Figure 5.2 Lecture note illustrating how colour balance may vary per voltage standard

This type of technical advice must be rectified by referral to content specialists *au fait* with local conditions to avoid misleading students. The researcher cautioned colleagues and students on the potential dangers of using unedited curated material by using this example (i.e. in Figure 5.2) during the Techniques 2 lecture in 2011. The implication was that staff and students should verify any

online information not on the curated portal to see whether it was accurate under local conditions (i.e. for tuition and actual use).

*c. Conclusions drawn from interviews and webinar*

Two website administrators provide invaluable technical support for online delivery at DUT and maintain the online platforms in use at DUT, namely, Moodle and Blackboard. Most users were comfortable with the Microsoft Word range of software. It is hoped that the multimedia material currently available on the curated beta site will encourage an exchange of ideas and resources among the various disciplines, as observed in the webinar presentations. Shaw (2000: 2) offers the following advice: “ill-defined and difficult to standardise projects are prone to failure, and can confuse students”. Shneiderman (2002: 1), in his book, *Leonardo’s laptop*, reinforces this statement by challenging hardware and software developers to build products that support human needs and which are usable at any bandwidth. In terms of text-based information, Adobe Acrobat was preferred as the format for reference notes for access on either Microsoft- or Apple-based computers. Digital images were saved as jpg files for lecture presentations.

It must be emphasised that, with the easy availability of the Internet, computer literacy goes beyond merely text and image: the challenge is to be able to navigate through a myriad of complex and confusing information in a comfortable manner. The ability to navigate may be the main form of literacy for the 21<sup>st</sup> century (Brown 2000:6). The researcher believes that the content on the curated portal will continuously require a thorough website analysis and experimentation, including input from subject or content specialists, periodically. The same principle will be applicable across disciplines, as noted from the staff interviews and from the webinar presenters.

**5.3.2 Visits to photographic trade exhibition and educational institutions**

In mid-October and early November 2011, the researcher visited three established consumers of digital media. The visits included the annual Photographic exhibition and Film Exposition (Expo) in Johannesburg (13-15 October 2011), external moderation at a University of Technology in the



Gauteng region (2 November 2011) and a private Multidisciplinary Art College in KwaZulu-Natal (11 November 2011). These field trips focused on investigating current trends of increasing or improving the use of existing facilities and planning for the improved use of scarce resources in the proposed multimedia educational portal.

*a. Photo and Film Expo*

The Photo and Film exhibition (Expo) was widely represented by the major photographic suppliers, including Nikon, Canon, Broncolor (Flash Packs), Adobe (Software) Epsom (Dye Sub Printers, Apple (Computers), San Disk (Memory cards) and Zeiss (Professional lens manufacturer). All of these brand names make up an important segment of the photography industry and related peripherals. The majority of the suppliers are based in the Gauteng region, and current contact is mostly via retail suppliers. Also present in the exhibition were representatives of the Professional Photographers of South Africa (PPSA-Educators' Forum). The annual exhibition event is usually attended by academics, professionals and emerging student professionals.

The exhibition featured live workshops (including those run by international guest speakers) and displayed the latest photographic equipment available in South Africa. These types of exhibitions offer discounted prices for expensive photographic equipment, and, in 2009, the Photography Programme acquired the professional SINAR Phase One digital camera at a show price of R75 000 in contrast to the retail price of almost R250 000. Attendance is widely represented by educators from the other UoTs and provides an opportunity to develop a community of practice and gather information for the continuous development of the Photography Programme.

The Expo revealed that a common trend among most of the studio photographers was the use of very large umbrellas or parasols, soft boxes and transportable flash lighting kits. The movable lighting systems included the use of battery-operated power packs. The high-end digital cameras showed the use of LEAF digital backs that support traditional medium- and large-format cameras such as Mayima RB, Hasselblad and SINAR cameras. There was a

distinct omission of display of medium- and large-format traditional cameras, but an increase in the display of digital single-lens reflex (DSLR) cameras. For the emerging photographer, there was the demonstration of portable off-the camera flash heads, fired through remote triggers, which provided useful ideas for location photography.

The popular use of painted canvas backdrops and portable reflectors on stands was another observation. The use of continuous light source for digital still photography is starting to improve as a wide array of larger lights and reflectors are becoming available. Most of the photographs displayed by local camera clubs and colleges were mounted on traditional cut-out boards. The large photography display by Epsom printers, as shown in Figure 5.3, was a popular attraction.



Figure 5.3 Photo and Film Expo, Epson printers (Bhorat 2011)

The Expo also revealed that professional photographers are using computers as a “tethering tool” so that the images, whether captured on a digital single-lens reflex or medium-format camera (Hasselblad), are available almost instantaneously (including the Adobe Lightroom presentation). Nikon cameras were the most popular choice among the skilled photographers, as a backup service is on hand worldwide if any camera goes in for repairs. Conventional black-and-white photography is still taught at some UoTs. This is possible with the specialised obtainability of traditional film, chemistry, enlargers, and other

features available from 35mm to large format 4x5s through a Cape Town-based distributor.

*b. Visit to a University of Technology in the Gauteng region*

One of the researcher's findings as an external moderator (November 2011) for the diploma level of the Photography Programme at a Gauteng UoT was that moderation is now conducted by a practising photographer as well as by an academic (the latter being the researcher). A common trend at the UoT is the additional use of professional photographers and/or software specialists for their applied teaching and learning. These practising photographers employ the students for two weeks of the year as part of the programme's in-service training. The combined evaluation arrangement helps to provide a balanced view of the photographic industry requirements as well as input from other Higher Education Institution representatives. The students' examination submissions of digitally printed images were presented in a customised photo album. In addition, their electronic portfolio contained both low and high-resolution images. This is a necessity, as the images are used as future online resources and hard copies by the university.

A tour of the Photography facilities revealed over 800 square metres of teaching and office space. The large studio design includes drive-in access and handles seven studio setups simultaneously, mostly for First- and Second-year students. A smaller studio is available for capturing advertising product assignments. Some of the traditional black and white and colour darkrooms and processing facilities have been renovated as individual computer cubicles, thus expanding their facilities to increase their digital component of teaching. The Black and White conventional photographic printing equipment is being replaced with dedicated computer laboratories with Apple Mac as the popular choice for all years of study. For all theory lectures, a single lecture venue is used, which includes standard audio-visual equipment found at most SA universities.

*c. Visit to a private college in KZN*

The private college offers a Higher Certificate in Photography and an Advanced Certificate in Professional Photography. Their recruitment advertisement

states: “over half of all photographers are self-employed - a much higher proportion than any other occupation”. It adds: “advances in digital technologies with regard to photography, web design, graphic design and associated disciplines have spearheaded the convergence of these previously disassociated fields”. Their academic staff component is complemented with practising professional photographers. Their photography is mostly digitally based and designed to equip students with real-life skills. As occurs in the Gauteng UoT, digital printing is outsourced to commercial laboratories either in Durban or Gauteng. The student displays were in the form of coffee-table books and large display images which require the services of professional laboratories.

#### *d. Conclusions drawn from visits*

The field trips to universities, the ready availability of e-books and a webinar interaction on photography revealed that there had been a marked increase (as mentioned earlier) in the use of digital media in photography education. The e-books were those produced by Sharboneau (2010), Rowse (2010), Bockaert (2001), World Photography Organisation (2012), Brown (2011) and Farese (2011). In addition, the electronic portfolios at the universities visited contained low, as well as high-resolution images, meaning that they could more easily be accessed online. The writings of Orlikowski (1992) on the subject of sustainability of human action through the adoption of technology appear to justify the use of digital media for the new generation. These observations were presented to the Photography staff in November 2011 (as part of the objective of this investigation and possible use for annual Quality Improvement Plans).

The exposition of student portfolios at the two educational institutions revealed the use of digital imagery as hardcopy and accompanying CDs which were clearly identifiable, consistent in file format and final presentation. The visits also emphasised the importance of keeping pace with technological advancements which are escalating on a daily basis. Based on these observations, interviews and use of digital technology, a common theme emerged, that is, of institutional preparedness in the use of digital imagery. Development in digital technology advances rapidly, and one needs to keep

abreast of the changes. Teaching with images is also a skill that has to be perfected, as highlighted in Green's (2006) investigation into using digital images in teaching and learning. There are certain guidelines that one needs to follow, such as those offered through the Open Archival Information System (OAIS) functional model regarding the curation of digital archives.

## **5.4 Developing the artefact in a pilot study**

This section show the results of carrying out objective 3, which was to develop the e-learning option suggested by the answers to questions 1 and 2 (i.e. the most suitable option to address the pedagogical needs identified). The purpose of the pilot study was to evaluate the proposed artefact with various users, and draw on the user experience and examples of successful adoption of e-learning programmes (see Table 5.2). The piloting phase occurred in three areas of operation:

- A staff development programme run for Photography at the Centre for Educational Learning and Teaching (CELТ), run as a five-day workshop;
- The development of a prototype website on the DUT Moodle learning management system (LMS); and
- The setting up of online sales for DUT Graduation photographs.

### **5.4.1 Staff development programme run for Photography**

A support and training workshop for all programme staff, representatives from the student body, and the Faculty Quality Promotion Officer, was conducted by CELТ in November 2009 (see Appendix E: this relates to "Problem Relevance" in Design Science Guideline 2 in Table 4.4). The intention was for all staff to have a clear vision of their roles and responsibilities and to provide the best and new teaching methods for their students. The following items headed the agenda for the Photography Continual Development Re-training Workshop held over five days in November 2009:

- identifying and selecting new teaching strategies and resources;
- preparation of study guides;
- identifying outcomes;

- assessing learner assignments; and
- highlighting the importance of teaching in accordance to a prescribed study guide.

Concurrently, an intensive Internet search located specific books and DVDs which could be used to enhance teaching resources (see Appendix H: this relates to Design Science Guideline 6 in Table 4.4). These materials were ordered through the DUT library. Free on-line registration with the Digital Photography School (DPS) (Rowse 2009) based in Australia revealed a wealth of primary data as camera technique tutorials are posted to subscribers on a weekly basis. In addition, Brian Ratty's (1998) on-line Photo Seminars photography course revealed valuable curriculum content for the theory subjects, which could be linked with the existing guidelines suggested by the South African Qualifications Authority (SAQA). It was gratifying to note that Rowse (2009), from the DPS, sent out a communication to all subscribers permitting the free-use of its educational tutorials under certain circumstances to ensure that copyright rules were adhered to (Appendix E, Section 2).

#### **5.4.2 Development of a prototype website**

The initial downloads of tutorials (as discussed during the CELT workshops) were sent to all academics in January 2010 within the Photography Programme for immediate use. Some authors allow the free use of hyperlinked e-books, including lecture notes (Armendariz 2010) through open courseware under the Academic Commons Attribution, and these are available on the *Photography Virtual Office* website (see Figure 5.4 - Homepage of the Photography Virtual Office). The subject content was reproduced on the prototype website in its entirety, in compliance with Copyright Laws, as stated in the respective rules and conditions of use by the various authors, but the notes are unpacked and/or corrected in the traditional classroom.

The online photography related subject content (theory and practical) included resources from Zucker (2007), Peterson (2009), Ratty (2009), Sharboneau (2010), Smith (2010), Nayar (2009), Bockaert (2001) and various independent or anonymous online authors. For the purposes of this project, the freeware

information was posted ready for use on the prototype website, with hyperlinks to the web addresses of the original authors. The complete versions of some digital resources were acquired separately (see Figure 5.5) and could be accessed from the DUT B.P. Patel Library at M.L. Sultan Campus (Zucker 2007; Ratty 2009).



Figure 5.4 Homepage of the Photography Virtual Office

### Topic 3

#### Multimedia Resources

This section contains tutorials and multimedia resources to assist with your photography course. The tutorials have not been tested for accuracy and are reproduced here in its entirety in compliance with copyright laws as stated in the rules and conditions of usage by the various authors.

The complete set of dvd's are available from the short loan section of MLS Campus library. Additional material will be made available by the respective lecturers.



Figure 5.5 Example of a topic leading to digital resources on the website

In addition, presentation resources (Figure 5.6) used in the student surveys (*Techniques 1 and 2*) were uploaded on to the website for immediate use (Appendices F and G, respectively). This was necessary for student retrieval.

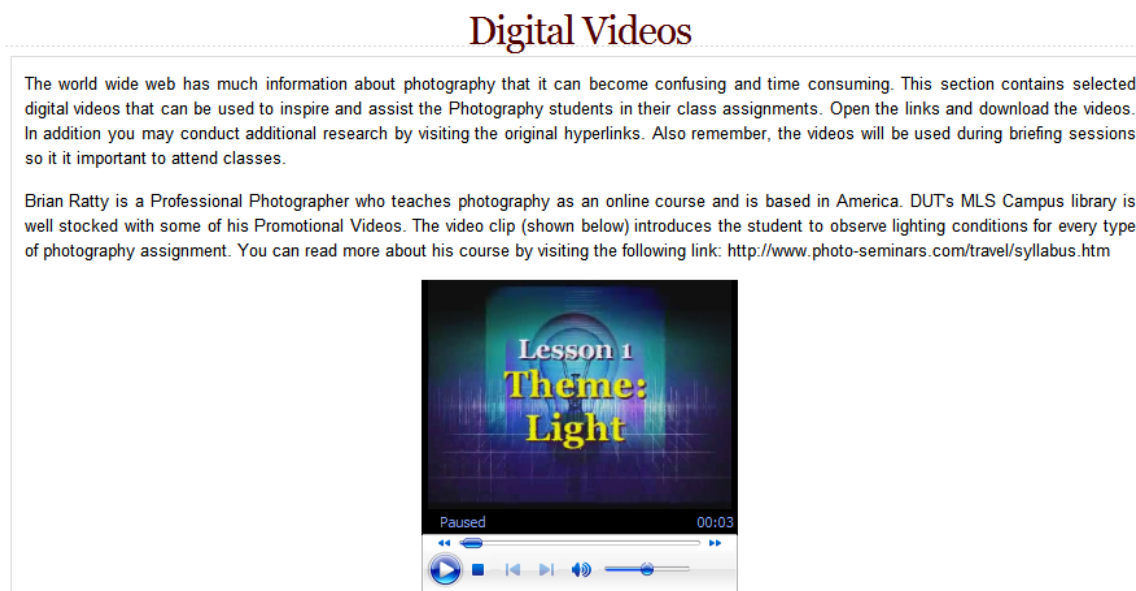


Figure 5.6 Digital resources on the portal

#### **5.4.3 Setting up of online ordering of DUT Graduation photographs**

As part of expanding digital training, in line with industry requirements (see research objectives 2 and 3 in Table 5.1), the Programme used the limited budgets creatively to upgrade some of its existing facilities. These involved items such as the computer laboratory, an additional large format digital camera, and professional digital studio lighting. The Photography Programme, at that point, was equipped with fully fitted three photography studios, professional digital studio cameras (Hasselblad and SINAR), several Canon digital single-lens reflex cameras and a digital computer laboratory comprising professional software (Adobe Photoshop) for image enhancement, manipulation and printing. However, enlarged colour printing was carried out on traditional darkroom enlargers, which were time-consuming and becoming very expensive (this traditional printing method was gradually being superseded with digital printing at both local and international industries). The Photography



Programme was thus in a prime position to offer adequate training at an advanced level, including digital printing. This training would better prepare the graduates when entering the job market. A business plan was submitted to the Executive Management of DUT and a conditional loan of R500 000 was granted (see Figure 5.7).

**EXECUTIVE MANAGEMENT COMMITTEE MEETING:  
18 JUNE 2009**

**MINUTES** of the **EXECUTIVE MANAGEMENT COMMITTEE** meeting held on  
18 June 2009 commencing at **10:40** in the Vice-Chancellor's Meeting Room, 1<sup>st</sup> Floor, Milena Court,  
Steve Biko Campus

<b>4.3 Request for high speed digital printer</b>	<p>It was noted that:</p> <ul style="list-style-type: none"> <li>• Tenders take place to outsource printing at high costs.</li> <li>• Once DUT obtains this printer, DUT can also tender for other work at other institutions.</li> <li>• EM agreed to consider this proposal and support their request for approximately R500 000.</li> <li>• The VC indicated that DUT has the funding for this printer and the costs can be recovered within 3 years.</li> <li>• This should be considered as seed funding or a loan account and the funds should be recovered and the profits should be split between the Institution and the department.</li> <li>• Prof. Jordaan requested that AV staff should move to the Multi media centre.</li> <li>• A strategic document should be put together regarding the AV staff.</li> </ul>	<p>Mr Kumar</p>
---------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------

Figure 5.7 Minutes of meeting where loan was approved for digital equipment

The idea of acquiring a high speed digital colour printer capable of producing good-quality images on a large scale with existing digital cameras in any studio or location application relates to “Communication of Research” in Design Science Guideline 7 in Table 4.4. It also complies with Management’s policy on promoting e-learning. It was anticipated that the printing facility would also reduce the cost of using external commercial laboratories for student assignments and portfolios. This project would “dovetail” with the re-offered BTech qualification, which included Professional Project Management for postgraduate students as well as for those who wished to enter the job market immediately on completion of their diploma. The student reflections of this exercise are included as the first case study of using digital imagery in a commercial environment (part of Research Rigour in Design Science Guideline 5 in Table 4.4).

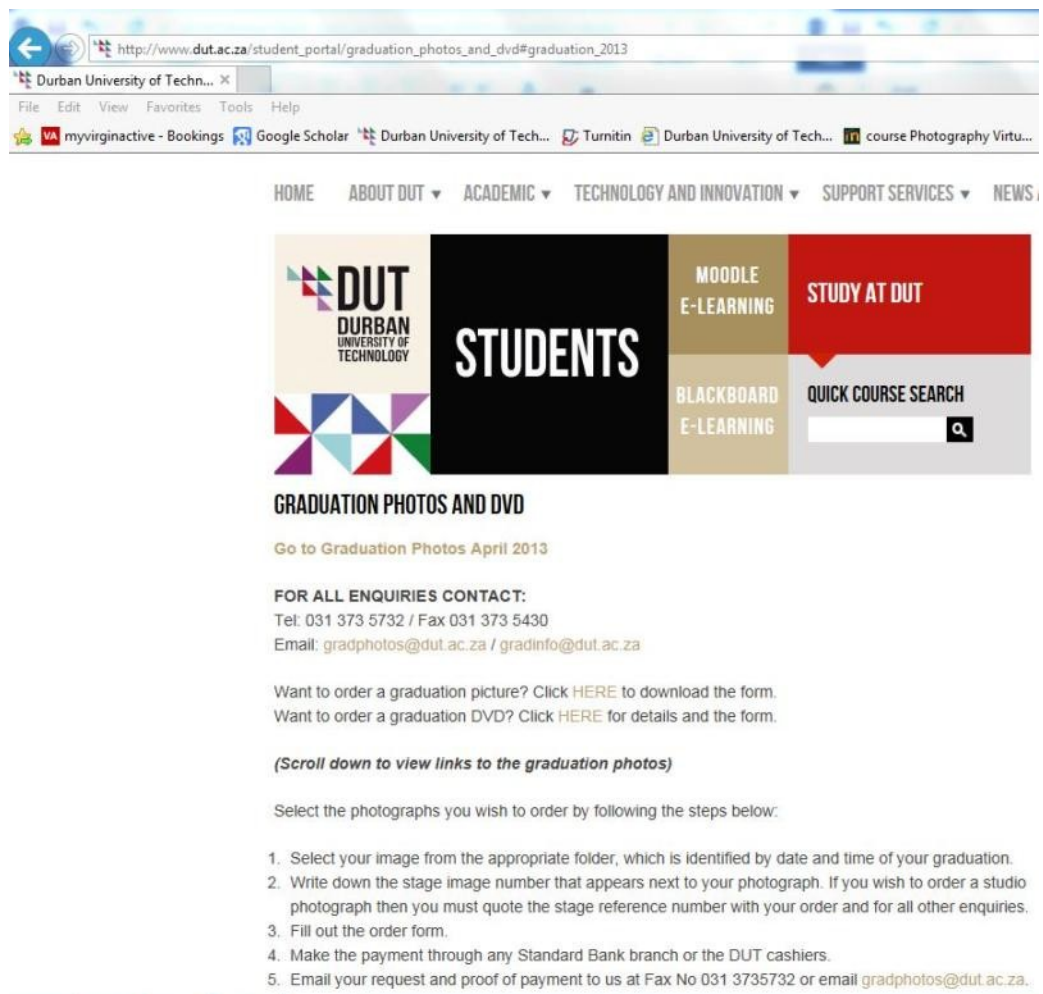


Figure 5.8 Home page for placing orders of Graduation photographs

Keeping the business training objectives in mind (part of the new syllabus), together with the proposed business plan, the Photography Programme staff embarked on a project to teach students “prestigious events” photography. This was intended as part of work experience during the university’s annual graduation ceremonies. This option was extensively discussed and approved at a programme meeting, and would form part of innovative Teaching, Learning and Assessment. The display of digital proofs became available through the DUT website for online placement of orders (see Figure 5.8). The uploading of images was carried out concurrently with that of other digital media (videos) used in the proposed curated portal. This exercise highlighted the importance

of ensuring the use of accurate meta-data for display and print, resizing images for the web and maintaining records of sales for audit purposes.

It was found that some users (mostly new graduates) were not familiar with online ordering procedures, and could not locate their images due to various reasons, such as poor resolution monitors. This occurred despite the fact that the digital images were clearly identifiable through venue, date and time of graduation. These clients were guided telephonically through the online order process. Other clients struggled with filling out a specially prepared online order form. These “problems” resulted in wasting time with the actual order but were noted as important factors when designing an online portal. Some graduates opted to come on campus to the Programme office and have their orders processed manually.

The use of a commercial venture provided an epistemology (which only became apparent in the graduation learning experience) for the educational portal. It was noted that a twenty-four-hour operation of a help desk is necessary when designing an online sales portal, due to unforeseeable questions which might arise during use. This is especially important for those clients who now have access to hypermedia communication via mobile telephones. However, for those users who may experience difficulties due to unfamiliarity of working with hypermedia technology or not being able to access or unable to afford the technology, the option of the traditional order system should always be available. This principle is similar to the planning by a good presenter when one would carry a set of hardcopy notes in the event of electronic failure during a talk.

The following critical elements emerged over the course of this exercise:

- Images must be professionally rendered with regard to technical aspects such as exposure, composition, and focus at the time of capture.
- Each photographer should maintain a record of the number of images captured, and extra images should be taken during capture to ensure the subject’s eyes were not closed during exposure.

- Every photographer should complete post-production so that he/she can rectify any shortcomings (in future) at the time of capture and waste less time during post-production.
- Networked computers must be operational at all times; downtime must revert to DVD backup copies of all images.
- There should be evaluation of students working in any commercial endeavour to ensure quality control.

The value gained from this initiative enabled the researcher to apply a hands-on approach and view this exercise as a financial viability/management tool for the Photography Programme. Personal disappointment arose when staff could not complete the workflow as originally planned. Others did not see the value of using this “out of the classroom” learning strategy to apply practical photography in a real-world situation in spite of Bawa (2011) exhorting staff to make learning “exciting”. The researcher’s sacrifice of his vacation time was rewarded when participating students spoke positively of this innovative teaching and learning experience. For example, Student G, in his reflective journal report, commented as follows:

Graduation has the potential of being a great for Work Integrated Learning for the Department. In its current form it needs a lot of work. There is a lot a student can learn by working during the Graduation, which covers all the subjects. It needs to be worthwhile for the students especially 3<sup>rd</sup> and 4<sup>th</sup> year. It should not be something a student feels forced to but something a students wants to do (sic).

For 4<sup>th</sup> years it should be a worthwhile option that they can put down as work experience when looking for work and should be equivalent to working in a photographic business. It should go all the way from the graduation ceremonies to post-production to printing, of which will give a student a great set of skills.

The critical reflection of each cycle helped to develop the process further. The researcher, in collaboration with students, would first recollect the day’s events and then put into practice the design of new steps. For example, when the networked computers stopped working, the students immediately took the initiative of retrieving a backup hard drive.

## **5.5 The prototype multimedia portal**

Setting up a prototype multimedia portal first involved visiting other instances of educational Internet portals to assess their potential effectiveness. Next, the Photography portal itself was set up on the Moodle LMS to ensure functionality and fitness for purpose. Finally, freely available multimedia resources were posted on the portal, but were first curated to ensure suitability for the context, target audience and pedagogical purpose.

### **5.5.1 Insights gained from visiting other educational portals**

Previous experience as an online practitioner highlighted the importance of providing easily understood assignment briefings and notes to students as hard copies, which were discussed during lessons. The widely publicized global collapse of the BlackBerry Services in October 2011 (Williams 2011) over a two-day period reinforced the view that technology can fail at any time, and a substitute plan should be available to handle such problems. It was, therefore, imperative that no discrepancies existed between data uploaded onto the educational portal and hard copy notes or handouts (at the students' request, as discussed in Chapter 6).

Before setting up a prototype portal, the researcher investigated other instances of educational Internet portals (or similar websites) set up by universities and colleges. An investigation into South Africa's leading distance learning university website revealed the use of very clear guidelines, and delivered tutorials are mirrored on their website. The development of the Bigshot prototype digital camera (see Appendix B) at Columbia University is available on the university website as well as on YouTube (Nayar 2009b).

Green (2006: 7), in the Wesleyan survey, recommended a sharing of resources, either at a central point or contributing information to a national resource. He established "structure and mechanisms to enable legitimate peer-to-peer authenticated file exchanges among faculty worldwide". Dolphin, Miller and Sherratt (2002: 5) highlight the issue of content management as being necessary to ensure the validity of information which has been gathered

together from different sources. Their paper supports the researcher's view that the curated educational portal should be easily accessible, allow content to be edited, and should be used as a first entry point of enquiry for both staff and students.

According to Shaw (2000: 35), one of the reasons why multimedia projects fail is because of the unrealistic mismatching of skills and roles of the actual development and production team. Various components such as audio and video compatibility may also have their own design peculiarities. For example, as shown in Appendix I and J in the digital Bockaert (2001) video simulations, the use of graphics requires expert personnel, well versed with editing, animation, graphics, product testing and proof-reading. Obviously, such a large team is out of reach of most educational institutions owing to escalating costs and diminishing budgets, and, hence, the option of curatorship is argued to be a cost-effective option.

Shaw (2000: 36) further suggests clear communication between all role players, and clarifying expectations is essential to avoid disputes on how particular tasks should be accomplished. Intervention may be required to set up training strategies such as cross training to increase the awareness or skills within the various interest groups. For example, ITC-skilled programme developers will learn more about subject content by working closely with academics in the disciplines. This "osmotic" effect creates excellent opportunities in development work, concludes Shaw (2000: 36). It was, therefore, necessary to conduct a survey of existing facilities at DUT to avoid a duplication of resources and to share expertise across campuses. One of the key issues was cost, for both the Programme and the students, as there were no funds available to support the project.

### **5.5.2 Setting up the prototype multimedia portal**

The artefact design and modelling process involved setting up a prototype multimedia portal and included conducting a usability review, initially with external clients (online sales of graduation photographs) as described earlier.

During this initial phase, it was noted that the Apple Mac computer system proved to be more consistent in its performance than the Windows based operating system, especially regarding the resizing and uploads of digital images for the web.

Other important factors which were noted included the website functionality, navigation, copyright compliance, validation of content, help features, feedback, page layout and accessibility. Travis (2012: [1]) cautions users that “writing for the web is not the same as writing for print; people read differently on the web and expect to quickly scan content pages for information”. These comments were vindicated when it came to validation of the tutorials, which are often not accurate for local content, as illustrated in Figure 5.2. This observation highlighted the iterative design of the artefact, which should evolve with accuracy during use. It was further noted that one needs to be involved in the daily queries from both staff and students regarding constraints such as bandwidth, computer access, power grids, uploads, ease of downloads, as well as complimentary or adverse comments, and to ensure that adequate backups are available regarding any online photographic venture.

Preparation of the digital content can be very time-consuming and laborious, but is a key aspect of setting up an Internet portal. However, it is work which takes place mainly behind the scenes, and thus has been termed the “hidden labour” involved in e-learning (see Pratt 2010: 23). Comparatively, however, this was a more viable option than previously used methods of producing new in-house teaching and learning material, such as producing videos and digitizing images from hard copy books, as highlighted in the researcher’s masters study (Bhorat, 2006). In the latter instance, costing for a produced video lecture was budgeted for between R10 000 to R20 000. In searching for and managing the digital material, the researcher’s subscription (over the years) to various online newsletters provided the incubator resource for the artefact. The subsequent purchasing of e-books (at approximately R1 000), downloads of digital resources from the Internet, attendance at workshops, visits to trade exhibitions and other higher-education institutions, and interaction in webinars helped to build up an embryonic database of curated digital resources for the portal. It

was then necessary to insert meta-data (cataloguing), file and store the raw data, edit and validate the relevant material, ensure copyright laws were not infringed and, finally, upload resources onto the curated internet portal. This phase of the project will need to be ongoing.

The design of the portal is based on points derived from the researcher's online investigation of portal use at various universities and educational forums, as well as the literature available on their websites (see Table 5.2). The following universities were involved: Wesleyan University, Monash, Columbia, Wisconsin, MIT, Duke, Harvard, Rhodes and Stanford. Other institutions involved were as follows: Digital Photography School, Amnesty International, World Health Organisation and Adobe Youth. Photography School (Rowse), Photography Business and Tutorials (Barker), and Academic Commons Attributions, amongst others, revealed a wealth of information and resources which could be used in the artefact. Various universities, colleges, online newsletters and interviews contributed meaningful subject content and ideas towards the curated educational portal, as shown in Table 5.2. The institutions have used hypertext and multimedia in various forms to enable staff to create an online community of practice. In addition, their publications serve as a benchmark to update the portal continually in conjunction with subject leaders, and forms part of DUT's current re-curriculation process. The YouTube and high-definition Vimeo video sharing websites provided sample videos.

### **5.5.3 Multimedia and writing resources used for the curated portal**

The next phase of the modifying process will discuss the combination of design evaluation and research contributions (related to "Design Evaluation and Research Contributions" in Guidelines 3 and 4 in Table 4.4) as suggested by Hevner *et al.* (2004). Included in this section is information leading to the curated resources described in Appendix H (multimedia and writing material resources) and used for the prototype site. The beta site (i.e. prototype) should be regarded as an evolutionary artefact, which contributes to "research rigour" in the construction and evaluation of the design (Hevner *et al.* 2004: 83).



Table 5.2 Freely available digital resources

Universities	Resources
Stanford University	Doctoral research in field camera through computer science lets a user explore different points of focus making the images interactive and avoids the problem of losing the 'decisive moment' when capturing an image.
Massachusetts Institute of Technology and Harvard Business School	The focus was on computational photography with the use of a sophisticated processing system based on non-digital camera operation without the traditional lens. Instead, a computer processing system and various other tools were used for focussing and special effects. Free tutorials, distributed through open electronic courseware under the Creative Commons Licence, reduced the overall costs in producing teaching videos. There were easy-to-follow guidelines in producing a digital image based on the Camera Obscura (pinhole camera) principle and Histograms (high contrast line film effect).
Wesleyan University	Findings of thirty-three institutions <i>Using Digital Images in Teaching and Learning</i> contributed to changing practices in higher education. Their recommendations are freely available under the Creative Commons Licence agreement. Some of their key findings have relevance for DUT as problems and experiences are similar.
Columbia University	The resources illustrated the easy-to-assemble and revolutionary Bigshot digital camera. Their unique online and simulated visual instructions revealed innovative teaching models which could be used over the Internet and as handouts and notes to the "digital native" students.
Duke University	Duke highlighted their use of discussion forums as a community of practice in the promotion of mobiles, iPads and 3D exploration in support of curriculum development for undergraduate research projects.
World Health Organisation	WHO discussed their use of mobile technology in the medical fields, especially in rural areas.
Amnesty International and Taking IT Global	Amnesty's curriculum guide is based on the <i>Born into Brothels</i> film, the <i>Kids with Cameras</i> project. This project was extended, with workshops held in Haiti, Jerusalem and Cairo.
Adobe Youth Voices	Adobe Youth Voice is a philanthropic programme designed to provide youth with life skills in disadvantaged communities.
Monash, Deakin, Wisconsin, Rhodes and Open University	The institutions offer guidelines in improving writing skills for both under- and postgraduate students.
Online newsletters and videos	These are from the Digital Photography School, Harvard Magazine, Photo-philanthropy, National Geographic, New York Times, Photography Business and Tutorials, Smashing Newsletter, Academic Commons Attributions, YouTube and Vimeo.
DUT	This involved Photography students' survey participation in revisited lectures (Techniques I and II).

In 2009, following the staff development CELT workshops, the researcher commenced the curation process, working with numerous resources, including hypertext images and freeware. The curated materials were then passed on to all staff in the Photography Programme so that they could start using them even before the portal was set up. This meant that they would not only have access to more curriculum-specific visual resources, but would also become familiar with the types of resources which would later become available on the portal. The pre-primary investigations led to including further hypermedia materials, which were purchased either through the library or privately. All of the resources used for this investigation are ready for use on the curated portal. Access to the beta site is available to currently registered photography students. The site is hosted and maintained by the Division of Corporate Affairs at DUT.

The videos obtained from the Media College (2011), Zucker (n.d), e-books by Bockaert (2001), Sharboneau (2010) and online multimedia paper by Nayar (2009) provided the challenge to collate, hyperlink and curate the educational portal as a design science model (Appendix H, Sections 1 and 2). Green (2006: 7) states: “while faculty often celebrated the abundance of digital images that could be found online via image search engines, there was a call for more dependable, high-quality resources than those typically turned up in a ‘Google Images’ search, that are easy to use and combine with images from other sources”. He further states: “often a good resource would be discovered by accident or via an image search engine”. In addition, it was suggested (and agreed on by staff) that the best images produced by the DUT students from the tutorial-based assignments should be used as an additional resource for updating digital images on the portal. These images would first be stored in the Programme archives (i.e. for later use in student portfolios) and could then be selected for use on the portal.

However, after being gathered, multimedia-based data need to be carefully evaluated before uploading onto a website. The researcher’s primary research through subscriptions to online newsletters and newspapers provided invaluable start-up opportunities to locate such types of resources. Once selected, the raw material was archived on an external hard-drive. It was easy to rapidly convert

and standardise the digital imagery output as part of the semantic web framework. This included both moving and still imagery for ease of operation by either novice or experienced staff. In addition, the resources were evaluated as part of the *Techniques 1* and *Techniques 2* lectures (see Chapter 6). For example, in the survey lecture (PowerPoint presentation) the researcher edited material from the e-books and other Internet resources. Appendix I, Section 1, illustrates the PowerPoint thumbnail notes used in the Techniques 1 lecture. Images from the Bockeaert's (2001) e-books were "frame grabbed" using the "snipping tool" (see Figure 5.9) for use in the presentation (and subsequently, for the portal).

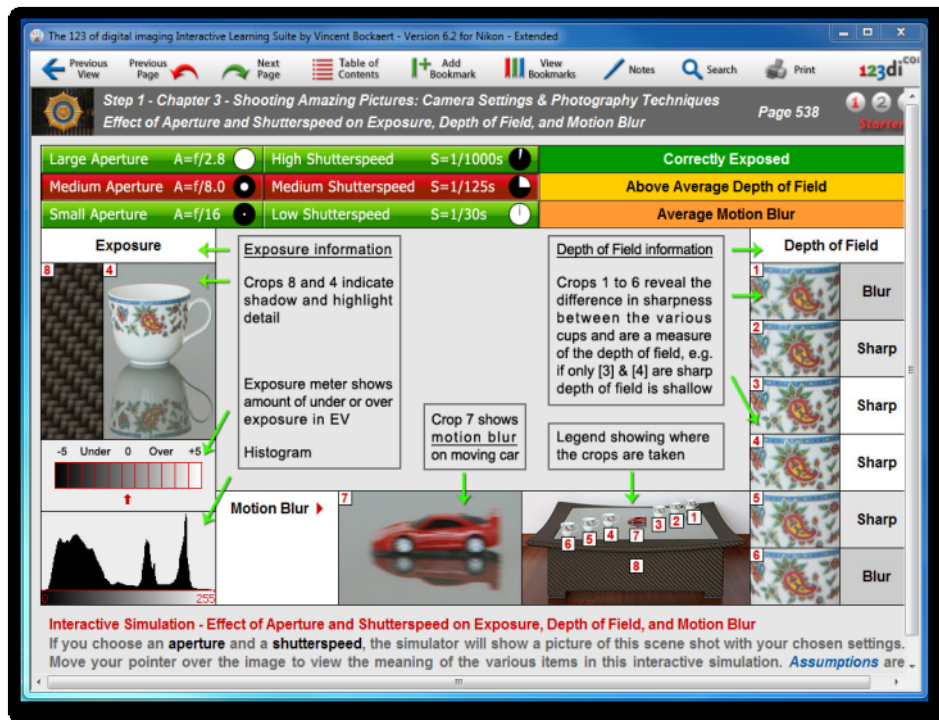


Figure 5.9 Test environment: simulation (Bockeaert 2001: 538)

Figure 5.9 shows the various options available to photographers on a simulator which demonstrates the range of shutter and aperture effects available, as based on the photographic principles, thus demonstrating to students theory and practice combined. This kind of visual demonstration is important, as students need to master both the principles and their application in practice to achieve professional looking photographs.

Bockaert's (2001: 538) camera settings, the depth of field (DOF) simulation and accompanying text needed explicit lecturer input for student understanding. The researcher made eleven single "screen dumps" and projected the images as individual slides (Slides 22 to 31, Appendix I) illustrating "another form of an incremental controlled lesson when building on previous learning", as suggested by McNiff (2002: 6). The PowerPoint slides could proceed to the next slide or reversed randomly in the class. The algorithm-based simulations became more easily understood as the students could see the linkages between changing shutter speeds, apertures and depth of fields on a large projector screen and ask questions. Subsequently, the Bockaert aperture and simulations of effects produced with different shutter speeds were digitised using the Camtasia software as a video file for future use on a computer and/or mobile device. See Figures 5.10 and 5.11 for two examples of the Bockaert e-book that forms part of the slide series which highlight the effects of the simulations. The images illustrate the effects of an underexposed image when a higher shutter speed is selected, and, in Figure 5.11, the effect is reversed, when a slower shutter speed is selected.

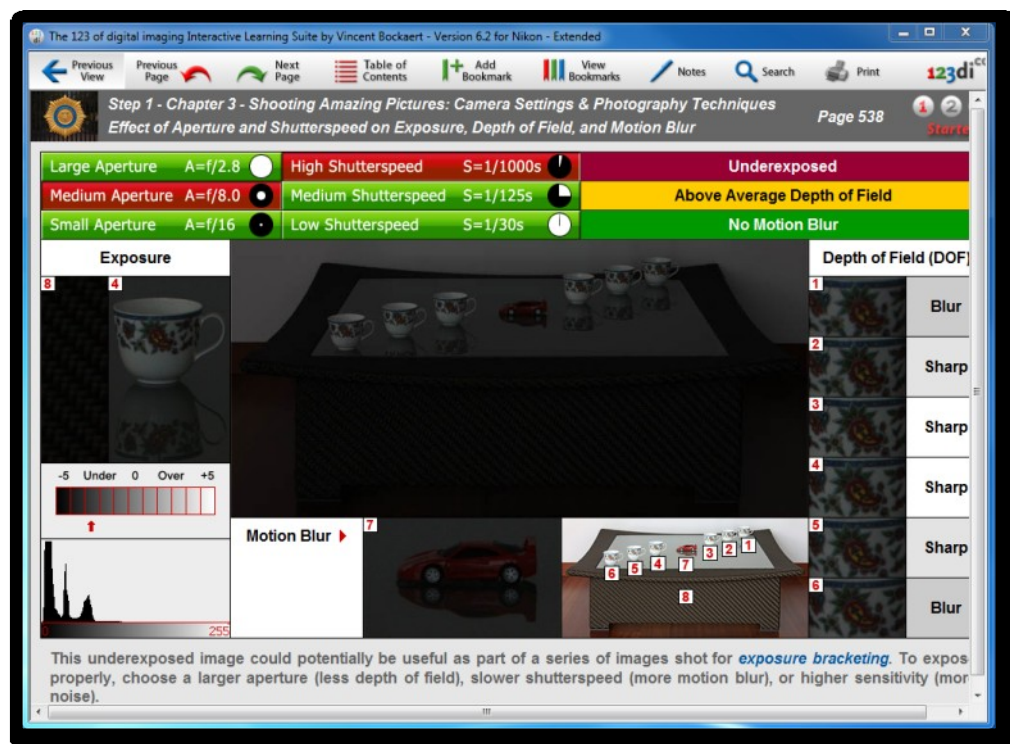


Figure 5.10 Image underexposed by moving to higher shutter speed



Figure 5.11 Image overexposed by moving to slower shutter speed

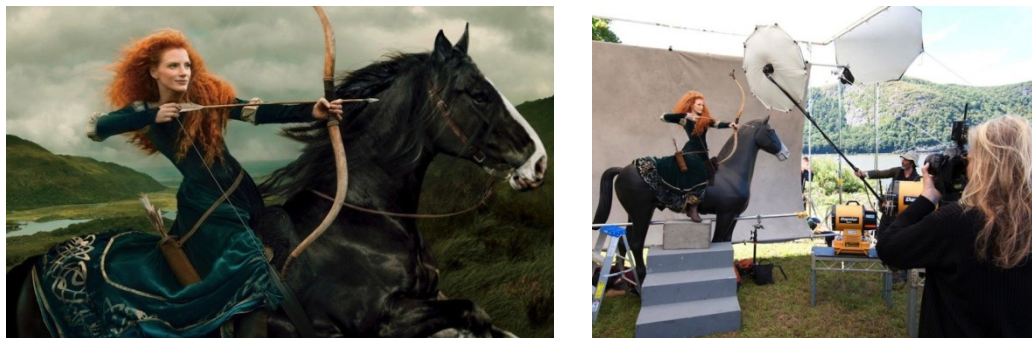


Figure 5.12 Behind the scenes of a Disney shoot (Leibovitz: 2014)

Much of the information on the e-books is hyperlinked to their original location via the Internet, thus ensuring that due and appropriate credit is given to the originator of the resource. In addition, the digital material is continually updated on various websites, and then filters through in an “osmotic effect” to appear in ever-changing forms on various photographic blogs. For example, the portrait photographer, Annie Leibovitz's (2014) collection of Disney characters captured against a green screen and then edited on Photoshop showed a mix of the old

and new techniques. The behind-the-scenes image in Figure 5.12 shows the effects of Photoshop manipulation in the finished photograph. The second image illustrates the technical aspects involved in the execution of the final image. These types of information have now become easily and quickly available through various blog sites, and can be uploaded on the educational portal just as easily and quickly, as opposed to waiting for a book to be published.

## **5.6 Conclusion**

As can be seen from the results presented, Chapter 5 went some way towards fulfilling research objectives 1, 2 and 3 as follows. The pedagogical needs identified were, firstly, the students' need for tuition in cutting-edge digital multimedia, which was necessary to meet Industry's requirements; next, the staff's need for assistance in presenting lectures on cutting-edge digital multimedia. A curated Internet portal could provide resources to meet both these needs in blended learning delivery. The development of the curated Internet portal was facilitated by feedback from staff and students, who suggested the following:

- Subject content should be regularly updated to equip students with photography-related business skills and thus prepare them for the marketplace.
- Staff needed to be more diligent in the tuition of students.
- Staff should adhere to the action plan based on the Photography Programme Review of 2010.
- Ongoing staff development initiatives should be provided by the HoD liaising with relevant industry partners.
- Heed should be paid to Management directives that teaching should not be compromised by personal studies.

The next chapter describes the outcome of carrying out research objective 3 by showing the results of testing out the curated Internet portal as part of the prototyping process.



## CHAPTER 6: PROTOTYPING THE INTERNET PORTAL

### 6.1 Introduction

This chapter deals with testing out the curated Internet portal during the prototyping process to see whether it catered for the pedagogical needs of DUT Photography Programme, as identified in the previous chapter. Table 6.1 shows how the various sections in Chapter 6 are geared to fulfilling research objective 4, namely, to using a prototyping process to test out the Internet portal in terms of its purpose and target audience.

Table 6.1 Chapter 6 sections dealing with research objective 4

<b>Objective 4:</b> to test out this option [i.e. the Internet portal] in terms of its pedagogical purpose and target audience.	
<b>6.2</b>	<b>Results of First-year student survey</b>
6.2.1	Demographics of First-year survey participants
6.2.2	Results of First-year Pre-Tests 1 and 2
6.2.3	First-year students' responses on general Internet use
6.2.4	First-year students' responses on Internet use for teaching/learning
<b>6.3</b>	<b>Results of Second-year student survey</b>
6.3.1	Demographics of Second-year survey participants
6.3.2	Results of Second-year Pre-Tests 1 and 2
6.3.3	Second-year students' responses on general Internet use
6.3.4	Second-year students' responses on Internet use for teaching/learning
<b>6.4</b>	<b>Conclusions on First- and Second-year student surveys</b>
<b>6.5</b>	<b>Results of Case Study 1: Online ordering of DUT Graduation photographs</b>
6.5.1	Linking WIL projects to the Photography curriculum
6.5.2	Creating subject-specific resources for the Internet portal
6.5.3	Providing hands-on experiential learning and faculty interaction
6.6.4	Conclusions on Case Study 1
<b>6.6</b>	<b>Results of Case Study 2: Online tutorial</b>
6.6.1	Online digital assignment
6.6.2	Narrative exercise
6.6.3	Conclusions on Case Study 2
<b>6.7</b>	<b>General feedback from users</b>
<b>6.8</b>	<b>Conclusion</b>

It must be emphasised that the testing out occurred as the portal form and content were being developed, and forms part of an ongoing prototyping and

evaluation process to determine if the multimedia resources collated for the portal would benefit students. When most of the Internet portal had been set up, selected users (i.e. current and past students) were invited to log into the portal and give informal feedback as part of the prototyping process.

## **6.2 Results of First-year student survey**

The First-year student survey was carried out with 23 First-year Photography students. The first section gathered data on student demographics. These were obtained to ascertain to what extent students' evaluative responses might have been influenced by factors such as age, gender, race and/or modes of transportation to DUT.

The second section consisted of Pre-Tests 1 and 2. These were designed to prompt recall of various photographic techniques which had (it was initially thought) been covered in lectures. This was because the content of the pre-test formed the subject content of the multimedia resources to be presented for discussion to the group in the third part of the survey. It was anticipated that the multimedia resources, particularly the visual aspects, would assist the students to understand both the photographic principles involved, as well as the application of these in various techniques. The discussion was intended to test out the impact of multimedia in clarifying photographic principles and the techniques based on them.<sup>9</sup> The pre-test dealt with the most commonly used and universally accepted camera setting symbols (e.g. for portraits, close-ups, landscapes, sports, and flash). These standard options can be used to simplify taking photographs, that is, without the user having to know the principles for adjusting the settings manually (the latter, of course, was required as part of the Photography Course).

The third section of the survey (see Appendix I) generated quantitative and qualitative data about Internet use (e.g. how many times students used the Internet, whether they had computer equipment and access, and so on). In

---

<sup>9</sup> The impact of multimedia on the student audience was so positive (in terms of understanding concepts and techniques), that the Subject Leader for Photography asked if the visuals could be used as exemplars for end-of-year examination questions.



order to encourage students to respond spontaneously, the survey questions were mixed in nature, some involving filling in blanks, some requesting ticks in answer to questions, and others requiring written comments. The data was subsequently reflected as percentage values. The results show that multimedia did not comprise a “new technology” for the students involved in the survey: most students were generally accustomed to using the Internet. The quantitative and qualitative data will be discussed separately, the first to give an overview of trends in Internet use, the second, to explain or clarify these trends.

### 6.2.1 Demographics of the First-year survey participants

There was no evidence of any of the demographic factors (in Table 6.2) influencing responses in the data gathered in sections two and three (or any of the other data, for that matter). The average age of respondents shows that most students were fresh from high school, which had advantages in terms of their being still accustomed to study habits and very likely being enthusiastic users of the Internet, and disadvantages in terms of knowing little about the workplace and Industry requirements. In cultural and gender terms, there were more African females in this group, and, while gender figures might fluctuate from year to year, the students were predominantly African ESL learners.

Table 6.2 Demographics of the First-year survey participants

Category	Count	Percentage
Age (Class average)	20	-
Male	9	39
Female	14	61
Modes of transport <sup>10</sup> - Car	8	36
Bus	4	18
Train	2	9
Taxi	4	18
Walk	1	5
Other	3	14
Race <sup>11</sup> African/Black	13	62
White	5	24
Indian	3	14
Total number of students	23	

<sup>10</sup> One student did not respond.

<sup>11</sup> Two students did not respond.

Mode of travel was included in the questionnaire as this might have been an issue affecting students' lack of concentration in lessons. The researcher's observations confirmed that, for most students, travel to DUT was time-consuming and/or fatiguing (e.g. in a 70km journey from the outer suburbs).

Lengthy travelling times could be seen to contribute to lack of concentration in lessons in another way, as many students set off from home too early to have a proper breakfast. Personal observation of students in the Photography course showed that they tended to lose concentration, especially when they were hungry. This was particularly noticeable amongst ESL students who travelled long distances and attended lectures at 8.30 in the morning. At times, students would ask lecturers for a cup of tea before they started lectures. During field trips, exhibitions and prize-giving ceremonies (including Graduation), students were seen to look forward to obtaining free meals. At these times, many students would comment about this as being the only food they had been given to eat for the day. While travelling times did not appear to influence feedback on the use of multimedia resources on the Internet portal, it could well be seen as a factor supporting use of the portal. This is because it would allow students to recap on lecture materials after hours, when rested and properly nourished, both of which are more conducive to effective study.

### **6.2.2 Results of First-year Pre-Tests 1 and 2**

Figures 6.1 and 6.2 contain examples of the digital images which are found in most camera manuals, but which are often overlooked by many users, in spite of their potential usefulness. During the oral discussion, examples of the various camera settings were shown using illustrations from the Bockaert e-book software (2001). This was a relatively simple visual exercise. Although it was not evaluated formally, the answers were discussed orally. However, the result was that many students struggled to answer during the oral discussion of the answers, as some of them could not interpret the symbols in terms of what the end result would be (i.e. in the actual photograph). It was established later that students had not actually covered these sections in lectures. Posting curated multimedia resources on the Internet portal would alert students to the fact that syllabus sections are not being covered in lectures.

Pre-Test -Techniques I - Explain the Camera Symbols

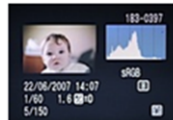


Figure 6.1 Pre-Test 1: Techniques I - Explain the camera symbols

Fill- in the corresponding aperture and shutter speeds as per the first example.

Shutters		Apertures	
	1/1000__		f2.8__
	_____		_____
	_____		_____
	_____		_____
	_____		_____
	_____		F22_____

Figure 6.2 Pre-Test 2: Techniques I - Aperture and shutter speeds

### 6.2.3 First-year students' responses to questions on general Internet use

The students' responses to the questions based on Internet access, duration, use, reasons and skills (Questions 1-5) are shown in Table 6.3. These were designed to elicit quantitative data which would reveal trends in general Internet use (i.e. recreational, as well as work or study related). The most popular instrument for Internet access was the mobile phone as reported by fifty-two per cent of the respondents, and sixty-nine per cent had been using the Internet for almost a year. The study revealed that sixty-one per cent of the students were using the Internet daily. Sixty-five per cent of the participants were using the Internet for educational purposes, and seventy per cent for keeping in touch with friends. Their Internet use skills ranged from seventy-four per cent as having good skills to twenty-two per cent of the respondents' skills as being fair, as indicated in Table 6.3. The overall enquiry revealed that many students entering DUT owned some form of communication device (mobile phone and or laptop) and used it regularly.

Table 6.3 First-year student results on general Internet use

1. How do you access the Internet? (Indicate with a tick).							
		Question 1	Home	Work	Mobile	Other	
		Rate/score	26%	0	52%	30%	
2. For how long have you had Internet access?							
		Question 2	One Month	2- 5 months	6-12 months)	More than 1 year	
		Rate /Score	4%	17%	9%	69%	
3. How often do you access the Internet in a week?							
		Question 3	Daily	2-3 times	4-5 times	Unclear	
		Score	61%	9%	26%		
4. What is your main reason for using the Internet (choose)							
		Question 4			Score		
		Entertainment			30%		
		Education			65%		
		Keeping in touch with friends			70%		
		Payments			4%		
		Downloads			13%		
5. How would you rate your Internet skills as?							
		Question 5	Excellent	Good	Fair	Poor	Unsure
		Count		74%	22%		4%

### 6.2.4 First-year students' responses on Internet use for teaching/learning

These questions were designed to elicit quantitative data to offer insight into how students viewed use of the Internet for teaching and learning. This was

because the literature on Net Generation learners had stressed the fact that the popularity of the Internet for the younger generation did not necessarily mean that they favoured tuition delivered entirely online. The chapters from Oblinger and Oblinger (2005), reviewed in Chapter 2, make frequent reference to students' expressed preference for face-to-face involvement and hands-on experiential work. The written responses to questions on Internet use (questions 6-10 in the student survey, see Table 6.4) are given in full in Appendix I, Section 2. The main results are discussed in this section, illustrated with examples from the data.

Table 6.4 First-year questions on use of Internet for teaching/learning

Question 6	Explain if the Internet is more beneficial than it is harmful.
Question 7	Is the Internet a good forum to learn?
Question 8	In your opinion what characteristics make a website useful?
Question 9	Other comments (if any).
Question 10	In a few lines clearly state your opinion of using hypertext and multimedia as teaching tools.

The students' written answers highlighted the benefits, as well as the importance of using the Internet as a learning tool. However, the students' responses showed that they might not necessarily find accurate information on the Internet, and that they might need to obtain secondary sources of information. Comments included the point that Internet sites were updated almost daily, so that new information was always available on demand. Students commented that they could easily download information, including data contained in pdf files. Their comments suggested that they viewed it as a very fast option for locating resources, and the point was made that a shy student might prefer using a computer rather than seeking clarification from the lecturer in class.

On the question about the characteristics of a useful website, students' fluency in using a website was mostly recorded as positive. However, it emerged that some students needed to be guided directly, quickly and accurately to the information for which they were searching. The participants further suggested that information sites should be user-friendly, with well-written text, and should

provide additional links with reliable information and subject content. One response summed up a common observation: information was often copied verbatim from the Internet without it having been properly understood. The students also commented that they could freely search for information from sites which academics considered unsuitable, such as Wikipedia. This point is substantiated by Fields (2010:6), who states that students often use keywords from websites to find information, unlike the procedures required for academic databases, which require controlled vocabulary to locate information.

Responses to Questions 9-10 formed the final part of the lecture survey in *Techniques 1*, which covered *other* comments they would like to make, and the use of hypertext and multimedia as teaching tools. The primary benefit, according to the majority of students, was the viewing of practical examples, together with the camera symbols or icons. This was because it was an easy way to summarise the lecture and benefited the visual learner. One student summed this up as follows: "I learn more today in the presentation, and I wish all classes will be the same as it more understandable." They also apparently enjoyed the correlation between the visuals and the text, which, they said, made learning more interesting, and helped them to recall examples more easily. However, many students were unhappy about the management of the Photography Programme's computer laboratory, as, very often, a few students abused the Internet facilities for social networking, and would not let the other students have access to computers for study materials. They also complained that the technicians were rude by peremptorily demanding that they leave when the facilities were being locked up.

In a debriefing session (18 November 2011), some students commented that, although the Internet was a useful tool, it was very easy to be "side-tracked". A few students stated that they preferred the traditional classroom lecture, as it helped them to become sociable, assisted them to overcome language barriers, and enabled them to work on group projects regularly. They also commented that Internet teaching was more of an individual learning approach, and did not allow for lively group discussions and interactions. Others commented that the frequency of "real time" explanations and interactions between the lecturer and

students stimulated critical discussion in the traditional lecture scenario. The last two comments echo the comments made in the chapters in Oblinger and Oblinger (2005a) stating the Net Generation learners' preference for experiential, hands-on learning, and not necessarily use of technology per se. As mentioned earlier, the chapters contributed by Brown (2005), Kvavik (2005), McNeely (2005), Ramaley and Zia (2005), Roberts (2005) and Windham (2005) suggest that the preference for experiential hands-on learning is a distinguishing feature of Net Generation learners.

Some students deplored having to wait for a detailed answer from the on-line lecturer. In addition, it was stated that on-line discussion forums tended to become boring; not all students contributed positively, irrelevant issues were discussed, and, after a while, users started new "threads". Furthermore, complex concepts and/or ideas were not easily absorbed when introduced over the Internet, although it might appear to be a more economical option. One student commented: "The Internet, while a useful learning tool, should not be used as a substitute for comprehensive lecture notes that should be provided by the lecturer." This statement was in contrast with the view of another student, who stated: "The lecturer could quickly recall additional information from the Internet and provide hand-outs that saved the respondents' time in having to write down notes." Another factor which emerged in follow-up discussions was that computer and Internet resources could become problematic for online discussions, especially with disadvantaged ESL students who did not have these facilities at home. As shown in Table 6.3, only twenty-six per cent were home Internet users. They also questioned what, if any, accommodation was being made for students with disabilities and/or special needs.

The overall consensus from the undergraduate students in both the formal responses and de-briefing session was that they would prefer hypertext and multimedia lessons as a blended form of instruction in a modern "traditional" classroom environment (see Table 6.5). Internet-based education was seen as being convenient and efficient, but should not be used as a substitute for the face-to-face mentoring and socialising, which a traditional lecturer and

classroom setup could provide. The following comments indicate some of the advantages students could perceive in traditional lecturing practice:

Table 6.5 First-year students' responses in support of traditional lectures

<b>Wed Nov 23, 2011 at 06:56 a.m., Student MR responded:</b>
Everyone still prefers traditional teaching methods because its reliable and u [sic] can ask questions and get answers immediately. It helps us become sociable and helps with language. Also we can do things together as groups were Internet teaching is more a personal teaching were u are doing everything ur self.
<b>On Wed, Nov 23, 2011 at 2:18 p.m., Student SM responded:</b>
I still prefer traditional lectures because I learn better if a concept is explained to me by another person who is more familiar with it. I also find it helpful when it comes to asking questions and having them answered immediately rather than having to email a lecturer and awaiting a response. Having to await a response tends to break one's train of thought.
I also learn from questions asked by other students and unless you are cc'd on an email or a part of a forum discussion on the Internet you may not have access to questions and answers that you may find helpful. The Internet, while a useful learning tool, should not be used as a substitute for comprehensive lecture notes that should be provided by the lecturer.

Discussing the results of the pilot study (i.e. about use of hypertext and multimedia) with the first-year cohort prompted a robust debate on how the students' reasoning, learning and recall skills might be improved. It became apparent that computer-mediated lessons needed to be sustained by human action (Orlikowski 1992: 409), as highlighted in Chapter 3. It was clear that students valued the development of a stronger class community of practice. It was also observed that, contrary to student MR and SM's views, students might learn the wrong answers from each other. The importance of a content specialist was emphasised, as students might well provide incorrect answers, which might be mistakenly accepted as correct by the other students. Some of the student survey comments which indicate that they were in favour of multimedia based lectures are given in Table 6.6.



Table 6.6 First-year students' comments on multimedia based lectures

S2. It is a good tool. It is helpful to any photographer whether an amateur or professional, because it teaches you to take a photograph in a very good way.
S3. To the multimedia side of photography, the lecture was very influential in terms of under and overexposing technics that you need to know as a photographer
S5. My opinion is that today's lecture has helped me a lot because it summarises everything we have learned in a short time. It also helps us to refresh our minds about what we have read before in our lectures.
S11. It makes the understanding better.
- It helped me, I felt I have gotten a better understanding of the lecture.
- makes the lesson a bit more exciting.
- I was able to view what was being said.
S12. When things are shown and described visually, you get a better understanding of the information you're receiving. When you have a better understanding visually it is embedded into your mind, thus making it easier to remember.
S13. Agree, some of the stuff is easily understandable, when it going with picture. It become easy. I learn more today in the presentation, and I wish all classes will be the same as it more understandable.
S16. Oh well it is a teaching tool, because even now I know things that I usually see in my camera and don't understand but now I know them very well. In terms of apertures and shutter speed I understand how to set them in any project or assignment.
S17. It is very convenient and it saves a lot of time. It makes the lesson more interesting and less complicated. Time is saved because everything is digital.
S21. Yes it is a very good teaching tool because you do not need to be with the teacher to learn and they can convey the info over the Internet.
S22. This is a good way to expand on knowledge in a body of writing.
S23. It is a useful tool but is easy to get sidetracked if not careful.

### 6.3 Results of the Second-year student survey

The *Techniques 2* survey with 16 Second-year Photography students was carried out on the 13 July 2011 and followed a similar procedure to that of the First-year survey. The first section collected information on student demographics. These were obtained to establish whether students' evaluative responses might have been influenced by factors such as age, gender, race and/or modes of transportation to DUT.

The second section consisted of Pre-Tests 1 and 2, which were conducted to establish whether students could apply knowledge from their Theory subject in practical applications. Pre-Tests 1 and 2 were based on students' knowledge of

how to use the digital camera menus, and, more specifically, to identify the effects of different light sources, such as daylight, tungsten, photoflood and fluorescent. The third section of the survey produced quantitative and qualitative figures on general Internet use followed by student feedback on internet use for teaching and learning.

### 6.3.1 Demographics of Second-year survey participants

Table 6.7 indicates that the Second-year students were equally balanced between the different genders. It also revealed that more students travelled by bus to campus, fewer students travelled by taxi, and an equal number walked to campus, in contrast with the First-year group. It later emerged that those students who travelled by bus lived between 20-50 km away from DUT and would arrive at around 7.30 a.m. and leave campus by 3.45 p.m. This meant that they had very little time to access library and other Programme facilities, as these became available only from 8.00 a.m., and lectures commenced at 9.00 a.m. This state of affairs actually supported the idea of posting Programme resources online, so that, unlike hard print copy library books and graphics, they could be accessed in digital form after hours.

Table 6.7 Demographics of the Second-year survey participants

Category	Count	Percentage
Age (Class average)	21	-
Male	8	53
Female	8	50
Modes of transport- Car	6	40
Bus	7	47
Train	0	0
Taxi	1	6.7
Walk	1	6.7
Race <sup>12</sup> African/Black	7	47
White	6	40
Indian	2	13
Total number of students	16	

<sup>12</sup> One student did not respond

The subject content of Pre-Tests 1 and 2 was based on colour balancing while using a digital camera, an introduction to the use of histograms, and the camera RAW (i.e. “unprocessed”) setting available in most semi-professional digital cameras (see Figures 6.3 and 6.4). The survey took two hours to complete and was held in the Audio Visual Lecture venue.

#### Pre-Test- Techniques II – Explain the Camera Symbols

Figure 6.3 Pre-Test 1: Techniques II - Explain the camera symbols

Colour gels?
Why colour balance ?
Cold blue light?
White light?
Mercury vapour?
Degrees Kelvin?
Warm light?

Figure 6.4 Pre-Test 2: Techniques II - Explain the following terms

### 6.3.2 Results of Second-year Pre-Tests 1 and 2

Figure 6.3 contains examples, obtained from a typical digital camera menu, of the colour balancing options available for use under varying lighting conditions. Figure 6.4 contains prompts to establish whether students could recall the technical terms used to describe colour variations. The current syllabus emphasises the importance of students learning the differences between capturing images on conventional cameras using film and using a digital camera. This is because the former is based on the negative film principle, and the latter on the transparency film principle. The advantage of digital format is that, if one knows how to control white balance on the camera, one will achieve true colour representation. This is necessary for photographers to be able to capture images with different lighting falling on a subject. In addition, there are various technicalities that are taught in the current theory subject. The multimedia lecture was designed to illustrate the effects that could be achieved so that students would be able to apply this theory in practice. The examples given in Figures 6.3 and 6.4 were of the type which subject leaders would use with students who were studying Photography at an intermediary level of the course. The Pre-Test questions were not formally assessed, but the answers were discussed during the course of the survey.

As with the First-year group, the Second-year group had difficulty answering the Pre-Test questions, as neither the theory nor its application had actually been covered in lectures. However, when the multimedia resources were shown,

students agreed that it gave them a good understanding of how the theory resulted in various techniques for actual practical application, in spite of the fact that this had not been covered in lectures. This suggests that these types of multimedia resources, when available on the Internet, would be a valuable asset for both lecturers and students. The lecturers had not covered these sections in class because they were not familiar with the latest digital techniques, as the syllabus demanded. However, the online multimedia resources could be demonstrated either by multimedia-skilled student tutors or another staff member, without having to prepare complete lecture materials in advance, or organise duplication of lecture notes. It would also standardise the examples used across the student groups. Students could use the resources after hours to recap the theory and its application in practice.

### 6.3.3 Second-year student responses to questions on general Internet use

The results given in Table 6.8 showed that students were using the internet for multiple reasons, often concurrently.

Table 6.8 Second-year student results on general Internet use

Question 1 How do you access the Internet?					
	Question	Home	Work <sup>3</sup>	Mobile	Other <sup>3</sup>
	Count	4 (25)%	6(38%)	11 (69%)	6(38%)
<sup>3</sup> some answers included the use at both work and other					
Question 2 For how long have you used the Internet?					
	Question	One Month	2- months	5 (6-12 months)	Other
	Count	1(6%)	2 (13%)	9 (56%)	5(31%)
Question 3How often do you access the Internet in a week?					
	Question	Daily	2-3 times	4-5 times	
	Count	8 (50%)	4(25%)	4(25%)	
Question 4 What is your main reason for using the Internet (choose)?					
	Question	Score			
	Entertainment	11 (69%)			
	Education	13 (81%)			
	Keeping in touch with friends	16 (100%)			
	Payments	2 (13%)			
	Downloads	9 (56%)			
	Other	2 (13%)			
Question 5 How would you rate your Internet skills as?					
	Question	Excellent	Good	Fair	Poor
	Count	6 (38%)	9 (56%)	1(6%)	

The most popular instrument for access via the Internet was the mobile phone (sixty-nine per cent) and fifty-six per cent of the respondents had already been established users for almost a year. Fifty per cent of the participants were using the Internet daily; this covered eighty-one per cent who used it for education. In addition, one hundred percent of the respondents stated that they used the internet for keeping in touch with friends. Furthermore, fifty six per cent were downloading information (including films), while sixty-nine per cent used the Internet for entertainment.

Table 6.9 shows responses to questions 9-22, which were designed to elicit quantitative type data. It was noted that, on the question on the fluency in the use of digital media, sixty-nine per cent stated that they were “good” users; twenty-five per cent, “excellent”, whilst six per cent did not respond. On the question of the ability to locate information, a high figure of eighty-one per cent responded positively, and ninety-four per cent stated that they could work with various file extensions. A mere six per cent of the respondents needed assistance in locating information from the Internet, cross transfer of information into multiple formats, and assistance in downloading information from the Internet. When asked about the important (i.e. for Photography) ability to read and analyse an image, ninety-four per cent stated they were capable of doing so, while six per cent said that they needed assistance.

While ninety-four per cent said that they could retrieve, save and download information, six per cent said that they needed assistance. When asked about their ability to handle and manipulate images on both Apple and IBM-compatible personal computers (PCs), eighty-eight per cent said that they were capable of this while thirteen per cent said that they needed assistance. A similar figure of eighty-eight per cent said that they could communicate by recalling/analysing information by viewing images. Seventy-five per cent of respondents said that they could apply rules of design to control shapes and objects while nineteen per cent said that they would require assistance with basic design principles.

Table 6.9 Second-year student results on fluency in the use of digital media

<b>Question 9 How fluent are you with digital media?</b>						
	Question*	Excellent	Good	Fair	Poor	No response
	Count	4(25%)	11(69%)			1(6%)
*1 Respondent did not answer						
<b>Question 10 Can you consistently find information from the Internet?</b>						
	Question	Yes	No	Need Assistance		
	Count	13(81%)	2 (13%)	1(6%)		
<b>Question 11 Can you share a digital image in multiple formats eg pdf, jpeg, Tiff?</b>						
	Question	Yes	No	Need Assistance		
	Count	15 (94%)		1(6%)		
<b>Question 12 Can you easily retrieve, save and transfer information downloaded from the Internet?</b>						
	Question	Yes	No	Need Assistance		
	Count	15 (94%)		1(6%)		
<b>Question13 Can you easily upload images onto a website?</b>						
	Question	Yes	No	Need Assistance		
	Count	12 (75%)		4 (25%)		
<b>Question14 Are you able to analyse or read images and be able to tell/write a story?</b>						
	Question	Yes	No	Need Assistance		
	Count	15 (94%)		1(6%)		
<b>Question15 Are you able to handle and manipulate image files into Apple Mac and PC computers?</b>						
	Question	Yes	No	Need Assistance		
	Count	14 (88%)		2 (13%)		
<b>Question 16 Can you communicate by recalling information by viewing images?</b>						
	Question	Yes	No	Need Assistance		
	Count	14(88%)	1(6%)	1(6%)		
<b>Question 17 Are you able to apply rules to controlling shapes and objects (drawing sketches) to communicate an idea?</b>						
	Question	Yes	No	Need Assistance		
	Count	12(75%)	1(6%)	3(19%)		
<b>Question 18 Are you able to read, analyze, discuss or use images?</b>						
	Question	Yes	No	Need Assistance		
	Count	15(94%)		1(6%)		
<b>Question 19 Do you carry your digital skills from one subject to another?</b>						
	Question	Yes	No	Need Assistance		
	Count	14(88%)	1(6%)	1(6%)*sometimes		
<b>Question 20 Do you know how a computer works and how images are stored?</b>						
	Question	Yes	No	Need Assistance		
	Count	15 (94%)		1 (6%)		
<b>Question 21 Do you know how to produce a PowerPoint lecture?</b>						
	Question	Yes	No	Need Assistance		
	Count	14(88%)	1(6%)	1(6%)		
<b>Question 22 Do you understand resolution and image sizes for visual presentation and print?</b>						
	Question	Yes	No	Need Assistance		
	Count	14(88%)	1(6%)	1 (6%)		

Eighty-eight per cent of students said that they could carry digital skills across related software (Adobe Photoshop, Power Point and Microsoft Word) while six per cent said they could not and another six per cent said they could do so occasionally. Ninety-four per cent of students said that they were familiar with storing digital images, while eighty-eight per cent claimed to be knowledgeable in preparing images for both presentation and print (Table 6.9).

The results of the Second-year student survey were discussed in a follow-up meeting on 22 August 2011. They suggested continuing with on-going student surveys and assessing the amount of knowledge received or given by the Programme Co-ordinator or HoD (for quality purposes). The class also suggested that the lectures could be condensed to keep the students' attention and improve student understanding of the key elements necessary for carrying out practical assignments (Figure 6.5).

<p>23. In a few lines clearly state your opinion of using hypertext and multimedia as teaching tools?</p> <p><u>Yes that was beneficial, most hypertext &amp; multimedia teaching</u>  <u>tools are very good as teaching techniques I prefer</u>  <u>this way of teaching as I get to hear <del>see</del> and see</u>  <u>what is being told/taught and is then easier to</u>  <u>understand!</u></p>
<p>23. In a few lines clearly state your opinion of using <sup>our</sup> hypertext and multimedia as teaching tools?</p> <p><u>It is beneficial in expanding knowledge <del>on</del> on</u>  <u>digital aspects and how <del>we</del> could use it when</u>  <u>taking images or working on assignments.</u></p>
<p>24. Other comments (if any)</p> <p><u>The subjects discussed might be more interesting</u>  <u>to expand on, in our theory lectures and in</u>  <u>our digital lectures. The presentation was</u>  <u>well used, but contained a bit of information</u>  <u>that was slightly confusing.</u></p> <p><u>Do on going surveys with students? assess</u>  <u>amount of knowledge received /given.</u></p>

Figure 6.5 Student responses on the use of multimedia as teaching tools



These comments suggested that greater attention should be paid to instructional design issues and its related processes. Students were assured that the multimedia used in the survey would become available on the educational portal. In addition, all resources required for their studies will be checked for authenticity and uploaded on the portal. Furthermore other lecturers and/or tutors would be able to draw on these resources and use them in other subjects.

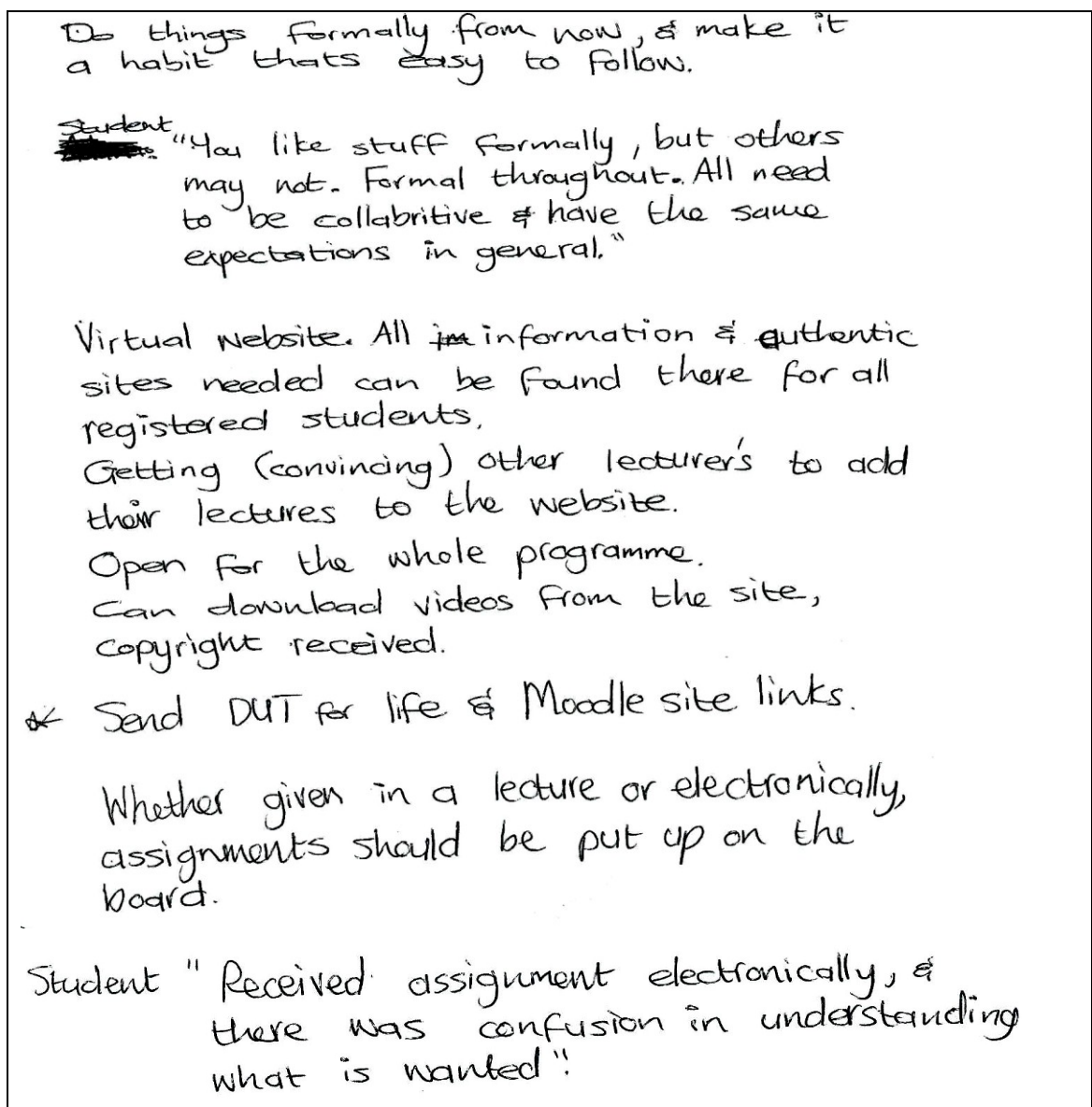


Figure 6.6 Extracts from minutes taken during debriefing session

Students stated that assignments given during a lecture (or electronically) should be available as a hard copy on the class notice board as well (see Figure 6.6). They mentioned an example of having received an assignment electronically, where this had ended up in confusion as the instructions were not clearly stated. In this case, they could immediately ask the lecturer for clarification. In the assignment which had been posted online only (see Figure 6.6), most of them would have gone home before they had realised that the instructions were not clear.

They also said that they would prefer it if all lecturers could be persuaded to make their lectures and/or assignments available on the website. A concern raised by the second-year group was the requirements of academic writing in assignments. It was stated that some lecturers in the Photography Programme did not require formal academic style in written answers. This was contrary to the Programme Co-ordinator's insistence that all communication needed to be formal and pitched at an academic level. Not all students believed that formal language was necessary in written assignments (see Figure 6.6). Figure 6.6 shows that some students at the debriefing discussion immediately asked for the links to the Dut4life email facility and Moodle site. This suggests the students' willingness to use electronic facilities, but also indicates that details of access to them are not properly communicated to students.

While the evaluation results suggested that the students had the ability to produce and/or share images in multiple formats and different uses were considerable, the triangulation<sup>13</sup> process using data from end of year examinations revealed less than excellent results. For example, students had over-rated their ability to produce and/or share images in multiple formats and for different uses. Figure 6.7 shows part of an examination question (*Theory of Photography 2*, 2011), with the marking memorandum (model answer) given in Figure 6.8. The moderator's comments (given below) reveal that the students' confidence in their ability to process digital resources was over-optimistic in terms of their actual ability to describe these processes in examinations:

---

<sup>13</sup> Triangulation is used here with the meaning of checking the validity of results by using data obtained from another source and/or by means of another method (Olsen 2004).

Digital photography questions need to be more explicit, especially for English Second Language students. For example the question “what is the purpose of an ‘action’... (could have been more explicit by adding)...“when using editing software such as Photoshop”. This is necessary as students tend to “compartmentalise” their lectures, provide ambiguous or repetitive answers and struggle to improve their writing skills in other subjects. In addition, Question G1 could have included that students provide an example when one would apply this Photoshop software facility (name omitted to preserve confidentiality).

However, the questions themselves needed some refinement in explaining what was required in order for the questions to be answered correctly.

G. What is the purpose of an ‘action’?	(2)
H. Write down the file extension that is assigned for an action.	(1)
I. Name 3 benefits for facilitating ones ‘workflow’ by creating actions	(3)
J. Name 3 difficulties one encounters when trying to make an ‘action’?	(3)
K. Where in the Photoshop Main menu would one locate the actions palette?	(1)

Figure 6.7 Theory of Photography II – 2011 Digital questions

The moderator’s comments highlight the importance of cross-checking information gathered from surveys. In addition, the mixed reactions (see Appendix J, Section 2) by the second-year group, prompted the researcher to pay critical attention to the subject content for the *Theory of Photography II* examination questions. Poor choice of examination questions reflects badly on staff expertise, and suggests to examination candidates that staff are not capable of the kind of precision they expect from students.

The issue of language used by lecturers (i.e. as shown in examinations and marking memoranda), mentioned in the students’ comments, could be reviewed in the light of data arising from the examination process. The marking memorandum for Theory of Photography II – 2011 (see Figure 6.8) revealed that formal writing is not used consistently by all academics. A lecturer’s model

answer include colloquial language: "...effects that are over the top and hard to simplify or rectify" (my emphasis), as well as incomplete sentences, shortened forms and lack of capitals. This does not provide any kind of "model" for students to follow.

	<b>MODEL ANSWER:</b>	
G	I. The purpose of an action is to facilitate workflow by reducing time spent on repetitive tasks. One records a repetitive task and then is able to play it on a batch on the computer without the operator having to be there. (2)	
H	J. atn (1)	
I	K. <b>Any 3 of the following:</b> (3) i. one can share actions with friends/colleagues and computers. ii. atn file suitcase are email able. iii. one can find and utilize other actions developed by other professionals made available on the internet. iv. learns more about Photoshop_ through the steps developed by others and made visible with actions palette. v. create borders, text effects and other effects already set up_ easy to use vi. time saving vii. accessible. Viii. can manage and control the content of actions: personalize	
J	L. <b>Any 3 of the following:</b> (3) i. not all steps and tools are action friendly or can be used in the action setting. ii. can be confusing for first time action creators. iii. sometimes the workflow has to be divided into one or more steps with different actions_ this can be confusing if it is not named/organised well. iv. utilizing the 'work' of others can be regarded as plagiarism vi. if the action is not tested and tried beforehand (which is time consuming) then mistakes become evident only after the action has run and photographs could be ruined or deemed inappropriate. vii. always create an action on a copy of ones images to prevent the loss of the original. viii. the more complex the actions the more mistakes can occur. ix. some actions downloaded from the internet produce effects that are over the top and hard to simplify or rectify.	
K	M. Window. (1)	
		10

Figure 6.8 Marking memorandum to digital questions in Theory of Photography II - 2011

The Second-year survey results suggested that eighty-eight per cent of the class could carry digital skills into using various software and for differing

outputs, print and web (e.g. in Adobe Photoshop, Power Point and Microsoft Word). However, the final moderation process of *Applied Photography II* (2011) digital portfolio revealed that students struggled to present electronic images in a single, uniform and preferred format. Some submissions included tiff, psd, or jpeg formats, and image sizes were inconsistent (3MB to 30 MB image files). In addition, one third-year student (not involved in the surveys) submitted a thirty page typed report as a 30MB – Microsoft Word document with three DVDs of the photographic portfolio. This does not display the necessary skills needed to process and present electronic documents. Students struggled to differentiate between the various file formats and apply appropriate metadata. The kinds of competencies needed to achieve quality storage and output in electronic format are prerequisites when seeking employment in a technology literate corporate world or when working as an entrepreneur.

The results in the moderation process contradicted the impression given in the students' survey answers that their Internet skills transferred seamlessly to applications in digital photography. This reinforced the importance of post-testing to triangulate results, and strengthened the importance of having digital processes demonstrated visually and in animated form on the Internet portal, firstly, in a face-to-face presentation. It also supported the inception of the project mentioned below, Case Study 1 (Online ordering of graduation photographs). This project meant that students would be faced with the need to apply competences in processing digital materials at the exacting level required by Industry standards. It also meant that they would become aware (through experiential learning) that the lecturers were applying the same advanced competences in making digital resources available on the portal, and not just relying on text books or commercial catalogues. They would then realise that their lecturers were modelling the skills that they themselves needed to acquire and develop, rather than "lifting" ready-made materials from the Internet in unsuitable or incompatible formats.

The Applied Photography II – 2011 moderator’s comments were as follows:

The portfolio list and some of the student’s submissions did not correlate. For example, Student A submitted 23 folders of images, and 28 images were submitted by student B. Student C submitted 36 images in the “digitals for fashion in the studio” category alone. Most students handed in images in jpeg format while submissions included tiff and psd format and in individual folders. This made the moderation process very time-consuming and laborious of the digital portfolios.

A simple black border around each image clearly labelled according to the portfolio requirement list would have improved the overall digital submission. This could then have been viewed as a slide show. It is understandable that the portfolios were not printed in an exhibition format; however, a cd submission is a partial requirement of the examination process, and consistency should be maintained (name omitted to preserve confidentiality).

#### **6.3.4 Second-year students’ responses on Internet use for teaching/learning**

Questions 6-8 of the student survey are shown in Table 6.10, and this is followed by a summary of the students’ responses (the unedited responses are provided in Appendix I, Section 2).

Table 6.10 Second-year questions on internet use for teaching/learning

Question 6	Explain if the Internet is more beneficial than it is harmful.
Question 7	Is the Internet a good forum to learn?
Question 8	In your opinion, what characteristics make a website useful?

A consistent view was that the Internet was beneficial if one knew how to use it properly. The majority of the students agreed that the Internet was a good forum in which to learn, as it was quick and worry-free to use. The concern was the easy access to non-educational sites and use of unreliable resources, such as *Wikipedia*. When questioned about the preferred characteristics which made a website useful, they stated that websites would be comfortable to use without too many links to other sites, and that the information and topics should be clearly marked and easy to find. They further commented that websites

provided an excellent opportunity for the sharing of ideas and networking, and that these should provide accurate information. The last comment was repeated during the follow-up discussion session.

A mixed reaction from the participants was recorded in the two concluding questions (23 and 24) about using hypertext and multimedia as a teaching and learning tool. Those in favour stated that this option gave the students the opportunity to benefit in researching skills. They could apply knowledge more readily in other subjects of the course. The comments included that the multimedia lecture was “simple and easily understood and provided a better understanding for the students and could make the lecturer’s task easier”. It was further stated that it “stimulated thinking abilities for the individual’s learning process, and this method of teaching could be expanded to include new multimedia links”.

Conversely, critical responses included statements such as: “...the lecture was extremely fast, confusing and very boring because the only thing you do is listen and look”. “I feel that it might be very nice to interact with the lecturer”. “We were either confused or the explanation was very fast, confusing and boring with no interaction”. The new method offered “was beneficial, but it took so long and the slides were many as a result I lost concentration, and the information was slightly confusing”. The mixed views of the students were subsequently found to have been influenced by the fact that some of the topics featuring in the survey had not, in fact, been covered previously in lectures (as had been assumed). Moreover, in spite of the students’ positive response to the use of multimedia in the lecture, this presentation should possibly have been shortened or spread over two lecture periods.

#### **6.4 Conclusions on First- and Second-year student surveys**

The evaluation of the surveys included assessing and noting students’ reflective reports from class assignments, end-of-year examination answers and moderators’ marking memoranda. This option verified the application of a similar process of testing a prototype, reviewing and refining it, as that

described by Cerejo (2010) (see Figure 4.4). The First-year students, in spite of being regular users of the Internet and mobile phones, were unanimous that they did not enjoy Internet-based education, but would prefer mixed mode lectures in class. They also concurred that in-person interaction was the preferred medium of teaching and learning. However, a student who could not participate in the original survey stated that his preference was towards hypertext and multimedia. This was possibly because, as a visual learner who attained high marks in practical photography, he was struggling with the theory subjects. The Second-year students preferred a more concise use of multimedia for lectures and a consistent approach by all academics in lecturing delivery/methods. Input from the class representatives to the PcO and HoD would ensure that individual students' input was kept confidential.

The written responses of many students in both the First- and Second-year survey showed incorrect use of syntax, vocabulary and punctuation (see Section 2 in Appendices I and J, respectively). A consistent pattern which emerged was that of problems with simple construction of sentences, frequent word errors, limited use of capital letters and very little punctuation overall. On the whole, the main meanings of their responses were not obscured. In implementing the suggestions and from general observations from the results of the student surveys, the following overview of the Photography qualification was added as part of the re-curriculation process currently underway at DUT:

Technological developments drive the Diploma in Photography at the Durban University of Technology (DUT), which provides fresh ways of producing creative photographic content. DUT's Photography programme is continually evolving (sometimes iteratively) and seeks to ensure that graduates are able to successfully create their own niches. The general approach will be developed through two basic elements (practical, and critical). The practical approach will engage students in perfecting their observation of images and ideas through experimentation. There will be a structured progression of practical work from the first year to the final year projects. Students will need to investigate, critically analyse and recommend solutions to various assignments (both practical and written) and be able to reflect critically on their own and fellow students work during a series of cyclical critiques. Furthermore, they will consider how they can make a positive influence in both local and global contexts through the design and production of images for exhibitions and webpages.



## **6.5 Results of Case Study 1: Online ordering of graduation photographs**

To recap briefly, Case Study 1 dealt with the setting up of an online facility for the ordering of graduation photographs. This project had previously been run offline as an experiential work integrated learning (WIL) project carried out by staff and students (all students) of the Photography Programme. Feedback on the project in Programme Reviews had been mainly positive, but the Project Managers had been advised to integrate the experiential learning into the actual curriculum (e.g. have “official” outcomes and assessment criteria to be included on syllabuses and terms sheets). In 2010 the project was run partly online (i.e. in blended learning delivery). Participants had to attend graduation in person (to capture the photographs) and take part in studio group work (i.e. in face-to-face interactions). After photograph capture, inclusion of metadata (e.g. name, time, date) and reducing file size for Internet display, the photographs were uploaded onto the DUT webpage. Clients would then select and order photographs online, and come in and collect the prints in person after they had been printed.

Case Study 1 is used to illustrate findings in the case of three important aspects of operating with an Internet portal:

- linking WIL projects to the rest of the Photography curriculum;
- creating subject-specific resources for the Internet portal; and
- providing students with the hands-on experiential learning and live interaction with faculty staff and students valued by Net Generation learners.

Although all three are interwoven in the actual teaching and learning process, they will be dealt with in sections so that evidence can be provided to support each point.

### **6.5.1 Linking WIL projects to the Photography curriculum**

As mentioned above, the Programme Review advised the integration of the ordering of Graduation photographs project into the rest of the academic

curriculum (as with the more “academic” subjects). Piloting the project online (i.e. from 2010 on) offered the option of linking it to the Internet portal on Moodle. Students can then literally see the connection between WIL and other aspects of the Photography Programme. This means that the portal not only offers the option of multimedia resources, but links the WIL project (literally) to the rest of the Photography curriculum. Case Study 1 provided a testing out of the principle of blended delivery for WIL before linking it to the portal: a precursor of full portal operation. Some of the students’ comments (unedited) are given in Table 6.11.

Table 6.11 Students’ comments on WIL Project

<p>Since it was my first time shooting a graduation ceremony of the DUT I enjoyed experiencing not only the photographers work, but also the ceremonies itself. It was nice seeing the graduates celebrating and I was happy to have the chance to participate in a part of South African culture.</p> <p style="text-align: right;">Student F (2010) BTech German Student</p>
<p>There is a lot more involved in the graduation process than I originally thought and so being a part of the “backstage” planning was a real eye-opener for me. It was great fun and I really enjoyed having all the responsibility as I work well under stressful situations.</p> <p style="text-align: right;">Student T (2010: 49) , Third-year student</p>
<p>Overall the graduation was a great experience for me since I started the course and I must say I learned a lot from it, since I mostly do weddings. Graduation helped with my communication skills also my organising skills. I believe that all students must always make sure that they learn from the graduation, the graduation is not only a way of helping out the department but it’s a matter of helping yourself as I have done from it. When I look at the graduation I look at it as a way of training myself for the outside world of photography, which is full of surprises.</p> <p>As for the post production experience I would say I kind of thought I did enjoy most of what we were taught to do, the right guidance was what kept us on track while doing post production. The whole graduation process from the shooting to the post production I think it was a really good way to familiarise us with the industry of photography outside tech. In the photography industry every photographer must be able to do all that I mentioned above, since you may never know when it will be needed that you do it, preparing yourself will ensure that you are taught correctly the ways of producing excellent work for your client.</p> <p>We also were taught how to use the printing machine that we have in the department, which I saw as really beneficial for all of us since these days the machine we have in tech is being used mostly in the printing labs that are in town. As much as we think all this was a waste of time but if we look at it we are being given free lessons, which we will surely need once we done and start working in the outside.</p> <p style="text-align: right;">Student PKZ (2012:44),Third-year student</p>

Table 6.12 gives examples of students' comments suggesting improvements for the project, as well as pointing out problems in the actual administration of the project.

Table 6.12 Students' suggestions to improve WIL Project

<p>In conclusion, from the candidate's [i.e. the BTech student writing this report] experience, coupled with student's responses on their own experience, graduation has both beneficial and negative come backs, but there is potential for the involvement to be bettered and made effective both as an income to the department and as a learning experience to the students.</p>
<p style="text-align: right;">Student S ( BTech)</p>
<p>After doing a set of interviews (18/07/2013) with students who participated in graduation ceremony the candidate [i.e. the BTech student writing this report] was enlightened with important suggestions, interesting facts and critical issues.</p> <p><i>"I didn't enjoy the fact that we had to do both the stage and the studio. By never being a professional photographer at the ceremony, I felt very uncomfortable photographing the actual graduation. I also felt shy standing high up above the ground in front of so many people. On the other hand I did enjoy working at the studio outside as this was a fun experience."</i></p> <p><i>"We have worked very hard the whole day and the lunch has only arrived at two o'clock. I was really looking forward to, as I haven't eaten since 7. When I ate half I realised that food did not have nice taste and I felt sad about it."</i></p> <p>While completing the Work Integrated Learning in conjunction with Durban University of Technology and participating at the Graduation Ceremony there were few shortcomings, which could be avoided for the next event. Firstly, the stage design and the positing of the stand where the hood is granted should be arranged as the image below. This will contribute to the less distractive background in the photographs and will improve the overall quality of the image. Secondly, keeping a small notebook close to the camera would be an advantage, containing all the settings of exposure, white balance and focal distances used at the previous ceremonies. This would improve and speed of the post-processing workflow where cropping and color correction will no longer be needed.</p>
<p style="text-align: right;">Student E (BTech)</p>

Student E even made practical suggestions about how the stage setup should be designed for improving the composition of the photographs (see Figure 6.9).

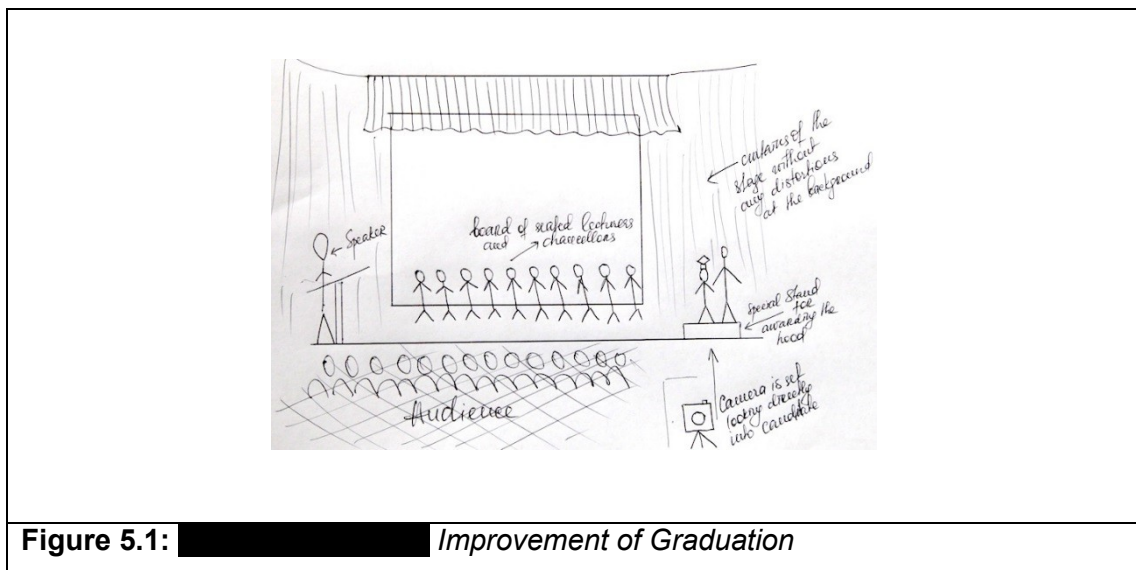


Figure 6.9 Suggestion for stage setup for Graduation photographs (from Figure 5.1 in the Student's BTech Report)

The online placement of orders, on-campus printing and selling of digital images saved the expense of printing off-campus and only confirmed orders were printed. That, in itself, was very cost effective. It enabled the researcher to make the graduation experience become more efficient, streamlined and valuable. It helped the programme to identify student potential, especially in those students who had first appeared as "At Risk". One student commented, after working for one day, that he/she never knew working was so strenuous. Time was saved by placing orders online, having payment affected electronically, and having photographs collected when printed or delivered via a postal service. As the development continued, the researcher tried to ensure that any potentially troublesome elements were kept out of the loop.

Case Study 1 was used to identify and resolve the problems that emerged during the completion of the graduation photography project and to refine the workflow for the website. The critical reflection of each cycle helped to develop the process further. The researcher, in collaboration with students, would first recollect the day's events (capture, post-production and sales) and then put into practice the design of new steps. For example, when the networked computers

stopped working during the sales of photographs, the students immediately took the initiative of retrieving a backup hard drive of images.

The following critical elements emerged over the course of this exercise from the researcher's observations:

- Images must be professionally rendered with regard to technical aspects such as exposure, composition, and focus at the time of capture.
- Each photographer should maintain a record of the number of images captured, and extra images should be taken during capture to ensure the subject's eyes were not closed during exposure.
- Every photographer should complete post-production so that they can rectify any shortcomings (in future) at the time of capture and waste less time during postproduction.
- Networked computers must be operational at all times; downtime must revert to DVD backup copies of all images.
- There should be an onsite evaluation of students working in any commercial endeavour to ensure quality control.

These elements apply not only to the project, but also address weaknesses identified in the student's Applied Photography portfolios (as mentioned earlier in the Second-year students' survey). Case Study 1 shows how the WIL project offers the opportunity for staff and students to address these academic shortcomings in a quasi-professional context using a blended learning approach. The project can be seen to address some of the serious pedagogical needs identified earlier.

### **6.5.2 Creating subject-specific resources for the Internet portal**

The saved images (correctly formatted and identified) formed a data warehouse of resources which could be used for the portal, produced and prepared not only by staff but also by students. In addition to the practical application of theory in WIL (as in 6.5.1), a second practical application is that students create their own pedagogical resources. Over 40 000 digital images have now been uploaded in the storage areas available on the DUT website, ready to be

accessed by staff and students and/or uploaded as exemplars on the portal. In contributing to these resources, students are learning not only about standard formatting for digital products, but also about orderly identification (e.g. using metadata, source, date, time - even GPS). This addresses the pedagogical issue of students submitting flawed portfolios because of faulty formatting and lack of metadata, as shown by the Moderator's comments.

The following student's comments show how the WIL project involved practical application of preparation of digital images:

What I have learnt is working in photoshop using various images to be edited in the same process. [Lecturer's name] gave me little excises to form my action towards post graduation photographs. Firstly we had to go do the colour correction of two images which had two different subject with different skin tone dark and light than had to do the cropping, selecting the images to be in a correct order and then we had to gather the palette with the a D.U.T logo with graduation images. The challenges I came over was making mistake without knowing to fix them because the actions are running and what nice about post grad it teaches me more about professionalism towards client service (Student N).

The student's mention of "professionalism towards client service" shows recognition of how preparation of digital images is an important work-related competence. Students involved in experiential learning can apply both digital and classification skills in Industry (and entrepreneurial workmanship) as well as in academic work.

### **6.5.3 Providing hands-on experiential learning and faculty interaction**

The offline experiences (i.e. group interactions) offered by the project provided students with the hands-on experiential learning and live interaction with faculty (staff and students) valued by Net Generation learners (Oblinger and Oblinger 2005). It also linked these preferred ways of learning with the online component, providing students with a balanced and thematically connected form of blended learning delivery. Students did not just "take part in a project", but performed hands-on work tasks together with other students and faculty staff, as commented on by one of the Third-year students:

In thanking [the staff] I would like to pass on a big thank you to all the lecturers who contribute their time and energy in the whole graduation - they are our bosses there so we work according to their orders so I would like to say thank for the effort. If there were no lecturers involved in the graduation order would be a huge problem. I think all the lecturers work very hard to always make sure that the shooting is a success, for the times they spent the whole day on their feet working. I say they worked well (Student P)

Student M's comments highlight the importance of face-to-face interactions with lecturers in an experiential learning context:

My lecturer would come and ask to see the photographs we took and by him saying "you are really good!" I felt like the world of art belonged to me, I wanted to do more shifts because I knew I was on the right track (Student M).

This Third-year student's comments show that the interactions between students and other students were not just "sociable", but also performed a mentoring function:

During the Graduation process, 1st year students have an opportunity to learn from 2nd and 3rd year students. I thoroughly enjoyed the 'mentoring' experience I was able to provide for 2 members of the 1st year class. These students played the role of stylists during the two days that I was photographing. I feel that the students were receptive to instructions while I was photographing and willing to learn and co-operate (Student PM).

Students also modelled photographic procedures for less experienced students:

As working in the graduation I was the only 3<sup>rd</sup> year and we had to set the lights for the first time I got the opportunity to set the light in graduation. Well I had to because I had to set an example to the other students who were second years (Student MH).

The extract below sums up the advantages students feel that they gain from hands-on, experiential learning in interactions with faculty staff, fellow students, and even the general public (in anticipation for the workplace):

On a positive note I enjoyed working with the different years and it was awesome getting to know everyone. I thought we all worked well together and got along. Having [name of staff member] there to help set up and show us what to with the lights was nice and

interesting (learnt something). Working with [name of a second staff member] on the big studio was entertaining, educational and put ease at it. I felt I learnt something from him and got something out of it. Was fun dealing with all the different people especially when they can't count e.g. "we have 9 people" and 14 people pitch for that one photo ha-ha? Working in that environment with shooting graduation is so much more fun, educational, interesting than doing it for an assignment in the studio (Student J).

The following excerpts elicited from the above extract support what the literature reviewed in Chapter 2 says about the preferences of Net Generation learners for hands-on experiential learning in face-to-face interactions:

**"...the different years"**

Small group interactions run across generations, and break artificial compartments between people and different elements of subject content (i.e. per year of study).

**"Having [staff members helping] ... was nice...and put ease at it"**

Staff members are seen in the context of their professional expertise, modelling the digital processing needed for Industry instead of just talking about it in the lecture situation.

**"Working in that environment with shooting graduation is so much more fun, educational, interesting than doing it for an assignment in the studio."**

Experiential learning is "more fun", more "educational" and more "interesting" than working on a formal academic assignment.

The immediacy and excitement which is generated by small group face-to-face interactions is what gives traditional delivery its "personal warmth" (Gutteridge 2006: 6). E-learning delivery, while it allows far more interactivity, tends to lack this warmth, which ultimately is why blended learning is a better option for Net Generation learners than delivery entirely online, as in MOOCs. In blended learning, the "warmth and immediacy of small group face-to-face interaction is



complemented by the heightened interactivity of electronic communication” (Gutteridge 2006: 6).

#### **6.5.4 Conclusions on Case Study 1**

As mentioned above, Case Study 1 dealt with three aspects of the Internet portal: linking WIL projects to the rest of the Photography curriculum, creating subject-specific resources for the Internet portal, and providing students offline with the hands-on experiential learning and the live interaction with faculty staff and students (i.e. elements valued by Net Generation learners). These aspects addressed areas which the Funnel of harm identified as weaknesses, which were also confirmed in the Pre-Tests. The weak areas identified are as follows:

- lecturers’ omission to cover (i.e. in lectures) the cutting-edge digital multimedia required by Industry;
- the lack of a link between theory and practice in the Photography Programme, in particular how theory explains the operation of cutting edge digital multimedia; and
- the inability of students to apply theory in practice, resulting in flawed portfolio submissions for assessment.

Case Study 1 showed that the Internet Portal has the potential to integrate WIL with the rest of the Photography curriculum (as recommended in the Programme Review). This was followed up by setting a link in the portal to the online ordering of graduation photographs sections (including to the stored products). In engaging not only students but also staff in creating subject-specific resources for the Internet portal, the WIL project addressed the issue of the link between theory and practice. It is one thing for a student not to understand arbitrary examples used in text books, but another to have students actually engaged experientially in producing their own exemplars in a work-related context. This addresses the issue of students submitting flawed portfolios because of faulty formatting and missing/incorrect metadata. The Internet portal may provide – in animations and online demonstrations and lectures – exemplars of how theory is applied in practice. However, it is the hands-on, experiential aspect covered in the WIL project that makes

programme delivery an effective, interesting and personally compelling instance of blended learning for Net Generation learners, as their comments have illustrated.

## **6.6 Results of Case Study 2: Online tutorial**

The online tutorial consisted of a digital assignment combined with a narrative exercise. The latter required participants to respond to questions on how they had carried out various aspects of the assignment. The online tutorial was based on a self-portrait assignment offered through the Australian Digital Photography School's (DPS) weekly online photography challenge (see Figure 6.10). This briefing was given as a project for the Second-year Photography students in 2010. The aim of this assignment was, firstly, to assist lecturers with a choice of digital photographic subject content (from an overseas source). Secondly, it was to prepare students in applying critical reflections as part of a narrative exercise. Thirdly, it would prepare them for their Third-year specialist Photography course, where they write a chapter in a mini dissertation on their own photography, describing the images and explaining the procedure used to produce the photographs.

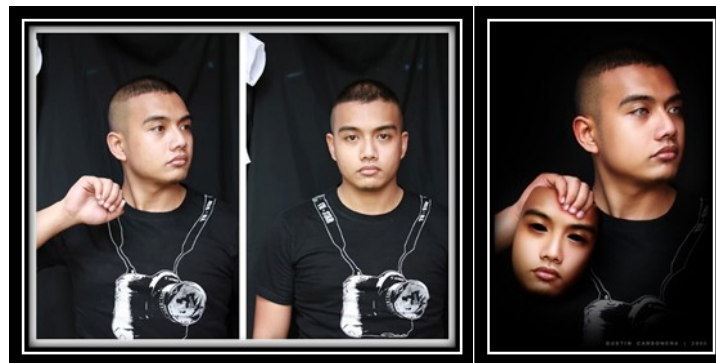


Figure 6.10 Digital unmasking - ripping one's face (Carbonera 2009:[1])

### **6.6.1 Online digital assignment**

The purpose of the assignment was to test if the photography students could be competitive as the DPS weekly photography challenge, but evaluated by DUT staff. The researcher passed this studio type assignment briefing to a tutor who

demonstrated lighting techniques and the students worked on the post-production digital manipulation with the Photo Shop lecturer, as shown in Figure 6.10. The subject choice was not restricted and interpretation was left as a free choice. The formative assessment of the images was discussed online under the title of *Self Portrait - exposing another identity* as shown in Figure 6.11.


	<p>Sep 28, 2010 photos: 20 – 68 MB Public on the web</p>	<p>"IDENTITY" may be described as that thing that makes you YOU. Ones identity is formed by the company you keep, society and cultures. For your last Applied Digital portfolio requirement create a self portrait whereby you incorporate 2 images of yourself. Your one "persona" holds the other one which may represent another part of yourself_ good or bad.</p>
-----------------------------------------------------------------------------------	--------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Figure 6.11 Online assignment briefing (du Plessis, 2010: [1])



Figure 6.12 Identity-1 (Second-year students 2010)

Thirty per cent of the class participated in the practical submission of this project. It was gratifying to find that, with the original idea obtained from the DPS on-line weekly challenge and with appropriate guidance, most students completed the practical project before the due date. The researcher's (online) assessment revealed that seven students from a group of twenty-five produced images that were nearest to the DPS weekly challenge image. The students'

promotion of free thought with the photographic assignment was good (see Figure 6.12).

### 6.6.2 Narrative exercise

Ninety per cent of the students did not hand-in the narrative exercise timeously. Only one student took part in the formal exercise, which was a disappointment. This lack of participation reaffirms the Programme Review findings (2010), where it was stated: “delay with students’ hand-in of work results in lack of timeous feedback from staff” (see Appendix D). While no other students took part in the assignment, it was a rewarding exercise for this student, who later went on to pass with distinctions in four subjects in the third year. It was apparent that the student responded positively to the written assignment. In addition, the student was able to upload the image onto the website and interact with the “digital lecturer”<sup>14</sup>. The exercise also revealed that extra attention is required to complete a basic spell and grammar check prior to submission of all written exercises. However, the main story stood out well. Figure 6.13 illustrates the student’s image and Table 6.13 gives the student’s written response to the class assignment.

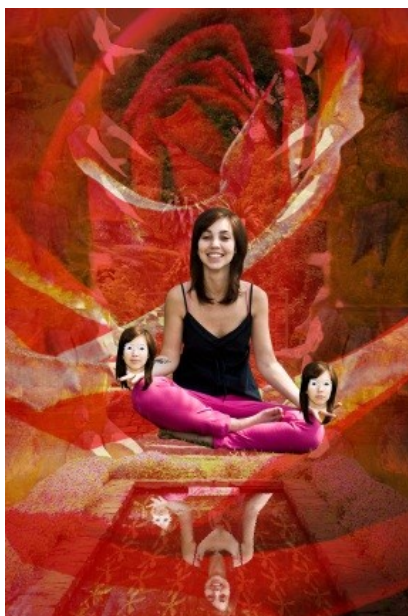



Figure 6.13 Identity-2 (Second-year student 2010)

---

<sup>14</sup> The nickname given to the Photoshop lecturer, who was also involved in e-learning research.

Table 6.13 Student response to narrative exercise

<i>What was your idea to your photograph and or influence?</i>
My inspiration for my self-portrait came from what I want to specialize in 3 <sup>rd</sup> Year. My original idea was to capture myself in our garden because that's where I discovered my passion for flower photography lies, but unfortunately it didn't look as nice as I imagined it would. I also wanted to sit in a meditating position because when you're in a garden you feel relaxed and it's a place to get away from the real world for a moment.
<i>Explain how you captured the photograph? Did you use a self-timer, what type of lighting did you use, etc?</i>
I captured the image in the morning at about 09:00. I placed my boyfriend in bright shade area with some side lighting. I moved him from side to side until I was happy with the lighting. Then I set the camera until I got the right exposure. Then me and my boyfriend swapped place. I got into my position and asked him if it's the right place then he pressed the shutter release button and captured the images. I did a few with different facial expressions. Because most of us girls/women has mood swings and I wanted to incorporate that into the final image.
<i>Did you experience any specific problems?</i>
I had a few problems especially with my background. My original background in our garden didn't look so great, so I decided to go through some of my images in my photo library and I ended up using an image I took in first year at the botanical gardens. It was also the first time I actually used my DSLR on manual.
<i>Explain the procedure for achieving the final result.</i>
I opened my background image in Photoshop. Then I duplicate the background and used vignetting on the layer to draw the attention more to where I want to place the main subject. I only duplicate the water so that can ripple the water so that it seems as the water is moving. Then I went and cut myself out of the image of myself and place it onto the background where I wanted to position myself. Then I made myself larger so that I look like a giant sitting on the stairs. Then I cut off my heads from two other images with different facial expressions and one in each hand. I then duplicated that layer and flip the image horizontally so it looks like a mirror image in the water but I made the mirror image smaller than the original image. I also changed the opacity of the layer.
Then I used one of my flower images and cut just the flower out and placed it onto my eyes to make it look like a mask on the two heads, to show my passion for flower photography. I used a green layer over my background and used a blending mode on it and I changed the opacity, to make the garden more green. Then I used one of my rose images and put it onto the green layer and also used a blending mode and changed the opacity of the layer. Then I used one of my images I took of thorns and placed it on the sides of the image so that it looks like a border. Then lastly I also cut out a flower out of my image and duplicated it so that it looks like a curtain and placed it in the water behind my reflection and I used a blending mode on it. Then I got my final image.
<i>Do you think the idea from this tutorial was useful? Substantiate your answer.</i>
Yes, because it challenged us on our editing and Photoshop skills, to see if we have learned anything the last two years in Digital Applied Photography I & II with  and if we could remember everything.
<i>Was the briefing clearly explained?</i>
Yes it was, we were briefed to decapitate [i.e. cut off] a body part of ourselves and we have to hold that body part. But it's a bit unfair that not everybody did what was briefed.

### **6.6.3 Conclusions on Case Study 2**

According to the participating students' online interaction, they appear to have grown in confidence and self-development. The self-portrait digital case study revealed that learning opportunities could be improved for students in a relatively short period of time. There also appears to be sufficient grounds to argue that the online weekly photographic challenge offered through the Australian Digital Photography School provided more motivation for students to participate than the typical "assignment" format of the DUT-based narrative exercise. The teamwork between the researcher, tutor and digital lecturer on the self-portrait assignment provided the opportunity to test out a curated portal briefing in a blended learning approach.

### **6.7 General feedback from users**

A select group of potential users (current and past students) was invited to login to the Internet portal while it was still under construction (see Figure 6.14). Positive responses were received in class discussions. Most students agreed that using the Internet was beneficial if you knew how to use it properly, and emphasised that the available information must be accurate, reliable and should not have too many links. As in the surveys and case studies, the discussions confirmed (but informally) that multimedia resources provide a better understanding of key concepts such as histograms, aperture and exposure settings. The following emails (see Figures 6.15 - 6.18) give some examples of written responses to using the portal while in the prototyping stage (i.e. while only the selected groups had access to the actual portal).

In Figure 6.14, the researcher's email to the potential user group gives users' instructions for login, points them to the online resources (including videos), and asks for feedback. In Figure 6.15, a responding user comments on the potential of the portal ("it's an awesome concept"), but his query shows that, no matter how "easily accessible" a site is, some initial user induction and guidance are required.

**Sent:** 13 May 2011 05:24 AM  
**To:** [Selected photography students]  
**Subject:** Under Construction\_teaching resources  
**Importance:** High

Dear Photography Students

As discussed/promised sometime during the year I have set up a website through DUT. Every registered photography student has been registered to gain access to the site that is available at:

<http://docaweb.dut.ac.za/moodle/>

Use the following settings to gain access

Copy and paste the link on your browser

Go to Visual Communication Design (under Course Categories)

This will take you to the Photography Virtual Office

On your extreme right hand side it should state you are "not logged in" (login)

Click on login and a message comes up asking you to login

**Your username is your student Number**

**Your Password is your surname in CAPITALS**

Once you have logged in you will get an option to edit your profile(optional)

or

Click on Photography Virtual Office (left of page)

This will take you to the PVO homepage.

Scroll Down and access the options.

Particular interest at this point is the Teaching and Learning Resources and the Digital Videos.

I will appreciate your feedback regarding access before I advise the rest of the students.

Figure 6.14 Researcher's email to potential user group

**From:** [REDACTED]  
**Date:** Wed, 18 May 2011 18:56:56 +0200  
**To:** Abdool Haq Mahomed Bhorat<[abdulh@dut.ac.za](mailto:abdulh@dut.ac.za)>  
**Subject:** Re: FW: Under Construction\_teaching resources

Hi Abdul

Had a look, but it doesn't give a listing of any resources or videos, are there none uploaded as yet? Other than that it's an awesome concept and easily accessible.

Many thanks

Figure 6.15 User query about location of resources

In Figure 6.16, the researcher emails the user a screen dump to demonstrate visually where the resources can be found. In Figure 17, a user makes a suggestion about additional resources, which the researcher has, to some extent, pre-empted (i.e. by setting up links to student assignments). The comment about the login, which is the one area in which Moodle's vaunted user-friendliness falls short, in that the standard login is in very small font and hidden away at the top right-hand corner of the screen.

**From:** Abdool Haq Mahomed Bhorat <[abduh@dut.ac.za](mailto:abduh@dut.ac.za)>  
**Date:** Wed, 18 May 2011 19:38:15 +0200  
**To:** [REDACTED]  
**ReplyTo:** Abdool Haq Mahomed Bhorat <[abduh@dut.ac.za](mailto:abduh@dut.ac.za)>  
**Subject:** Re: FW: Under Construction\_teaching resources

Hi [REDACTED]

Switching on my computer to see what the problem is. Are you still online?

**From:** [REDACTED]  
**Sent:** 18 May 2011 07:39 PM

**To:** Abdool Haq Mahomed Bhorat  
**Subject:** Re: FW: Under Construction\_teaching resources

No, not at the moment, I'm out with the family. Can have a look tomorrow again.

On Wed, May 18, 2011 at 7:49 PM, Abdool Haq Mahomed Bhorat <[abduh@dut.ac.za](mailto:abduh@dut.ac.za)> wrote:  
Oops! sorry.  
See the screen dump tomorrow.  
You will find all the videos under the Resources section (left hand side of page) as shown on the screen dump.

Enjoy your evening.

**From:** [REDACTED]  
**Date:** Thu, 19 May 2011 15:48:44 +0200  
**To:** Abdool Haq Mahomed Bhorat<[abduh@dut.ac.za](mailto:abduh@dut.ac.za)>  
**Subject:** Re: FW: Under Construction\_teaching resources

Thank you, I see it now. Site is very user friendly and easy to navigate around.

Figure 6.16 Interchange of emails about accessing resources



**From:** [REDACTED]  
**Date:** Wed, 18 May 2011 10:19:24 +0200  
**To:** Abdool Haq Mahomed Bhorat<abduh@dut.ac.za>  
**Subject:** Re: Under Construction\_teaching resources

I think it's a good idea for student's to have access to these resources. Maybe also include links to research papers that can be used for assignments and suggested readings. The login hyperlink is a bit too small.

Hope this helps.

**From:** Abdool Haq Mahomed Bhorat  
**Sent:** 18 May 2011 10:53 AM  
**To:** [REDACTED]  
**Subject:** Re: Under Construction\_teaching resources

Thank you for the feedback. You should also look at the App IV and Theory IV folders. I have uploaded Btech report samples. The site will be continually uploaded. If you require any specific readings please let me know either via email or on the discussion forum. If you have email addresses in electronic format of your class please send it to me. Will look at the font size.

Figure 6.17 Interchange of emails suggesting further resources

**From:** Abdool Haq Mahomed Bhorat  
**Sent:** 21 July 2011 04:57 AM  
**To:** Webmaster  
**Subject:** guest log in  
Dear [REDACTED]  
Am I allowed to log in guests on PVO? If yes not sure how this works?  
Please advise.  
Regards

**From:** webmaster  
**Date:** Thu, 21 Jul 2011 08:39:14 +0200  
**To:** Abdool Haq Mahomed Bhorat<[abduh@dut.ac.za](mailto:abduh@dut.ac.za)>  
**Subject:** RE: guest log in

Hi Abdul  
You can allow guest access to a course. You need to edit your course and then scroll down until you see Guest Access and you can allow guests without the key. Basically means that it is open completely. Or can set to allow guests with a key.  
Kind regards

Figure 6.18 Interchange of emails with webmaster about guest access

Figure 6.18 shows an interchange between the webmaster and the researcher about enabling guest login. While Moodle is not the “official” DUT LMS, the webmaster was part of the group of Moodle enthusiasts and hobbyists who set up Moodle servers at DUT. The DUT webmaster, in fact, played a key part in assisting staff to publish course materials online on a “dutmoodle” server donated by an academic.

## **6.8 Conclusion**

Student demographics could be seen to play little or no part in the students’ responses about using online learning and/or traditional lectures being used for Programme delivery. The need expressed for retaining face-to-face oral interactions cannot be attributed to the predominance of African learners in terms of being a newly literate culture. The literature has made it clear that the younger generation craves an experiential, hands-on approach with “live” interactions. Furthermore, the findings on the degree of fluency in everyday social use of the Internet, whether on computer, mobile phone or tablet, show that our students are highly “tech-savvy” in this regard, probably more so than most of their lecturers. The lengthy travelling periods experienced by many students and consequent lack of sufficient time to access Programme resources in the DUT libraries is a demographic factor in favour of facilitating online resources.

The Pre-tests for both First- and Second-year students confirmed that, as revealed by the Programme Review, neither the theory explaining why/how the digital technology worked, nor the technology itself was being covered properly in lectures (if at all). The students could not then explain the functioning of the processes involved in digital photography, as they did not know how theory informed practice. In an Industry characterised by rapid technological change, this was a pedagogical need which needed to be addressed as a matter of urgency.

The responses on Internet use and Internet aptitude suggested that the deficiencies observed in the Photography Programme delivery could be

addressed in part by use of an Internet portal. This would need to be a curated portal, as students had expressed misgivings about finding their way through the mass of material on the Internet. Moreover, some of the vast resources available on the Internet might well be incorrect or inappropriate in the context of the DUT Photography Programme, or for the level involved (e.g. First-, Second- or Third-year, or even BTech level). Students also expressed a strong preference for retaining traditional lectures, because of the interaction it gave them with other students and faculty staff. It was not that students objected to the Internet as used for teaching and learning: they clearly thought that it had advantages in terms of quick and relatively cheap access to educational resources. However, they showed a preference for social interaction with peers, and face-to-face encouragement - and re-assurance that they were on the right track - from their lecturers.

The results of Case Study 1 showed how the immediacy, warmth and excitement of hands-on experiential learning with educators and peers could be viewed, not as a once-off project, but as an integral part of the Photography Programme. This could be achieved not only by application of the theory in practice in professional type work, but also by using the product of the work (i.e. carefully processed digital images with relevant metadata) as a resource for the Internet portal. The “data warehouse” of digital images, as well as the site for the online ordering of DUT Graduation photographs, could also be hyperlinked to the Internet portal. Case Study 1 also confirmed that blended learning delivery was a highly suitable option for the Photography Programme.

Case Study 2 showed that exemplary work could result from online tutorial assignments, as well as online interaction, saving students and lecturers travelling time and inconvenience. The online tutorial showed that the Internet is an ideal medium for display of digital technology (i.e. in comparison to hard print). The fact that most of Industry’s present and future requirements would be for online multimedia makes the Internet portal a highly appropriate showcase for student assignments of this nature. There are also the factors of cost and convenience involved in the production of high quality photographic

products. These problems are solved by submission to and display on the Internet portal.

Finally, general feedback from a selected group of potential users showed that resources could easily be accessed, although some form of induction might well be needed. Students not only recognised the potential of the portal but could also make suggestions for improvement. The student who wrote: "it's an awesome concept and easily accessible," summed up the potential of the Photography portal.

However, whether or not the Photography portal was likely to be accepted by staff and students as part of "normal", everyday teaching and learning is discussed in the next chapter. Chapter 7 is, in a sense, a summing up of the salient elements signalling morphogenesis (change) or stasis (in this case, stalemate), and will attempt to arrive at a prognosis before the final conclusions and recommendations are provided in Chapter 8.

## CHAPTER 7: MORPHOGENESIS VS. MORPHOSTASIS

### 7.1 Introduction

This chapter will gauge the likelihood of change occurring based on an analysis of artefact development at the three levels of the morphogenetic approach described in the methodology. As mentioned in Chapter 4 (p75), analysis can be done only in the sense of making a prognosis (Archer 1995: 167) as to the probable results of the intervention. Figure 7.1 sums up the levels of stratification operating in the methodology in the course of this study. The levels comprise that of the morphogenic cycle in general, its application to innovation development in the specific context of the Photography Programme, and its material manifestation in the design of an artefact, an educational Internet portal.

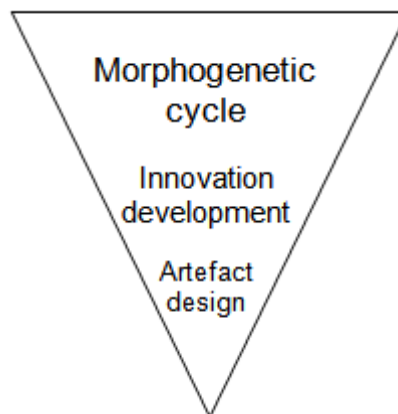


Figure 7.1 Overview of the levels of stratification in this study (See Figure 4.1 for details)

At the wider level of social change, the morphogenetic cycle, a prognosis will be made as to the likelihood of the portal being adopted by the Photography staff and students as part of blended learning delivery in terms of past history and current problems experienced. At the next level, that of innovation development, it will be shown how the artefact addresses the problems identified in the “funnel of potential harm”. Finally, at the level of artefact

development, the design science guidelines (Hevner *et al.* 2004) will be used as a framework to assess the probable outcome of the artefact design (i.e. whether the artefact is likely to be successful).

## **7.2 Development at the level of the morphogenetic cycle**

Luckett's "Morphogenetic cycle for the ADP review" (2012: 342) was adapted for use in this study (Table 4.3 in Chapter 4) to illustrate the way in which historicity operated in the morphogenetic cycle. The time frames will be filled in below to show the current situation as creating the pre-conditions for morphogenesis/morphostasis in the programme delivery in Photography.

### **7.2.1 Historical background to present day era**

From the 1980s until the 1990s (Time 1 in Table 7.1), teaching and learning took place at the South African universities or "technikons"<sup>15</sup> (as DUT was then) in preparation for traditional forms of employment and professional functioning (Lamp Magazine 1981: 88). Up until the 1980s, there was very little or no computer or digital technology, and lecturing was mainly by "talk and chalk". However, use of overhead projectors and television was becoming commonplace towards the 1990s (Greyling 1982). The cultural conditioning was Eurocentric and English or Dutch learning traditions predominated at universities. The agencies involved in maintaining the Eurocentric status quo were Education Departments, university Management, and staff (lecturer, admin, support, and so on), as well as students and parents.

The immediate past and present day era (Time 2 - Time 3 in Table 7.1), roughly 2000 – 2014, reflected teaching and learning as being more in line with Industry structures (e.g. employment in corporate structures, entrepreneurship, education, and particularly IT-related Industry). As has been shown in the empirical work, at the time of data-gathering, the Photography Programme was technology driven, particularly in terms of Industry's need for cutting edge digital expertise. While Net Generation students were highly computer and mobile literate, and familiar with digital technology for recreational social use, older staff

---

<sup>15</sup> Prior to this, DUT was known as the "Natal College for Advanced Technical Education".

still preferred “chalk and talk” lecturing, and favoured an approach based on liberal humanism. Staff abilities were layered (stratified) in terms of ICT and mobile literacy, but most had mobile phones.

Table 7.1 Time frames leading up to present day context (T1 to T3)

Periodisation	Morphogenesis/Morphostasis
Time 1 (1980s - 1990s) Historical background	Structural/cultural conditioning
Technology: Development of the Internet	
Pedagogy: Digital e-learning not yet developed for everyday teaching/learning use	
Time 2 - Time 3 (2000 - 2014) Period involved in research	Social/socio-cultural interaction

DUT was now a “transformed” multicultural university, with a mixture of cultures, and spread over a number of campuses. However, staff and students existed mainly in silos, with little true transformation or multiculturalism. Student culture was now predominantly African, with Management culture becoming more so. Traditional Eurocentric learning was still predominant, in spite of successive attempts at transformation and re-curriculation. However, recent re-curriculation initiatives had embraced a more student-centred approach better suited to the socio-political changes in South Africa. This had been facilitated by the fact that agency had changed after political liberation, with the political transformation of Education Departments. As a transformed multicultural university, while more Africans were represented in Management structures, and comprised the majority of the student body, Indian and white staff still predominated in the lecturing group. Many academic staff members were disenchanted by the merger of the two technikons into the new “university of technology”, unsure of their role in this new dispensation, and de-motivated by the inequalities and downgrading resulting from the merger and the restructuring exercise. Lectures were regularly disrupted by student protest action at the beginning of each year, and the Photography students had become more critical of traditional lecturing delivery in view of the technology

they were expected to master, and of which most had a better grasp though frequent social use. Staff lacked technical skills for teaching and learning as opposed to students, who were classified as technology literate and whose expectations for the marketplace were different from those of the staff. This led to poor performance of students, and both parties started blaming each other.

By contrast, the development of computers and the Internet (in Appendix A), as well as associated advances in digital photography (in Appendix B) showed the possibility of transforming teaching and learning with digital resources. As new technologies developed, they started to reach out to thousands of users, for both work and leisure, and slowly transformed its daily use. In addition, with the advent of faster Internet accessibility, multimedia-enabled mobile phones, (such as the Apple iPhone, BlackBerry and various other models of smart phones) had reached a global market and were no longer reserved exclusively for a small elite (Kjeldskov, 2013:3). Archer's morphogenic approach highlights the importance of this type of historical development of events in the broad spectrum of social change.

### **7.2.2 Morphogenesis vs. morphostasis in the context of the Photography Programme**

In view of the breakdown in systemic and social functioning apparent in the state of affairs, as well as rapid social changes in the direction of a "Net Generation" of learners, some form of morphogenesis seemed to be indicated. This brings us to the issue of why this study comes to the conclusion that morphogenesis rather than morphostasis was the prognosis for the artefact developed (i.e. blended learning using an Internet portal). This outcome is strongly indicated (but not assured) by reaching a conclusion based on the pre-conditions which Archer (1995: 295) identifies as resulting in morphostasis and morphogenesis (see Table 7.2). The Photography Programme was clearly experiencing a crisis at the time of the Programme Review, a crisis characterised by low systemic integration (delivery was not working) and low cultural integration (factions had polarised, and had resorted to "blaming"). In view of the urgency of the situation, some form of resolution was required.



In Table 7.2, the sections highlighted in grey (quadrants in Archer's 1995: 295 diagram) indicate that an impasse between transformation (morphogenesis) and continuance (morphostasis) had existed up until the time of the Programme Review. Compromise had been possible previously, in terms of staff using a liberal humanistic approach, where the students' eventual employment required advanced digital expertise. This contradictory state of affairs had been tolerated, but only by ignoring the problems. Once the Programme Review had identified serious defects in programme delivery, the situational logic (or prevalent mindset) switched over to one of elimination, that is, finding and blaming the person/s responsible, with the most powerful agents (in terms of roles and resources) being in a position to dictate what should happen.

Table 7.2 Preconditions for morphostasis or morphogenesis (from Njihia 2000: 98)

		SYSTEMIC INTEGRATION (Structural or cultural)		
		High	Low	
SOCIAL INTEGRATION	High	Necessary complementarity	Necessary contradiction	Morphostasis (i.e. maintain status quo)
	Low	* <i>Contingent complementarity</i>	Contingent contradiction	Morphogenesis (i.e. change)

This could have resulted in a draconian imposition of "traditional" tuition with punitive force. In view of the overriding culture of transformation, and the manifest unfairness<sup>16</sup> of imposing punitive measures on both staff and students, this was clearly not a viable option. Moreover, as has been pointed out earlier (p79), the situational logic of elimination is a mindset only, and not a projected outcome. This situational logic need not result in internecine conflict or mass

<sup>16</sup> "Unfairness" in terms of the reality that staff and students were the victims of the unintended consequences of past acts in which they had no part (i.e. opening of universities to previously disadvantaged students, as well as the merger and subsequent restructuring.)

destruction, if a mutually agreeable compromise can be reached. Concurrent with the above events, a window of opportunity had opened for innovation, as shown by the “contingent complementarity” section in Table 7.2 (asterisked and in italics). This opportunity arose because of the emphasis on introducing e-learning at DUT, and the notion will be developed further in the next section.

### 7.3 Development at the level of innovation

In his adaptation of Archer’s morphogenetic cycle for innovation design, Wong (2005:13) describes the various configurations of agential (people) structural (material) and cultural (ideational) elements which lead to either morphostasis or morphogenesis. Morphostasis, in this case, would be a rejection of the innovation and a retention of the status quo, while morphogenesis would involve a change towards the direction offered by the innovation (which might well be gradual or in stages). Figure 7.2 shows Wong’s model adapted to illustrate its application to the innovation design carried out in this study.

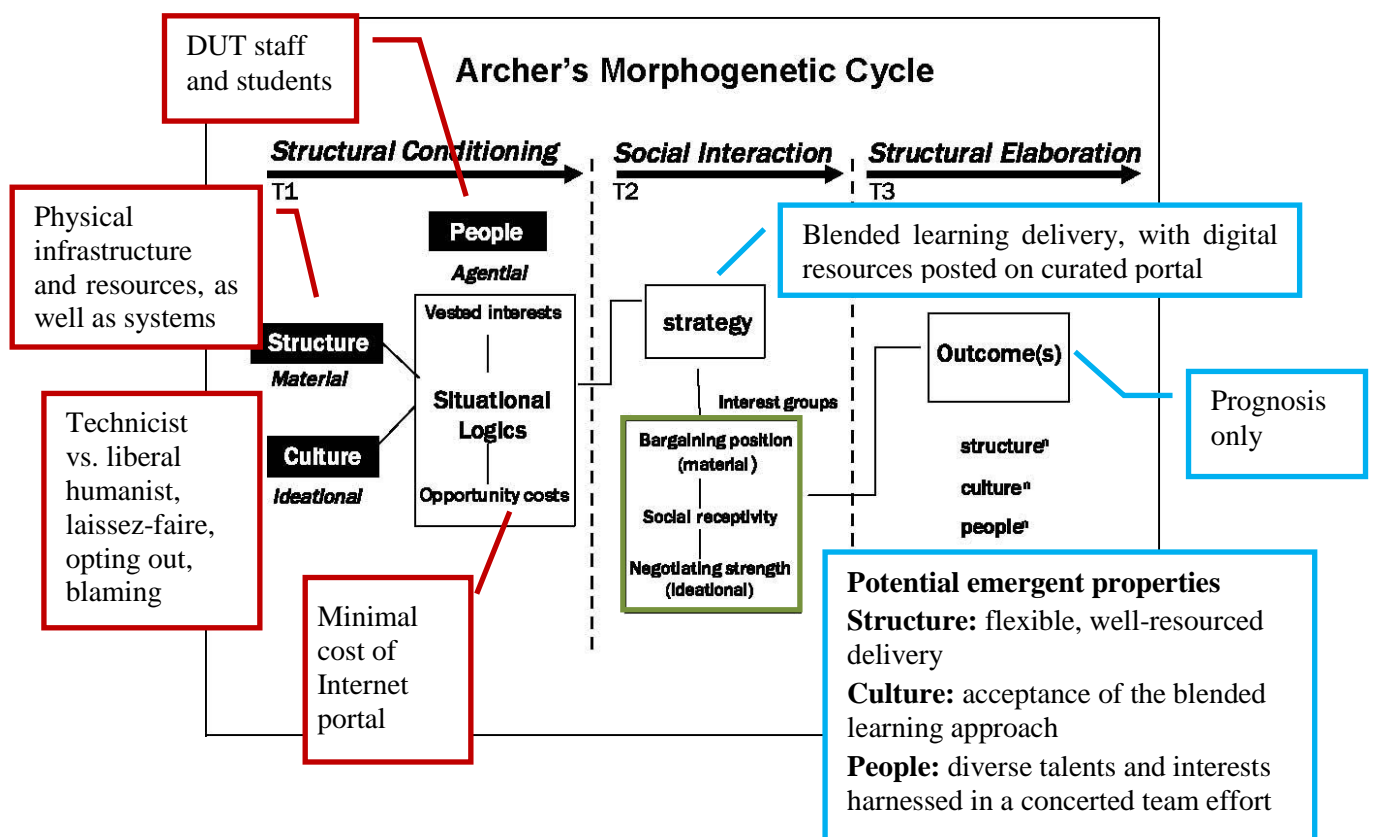


Figure 7.2 Morphogenetic progression followed in innovation design (adapted from Wong 2005: 13)

As Wong's model suggests, innovation development involves establishing the following:

- the systemic conditions pre-existing the change;
- the situational logics arising from the specific configuration of structural and cultural conditions;
- the social interactions among actors; and
- the ways in which the outcome might reflect the transformation of structural, cultural and agential conditions.

The proposed change was to introduce access to resources on an Internet portal so that traditional learning might be enhanced by digital resources in a blended learning approach. This would solve the impasse identified above. It was not envisaged that all lecturers would move over in lockstep fashion to the "new dispensation", but merely that there would be more options available than in traditional delivery using hard print resources. It would also allow specialists in various areas of the discipline to share expertise rather than have everyone necessarily replicate the same content knowledge or skills (lecturing or digital).

### **7.3.1 The systemic conditions pre-existing the change**

As mentioned in the previous section, the funnel of "potential harm" (Figure 5.1) established the systemic conditions pre-existing the proposed change, and also, to some extent, clarified the cultural variations amongst various actors and agents (i.e. their stock positions in terms of attitude). At a structural (i.e. material or systemic) level, pedagogical delivery was not working effectively in the Photography Programme, as established in some detail in the Programme Review. To some extent, the malaise affecting Photography was apparent throughout DUT in varying degrees since the institutional merger, and even more so, after the departmental "restructuring". However, the Photography Programme's defects had been publicly exposed in the Programme Review, and urgent action was required as a matter of corporate policy.

The positive aspect was that, according to Archer's morphogenetic theory and its adaptation for innovation design by Wong, innovation has more chance of

success when there are contradictions and non-complementarities than when affairs are going smoothly. Cultural and structural dissonances can be borne (even ignored) if keeping the status quo is in the interests of powerful agents or blocs. However, when it is clearly not possible to tolerate - or hide - serious malfunction, some action must be taken. In the case of deadlocked positions (e.g. staff *laissez faire* liberal humanism vs. students' desperate need for technical expertise to gain employment), innovation offers both sides a face-saving compromise. To show how the various elements worked in the course of (at least partly) achieving this goal, Wong's model will be followed through. This will suggest the conclusion that the innovation development, through social interaction, had the emergent properties needed to make the innovation acceptable so that it might actually work in practice.

The structural conditioning at the outset of the morphogenetic cycle in innovation design contained the following elements (as shown in Table 7.1). The most powerful agency constituted the DUT Corporate agency (i.e. top management), with the "official" culture (the VC's) being that e-learning had the potential to transform pedagogy. The Programme Co-ordinator's interest in the technical side of Photography meant that a technological innovation (i.e. via some form of e-learning) would have more appeal than one based on traditional lecturing delivery. It must be remembered that staff groups and non-formal alignments also had ideas about "correct" ways of operating, influenced by ethno-cultural considerations, although it was not within the scope of this study to investigate these. Lecturing staff were disillusioned by the results of the institutional merger and subsequent re-structuring, as well as by unreasonable demands to deal with under-prepared students and poor facilities. They tended to adhere to a classroom culture of liberal humanism as a response to past inequities. This stance avoided the issue of delivering on cutting edge digital technology, which the pre-tests in the previous chapter showed was not covered in lectures. The Photography Programme Report (2010) revealed that the reason for this was that too few staff had the necessary technical expertise, which was attributed to a lack of staff development in the area of digital technology.

The structural (material, including systemic) elements which could be seen to affect the corporate culture (i.e. various players' mindsets) are shown in Table 7.3.

Table 7.3 Elements of structural conditioning at the outset of the morphogenetic innovation cycle

<b>AGENCY (People)</b>		<b>Specific examples in context</b>
Corporate agents		Top management and/or executives (e.g. the VC)
Primary agents		Deans, HoDs
		Programme Co-ordinator <sup>17</sup>
Agents at lower levels		Members of affiliations or special interest groups (e.g. unions)
Actors		Lecturers, students, technicians
<b>STRUCTURE (Material)</b>		
Physical infrastructure lacking		Lecture rooms, equipment, computers and laboratories (including connectivity ), funding
Human resources infrastructure lacking		Personnel, training (particularly in digital technology)
Systemic problems		Educational system not working at various levels due to lack of infrastructural support
Departmental autonomy and efficiency		Flawed by restructuring, leaving former departments without autonomy and under-resourced
Leadership systems		Flawed by restructuring, which demoted HoDs to the nonexistent post of Programme Co-ordinator
Programme delivery systems		Lecturers and support staff over-taxed and demoralised by results of re-structuring
<b>CULTURE (Ideational)</b>		
Technically focused: on Internet on digital photography		VC, Programme Co-ordinator, students (Net Gen) Programme Co-ordinator, digital experts, technicians
Liberal humanism (response to past inequities)		Lecturers unskilled in digital or computer technology
Entitlement mentality		Students (understandably) sensitive about continuance of past inequities
Need for employment		Student awareness of need to acquire cutting edge digital technology for employment
"Opting out" mentality		Staff and students disillusioned by conditions caused by "funnel of harm"
"Blaming" mentality		Lecturers and students ("Why bother?")

<sup>17</sup> i.e. the researcher

The lack of physical and human resources infrastructure put stress on all academic programmes at DUT, as it led to systemic failure in programme delivery at many different levels. However, the downgrading of the post of Photography HoD to “Programme Co-ordinator”<sup>18</sup> resulted in even fewer resources (material and staff), systemic problems because of infrastructural deficits, and frequent leadership crises (problems identified in the departmental Programme Review). These clearly had a causal effect on programme delivery.

The various structural problems could be seen as contributing, in some part, to the corporate culture (i.e. mindset) at the various levels of agents/actors. While top Management (as powerful corporate agents) were obviously less susceptible to institutional ills than lecturers and students (mere actors), they were obviously committed to improving programme delivery. As befitting a university of technology, the VC’s vision for enhancing learning was (and still is) technically focused, in actively promoting e-learning. The Photography Programme Co-ordinator, coming from a technical background, also had a predilection for the digital technology and the Internet, as did most of the Photography students (as revealed by the surveys). The majority of lecturing staff in Photography preferred a traditional lecturing approach favouring liberal humanism, and were not (at the outset) enthused by digital technology. Due to the systemic failures in programme delivery, the students tended to be anxious about the quality of tuition, and projected an air of entitlement; the reality was that they were desperate to acquire the cutting edge digital technology needed for employment. There was also a fair degree of “opting out” by staff and students, as the situation was untenable, but this changed to “blaming” (by both staff and students) when the Programme Review revealed the cracks in the system.

### **7.3.2 The situational logics**

The situational logics (see Table 7.4) were all in response to the same problem (i.e. lack of effective programme delivery) but differed in terms of the level - and

---

<sup>18</sup> Programme Co-ordinator: an appellation used for a non-existent post with no seniority, authority or concomitant remuneration.

nature - of agency (or actor) involved. For top management and/or executives (e.g. the VC), e-learning was proposed as “the answer” to effective programme delivery. The deans and HoDs adhered to the corporate policy (i.e. on e-learning) but were not personally involved in delivery, as they operated mainly at an executive and administrative level. Agents at lower levels with various alignments would, of course, choose whatever “position” suited their immediate and long-term needs: the logic would not be geared towards programme delivery, but towards personal or group advantage. Hapless actors (staff and students) were locked into appeasement for past inequities and desperation for the tertiary-level digital expertise they felt (as fee-paying students) that they were entitled to, with each side being blamed for the shortcomings in academic programme delivery. The Programme Co-ordinator was in a good position to design and effect a working solution to the problem (i.e. of effective programme delivery). He thus settled for a blended learning option which would leapfrog over the infrastructural problems, and worked on a solution which would not require extensive staff re-training and would appeal to the Net Generation learners’ predilection for web-surfing. This was likely to work, provided that it was supplemented by sufficient face-to-face mentoring and “live” interaction.

Table 7.4 Situational logics in response to programme delivery problems

<b>AGENCY (People)</b>	<b>Specific examples in context</b>	<b>SITUATIONAL LOGICS</b>
Corporate agents	Top management and/or executives (e.g. the VC)	e-learning will transform pedagogy
Primary agents	Deans, HoDs	encourage e-learning
	Programme Co-ordinator	innovate: set up portal
Agents at lower levels	Members of affiliations or special interest groups (e.g. unions)	look for advantage
Actors	Lecturers, students, technicians	blame, opt out

### 7.3.3 The social interactions among actors

The social interactions constituted both the researcher’s role as Programme Co-ordinator (i.e. before and during the Programme Review) and as researcher, in

the course of gathering data for this study. According to Wong's model, adopting an effective strategy during interactions is crucial for innovation development. Following the morphogenetic progression involved in innovation design (in Figure 7.2), Figure 7.3 (inset from Figure 7.2) shows the best strategy to follow for innovation design in terms of bargaining position, social receptivity and negotiating strength.

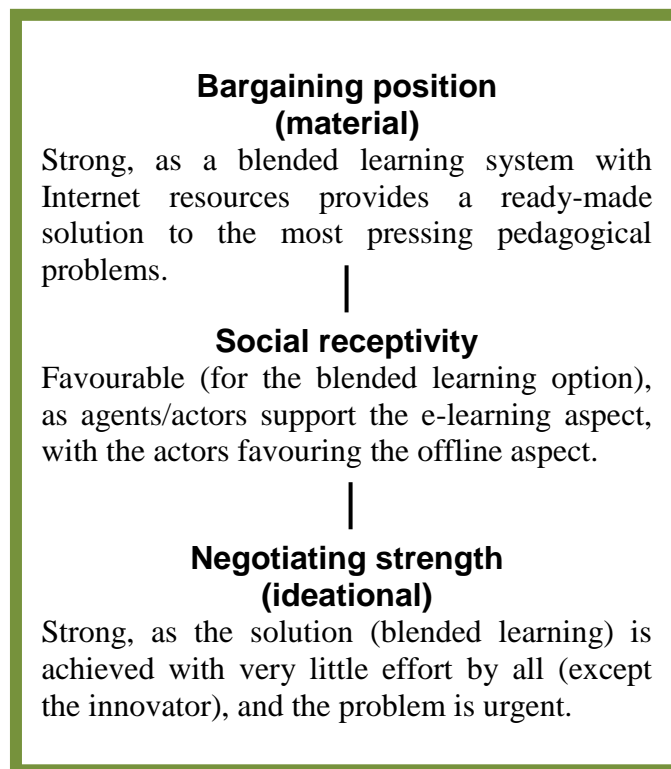


Figure 7.3 Strategy in terms of bargaining position, social receptivity and negotiating strength (inset from Figure 7.2)

As the portal is still in the course of being introduced and tested out, the interactions have not yet been concluded. However, some conclusions can be drawn from what is already known. The bargaining position from a material point of view was strong: resources and expertise were being offered (free of charge)<sup>19</sup> to address the issue of providing specialist tuition in the theory and practice of cutting edge digital photography (i.e. a key Industry competence).

<sup>19</sup> By virtue of the Programme Co-ordinator's research project and the group of Moodle enthusiasts maintaining the servers.



Social receptivity was favourable: Management and the Programme Coordinator were higher level agents who strongly supported an e-learning solution, which was also looked on favourably by the majority of low-level actors (i.e. students). However, students, as well as lecturing staff, also favoured the retention of small group interactions for learning, thus a blend of traditional and Internet learning was likely to be the most acceptable innovation. As for negotiating strength, the solution (adding a curated Internet portal) was provided with very little effort by all, except the innovator. Moreover, the problem was urgent, requiring a speedy solution. The solution can be seen not to favour any one group, but to offer growth opportunities for all groups. It is thus an acceptable solution in terms of the situational logic of “elimination”, which otherwise might have prolonged the conflict with destructive results for all parties.

Finally, as well as the strong support for e-learning from powerful agencies, the high systemic integration/low social integration combination signals the preconditions for morphogenesis. In particular, the recent improved infrastructural support for e-learning, as well as the facilities (particularly servers) fairly recently offered by the Moodle enthusiast group provided an instance of contingent complementarity (see Table 7.2) which favoured a change towards innovation.

#### **7.3.4 Emergent properties for structural elaboration**

However, as Figure 7.2 suggests, the intended outcome (at the stage of writing) could be a prognosis only. It was thought that the innovation had the following potential emergent properties (Figure 7.2 insert outlined in blue):

- structure: a flexible, well-resourced system of programme delivery;
- culture: acceptance of blended learning approach; and
- people: diverse talents and interests harnessed in a concerted team effort.

## **7.4 Development at the level of the artefact**

In terms of a final prognosis at the level of the artefact, the design science guidelines of Hevner *et al.* (2004) provide a pragmatic/realistic assessment as to the outcome of the artefact design (i.e. whether the artefact is likely to be successful). The extent to which the seven design science principles provided by Hevner *et al.* (2004: 83) were fulfilled is given below.

### **7.4.1 Design as an artefact**

The completed artefact took the form of a curated digital multimedia portal which attempted to address the educational problems identified by providing specialist online photographic resources. It also modelled the teaching of digital technology, something to which multimedia tuition lent itself.

### **7.4.2 Problem relevance**

The problem was important and relevant, not just in terms of affecting educational delivery, but also in terms of providing employment for DUT graduates as well as the specialist expertise needed to uplift the economy. It was thus a “business” problem in two respects: the business of tuition and the business of the commercial world.

### **7.4.3 Design evaluation**

The literature review interrogated various aspects of campus e-learning delivery to establish best practice in different contexts, and the student surveys and case studies narrowed down the options to what was the most appropriate design for the intended context and audience. Staff and student feedback was obtained on the various resources proposed for the portal during the prototyping process.

### **7.4.4 Research contributions**

To the researcher’s knowledge, this is the first time a curated educational portal has been designed for use with a specific academic Programme. While it is not the first time that design science has been used within a critical realist approach (see Hill 2009), it is the first time Archer’s morphogenetic action research cycle

has been linked to design science. Besides making a research contribution, a design is more likely to be successful when it is linked to its social context.

#### **7.4.5 Research rigour**

The qualitative research methodology used gathered a large amount of data, not only from surveys and case studies, but also from authentic academic processes and functions. The data is then “authentic” for the specific context for which the artefact was designed. Archer’s morphogenetic research cycle requires more rigour than traditional action research, as events need to be analysed in their socio-historical setting. Both critical realism and the morphogenetic approach require a high degree of logical analysis.

#### **7.4.6 Design as search process**

Artefact design was part of a genuine “quest” to find the most suitable solution to an urgent pedagogical problem. While enablements such as support for e-learning and a viable infrastructure existed, there were also the usual constraints attending academic institutions, such as ethical limits (i.e. on experimentation), institutional mores and regulations, and the attitudes of other staff and students. The researcher widened the search by means of visits and field trips to other institutions, and attending photographic expos.

#### **7.4.7 Communication of research**

The researcher has communicated details of the project to colleagues, staff of the Quality Assurance Centre, and kept in regular touch with Management and IT. He also attended a data curation conference and took part in staff development workshops and webinars. The online site communicates the research to visitors: the Moodle website, together with the Photography Online Virtual Office and the website for the online ordering of Graduation Photographs.

The smaller action research cycle of artefact design, piloting and modification took place within the larger cycle of transforming social structure, although it could still be termed morphogenetic in the sense of contributing to the combined agency of Internet resource providers who contributed to rich media currently

available online. As mentioned previously, the approach of Hevner *et al.* is positivist rather than post-positivist, yet it could be adapted to fit within a critical realist approach, as with Hill's (2009: 22) generic business model and Nonaka's (1991) model of knowledge transfer through a process of evaluation and recommendations.

## **7.5 Conclusion**

Chapter 7 carried out an analysis at the three levels of the morphogenetic approach described in the methodology in order to make a prognosis about the likelihood of morphogenesis occurring (i.e. a change to using the Internet portal in a blended learning approach). It can be seen that the kind of morphogenetic analysis used by researchers such as Horrocks (2009), Luckett (2010), Njihia (2008) and Quin (2006) is not predictive in an absolute sense, but is useful for setting current events in their historical setting and thus tracing trends for future development. An advantage of using a morphogenetic approach is that the causes for/against adoption of innovation can be identified more clearly than by using a rubric type assessment based only on the perceptions of users (or potential users). The latter, in Bhaskar's terms, use data from the empirical (conceptual) and actual (experiential) levels of the whole reality, leaving the deep level causes (or mechanisms) unexplained. Having said that, the design science principles (constituting a kind of rubric) are useful in gauging the rigour and authenticity of the artefact design. There is evidence to suggest that, at all three levels, the prognosis for the adoption of the curated Internet portal is positive. The next chapter will, therefore, move on to arrive at conclusions and recommendations for the whole research cycle.

## **CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS**

### **8.1 Introduction**

Chapter 8 comes to conclusions on the extent to which the general research aim and specific objectives were accomplished, and notes the delimitations of the study. It then makes recommendations as to the further development of the Photography portal, as well as for other portal developments at DUT. Recommendations for further research are also given, and the chapter ends with some concluding thoughts.

### **8.2 The extent to which the research aim and objectives were achieved**

This section deals with the extent to which the general research aim and specific research objectives were achieved.

#### **8.2.1 The extent to which the research aim was achieved**

The general aim of the research was to provide DUT staff and students with an educational Internet portal providing access to curated multimedia resources relevant to the Photography Programme. Both the literature review and the empirical work suggested that blended learning delivery would be the most effective campus e-learning option, particularly in terms of the pedagogical needs identified. The literature suggests that academics, on the whole, have not been quick to adopt e-learning. In the context of this study, the Photography staff, at the stage of writing, clearly had a strong preference for face-to-face small group interactions. The students, too, expressed a wish not to be abandoned to the vagaries of the Internet without the benefit of face-to-face interactions with staff (e.g. for lectures and experiential work). A curated Internet portal was designed, prototyped, and set up ready for use on the DUT Moodle LMS in the course of this study, achieving the general aim of the research.

This innovation is in line with the vision of DUT's Vice Chancellor, as highlighted during his keynote address at the eLearning festival in December 2011. The Vice Chancellor encouraged the use of eBooks and spoke positively of institutional support to promote digital learning, addressed the issues facing under-prepared students entering university and suggested the means to redefine subject content during the current re-curriculation exercise. The analysis of preconditions (Chapter 7) leading up to and immediately before the introduction of the Internet portal gives a favourable prognosis for the reception of the innovation.

In retrospect, the curated portal is thought to be one of the best ways to encourage a gradual move towards engagement in e-learning at universities, in fact, in ways which "set" e-learning courses do not. This is because the curated Internet resources can be used flexibly, in much the same way that traditional type resources, such as text books, notes and reference books have been (and are still) used. Even if the lecturer does not wish to use the resources in lectures, the portal address can be given to students, who may wish to use the portal resources instead of - or together with - traditional resources. Moreover, the latter still have their uses in a context where there are regular electricity cuts, network failures, low bandwidth, and little or no student access to computers after hours. The factor which makes the portal educationally viable is not its lesson presentation, as in a set e-learning course, but the process of curation, in order to ensure that resources are directly relevant to the prescribed syllabus. The portal then is in the nature of a prescribed text book, with the added dimension of reference work (for staff and academically advanced students), as well as having options of interactive animation for describing digital processes, which hard print books cannot provide. This gives autonomy of choice to the individual lecturer, who, although obliged to use a standardised course or syllabus, may well prefer to organise actual tuition in ways which suit his/her unique, individual pedagogical preferences.

### **8.2.2 The extent to which the specific objectives were achieved**

*Specific research objective 1:*

- 1) to establish the pedagogical needs e-learning might serve in the context of the DUT Photography Programme.

This was achieved by means of analysing data from the Programme Review, field trips interviews, surveys, webinars, case studies and personal observation. The variety of methods and data sources meant that the findings could be triangulated and verified. The outcome was the identification of the causes of the “malaise” affecting the Programme, resulting in poor work and indifferent marks.

*Specific research objective 2:*

- 2) to investigate the e-learning options available in terms of finding the most suitable format for the intended pedagogical purpose and target audience.

This was carried out partly in the literature review, and partly in Chapter 5, where the students’ preferences for learning delivery were investigated. The results concurred with the literature in suggesting that blended learning delivery would be the most suitable campus model.

*Specific research objective 3:*

- 3) to develop the e-learning option which the results of addressing objectives 1 and 2 suggested as being the most suitable option.

This was carried out in the second part of Chapter 5, which describes how various sources were consulted to develop a prototype portal and upload curated resources on it.

*Specific research objective 4:*

- 4) to test out this option in terms of its pedagogical purpose and target audience.

This was achieved by means of student surveys and case studies, obtaining students’ responses to various digital learning resources (e.g. digital tutorials and exercises). The option of using the portal in blended learning delivery with

an experiential learning project (e.g. the WIL Graduation project) was also tested out. Finally, favourable feedback was obtained from a selected user group on the prototype portal itself.

### **8.3 Delimitations of the study**

The limitations of this research project lie primarily in that benchmarking occurred within the context of the Photography Programme. The majority of the student participants were ESL learners, but no significant differences could be discerned between these and the mother tongue English learners in terms of their response to digital resources or the portal itself. The triangulation process was effective in ensuring that survey and interview responses matched the evidence provided by practical work during course assessment. However, the triangulation process did reveal that students were over-optimistic about transference of digital competences learned in social media to the workplace specifications required by Industry. Thus, while it is accurate to say the DUT students were enthusiastic Net Generation learners, and responded well to the concept, as well as practical examples, of e-learning, it cannot be assumed that they will automatically adapt to online tuition or apply digital skills learned from Facebook in workplace photographic practice. As mentioned in Chapter 5, because of time constraints, the investigation could not be expanded beyond the discipline of Photography. Moreover, not all Photography subjects are currently represented on the portal: while resources tested out dealt with problem areas, currently the portal contents are limited to the subjects taught by the researcher. Even so, by addressing the problems experienced within this academic programme, this study could assist departments facing similar challenges by expanding their vision to include an e-learning solution to deal with pedagogical problems.

### **8.4 Recommendations**

These recommendations are in line with the vision of DUT's Vice Chancellor as highlighted during his keynote address at the e-learning festival in December 2011. The Vice Chancellor encouraged the use of eBooks and spoke positively of institutional support to promote digital learning, addressed the issues facing



under-prepared students entering university and suggested the means to redefine subject content during the current re-curriculation exercise.

#### **8.4.1 Recommendations for the development of the portal**

The following recommendations are made for the development of the curated educational portal:

The recommendations based on student suggestions are as follows:

- Hard copies of assignment briefings should be displayed on the Notice Board (this emphasises the need for the “virtual” to be balanced by the “actual” in blended delivery.)
- An online survey for users to test out the portal should be posted on the portal. This could be used to obtain feedback on usability, and suggestions for additional resources (e.g. lectures with slides).
- Further online surveys should also be set up on the portal to monitor Programme delivery in general. This would provide a public yet confidential means for students to give feedback, and thus avoid further “funnel of harm” situations in the future.
- Photographs could be marketed electronically, using PayPal with passwords for clients to purchase family photos, which could be sold in digital format as well as in hard print format.

These recommendations for development of the portal are suggested by the researcher:

- Photography staff should be informed that the portal resources can be used as notes or exemplars in more than one context (e.g. subject or lecture), and can be used for other sections of the syllabus subjects, or even for short courses.
- The portal should contain a hyperlink to the online ordering of Graduation project and resulting resources. Amongst other uses, students could use the link for their personal CVs when citing work experience.

- The contents of the educational portal should be augmented to cover all subjects in the Photography Programme (the contents currently limited to the subjects taught by the researcher).
- The curation process should involve not only selection, formatting and cataloguing of materials but also keeping digital materials to a suitable time frame (i.e. to avoid information overload).
- Training should be offered to Photography staff members not familiar with the use of portal technology.
- Staff should be educated about copyright issues and the Creative Commons Agreement, so that they understand the implications of using and/or contributing digital resources.
- Staff and students should receive training in preparing additional materials for the portal, as follows:
  - Tools and software should be shared to assist staff in organizing, cataloguing and managing their personal digital collections, and to assist them to standardise the format for distribution via the portal.
  - Student skills should be improved, so that they can share and transfer digital imagery in multiple formats, various applications and apply meta-data (cataloguing).
  - Workflow strategies need to be improved, including time management to improve entrepreneurial skills and collate teaching material.

#### **8.4.2 Recommendations for further development of portal technology**

The following recommendations are made for further development of portal technology at DUT:

- A plan should be developed to provide a digital image services to other departments with support from post-graduate photography students.
- Formal and informal exchanges between departments and the DUT library should be encouraged for using digital images more effectively in teaching.

- Potential users should be directed to easy-to-share and online electronic resources (visual and text based) in any given subject area.
- Staff should be offered training in the use of Adobe Lightroom software, which boasts a wide range of interactive facilities such as zoom, easy metadata usage, very fast editing options and multiple data transfer to external hard drives simultaneously for delivering lectures, as opposed to the more limited PowerPoint option.
- Image collections with uniform meta-data from different departments should be brought together to a central facility to facilitate sharing of resources.
- Digitally literate students should be employed across DUT campuses (possibly in WIL projects) to collate the presentations generated by individual lecturers.

#### **8.4.3 Recommendations for further research**

The Photography portal should be researched in terms of staff and student response to it in an actual working context, as well as reasons for its adoption (or not) by staff and students. The online survey should assist with this, but there is also the need for staff surveys (online and/or on hard copy). Research is also needed to determine whether the portal actually assists with the development of digital skills, as envisaged, and how (if at all) students' examination results (particularly the portfolios) are affected by the introduction of the portal, and, if so, why.

One of the suggestions prompted by the literature review was the possible adaptation of the curated Internet Photography portal into a MOOC type artefact for completely online tuition, either as:

- a registered academic course;
- a registered short course; or
- free resources for lifelong learning (e.g. OCW)

Before this could take place, the following aspects would need to be researched:

- a means of dealing with studio work;
- ways of providing personalised means of learner support (as in the highly successful Sheffield MOOC);
- how to layer the course, for example, in levels of access so that non-registered users do not have access to the full degree qualification;
- the issue of possible nonacceptance (i.e. for further education or employment) of accreditation gained by online means only (i.e. with no physical examination attendance required); and
- How learners respond to tuition by means of MOOCs, which, according to the literature, is under-researched.

## **8.5 Concluding thoughts**

The critical realist approach provided the philosophical framework for an evidence-based commitment to providing students with cutting-edge technology which might better prepare them for the market place. This was achieved through the three strands of the development of the curated online educational portal. The online educational Internet portal was identified as the most suitable way to empower both students and academics who wish to use digital resources. It is hoped that this investigation has demonstrated that the adoption of a critical realist approach to the design of the curated prototype model serves the purposes of multimedia digital learning at DUT (as benchmarked on the Photography Programme) and can be adopted by other UoTs. The portal offers an effective means to enhance programme delivery, and the outcome is achievable with very little financial layout.

# **APPENDIX A: TECHNOLOGICAL DEVELOPMENTS LEADING TO THE FORMATION OF THE INTERNET**

## **A.1 Introduction**

This appendix will give a historical overview of developments leading to the inception of the World Wide Web, set in place by the techno-system comprising the Internet (Aunger 2010: 775). The rapid changes in technology over the last fifty years have relevance not only in terms of the technological advancements now available to the researcher, but also in terms of the orientation adopted, critical realism (CR), the methodology, and the morphogenetic approach, in terms of time being viewed as a mechanism. The critical realist orientation was explained in Chapters 3 and 4, highlighting the importance of human action through the maintenance and adaptation of technology as discussed by Orlikowski in her “structurational” model of technology (1992: 409). The “semantic web” is a further development on mechanical linkages, and is a mechanism for dealing with the rapidly evolving technology and adapting delivery to suit similarly evolving learner needs. Finally, the advent and rapid development of mobile technology offers academics and students the option of mass or guided information retrieval as well as tuition.

## **A.2 Technological developments leading up to the Internet**

Figure A.1 illustrates the evolution of the Internet, with the University of California, Los Angeles (UCLA) in 1969 creating the ARPANET (Leiner *et al.* 1997: 103) with almost two billion users (Holzer 2010: 11). In addition, the two timelines (see Figures A.2 and A.3) from the Morgan Stanley Research group (2010) illustrate the cloud computing of multimedia applications and new global computing cycle characteristics, especially the exponential growth in 2010 with mobile Internet. The technological discoveries leading up to the inception of the Internet will be dealt with in this section.

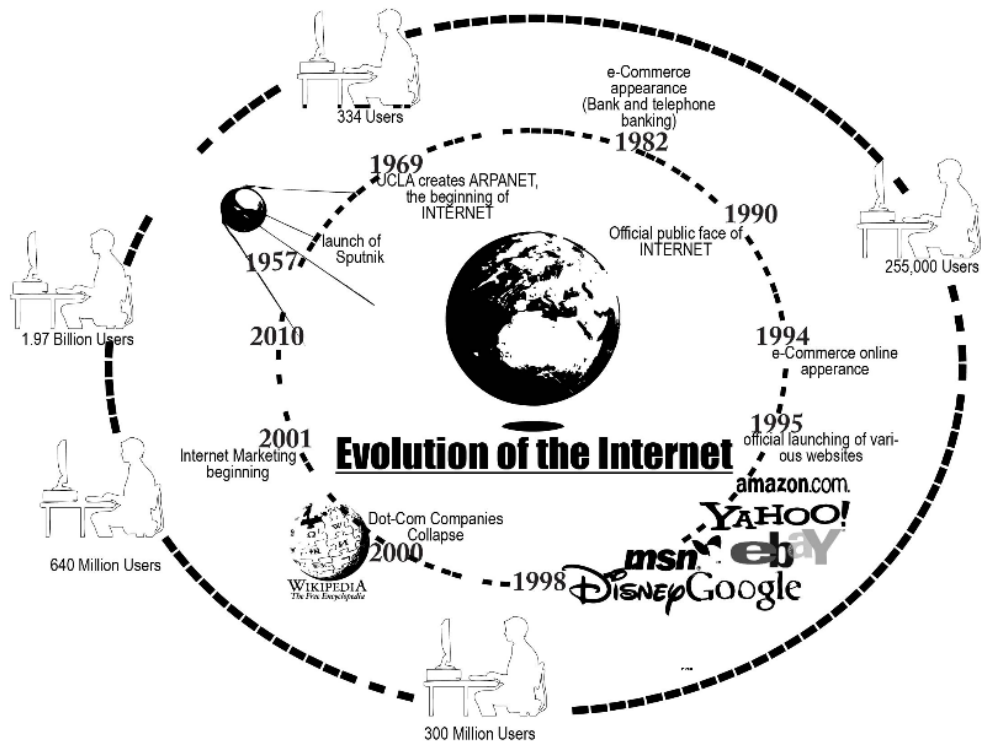


Figure A.1 Internet timeline (Interaction Blog 2011)

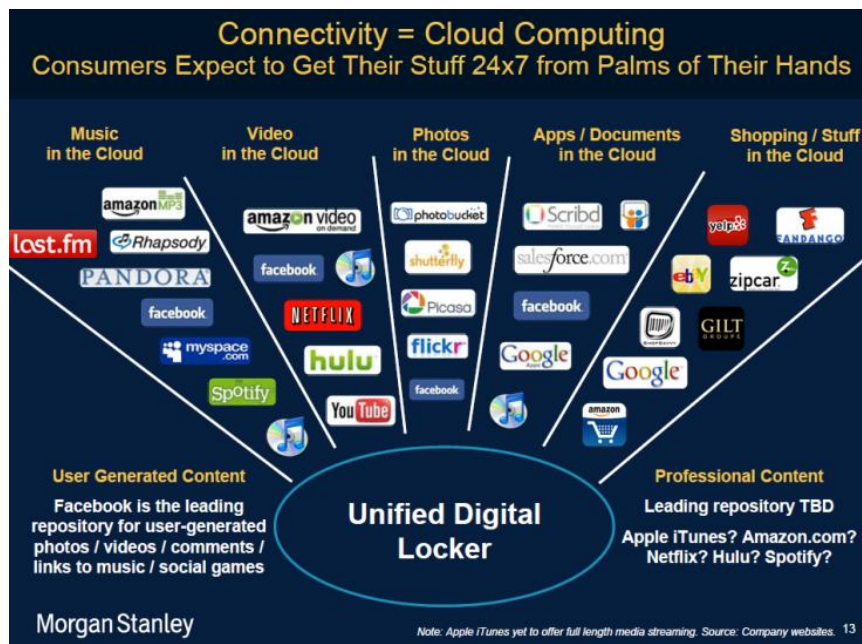


Figure A.2 Cloud computing trends (Meeker 2010: Slide no 13)

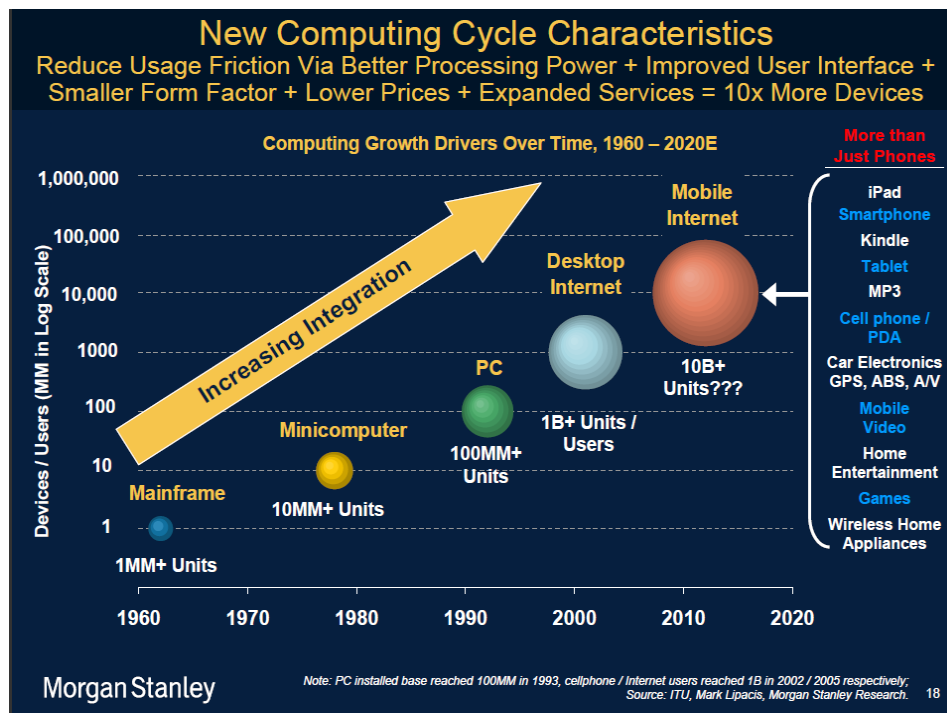


Figure A.3 New computing trends (Meeker 2010: Slide no 18)

### A.2.1 The harnessing of electricity

Michael Faraday (1791-1867) was a physicist, chemist and strong contributor to the development of modern-day electricity, which played an important part in further technological developments (Tricker 1966; Gribbin and Gribbin 1997; Russell 2000). At the age of 13, Faraday started working in a bookbinding shop in London, where he read almost every book he bound (Gribbin and Gribbin 1997: 15-17). His interest in the concept of energy led to his future discoveries of motors and generators. In 1831, he began a series of experiments in which he discovered electromagnetic induction (Russell 2000: 87-89). Faraday's biggest breakthrough was the invention of a small generator to produce electricity, with computers as one of the major consumers (Russell 2000: 31, see Figure A.4 for a precursor of the electrical motor generator).

However, it was still another generation before an industrial version was built, and another twenty-five years before electricity became available to the average household (Brown 2000: 1). This facility forever changed the way homes, work,

entertainment, communication and transport systems worked, and transformed social practices. The availability of worldwide electricity transformed the way we live.

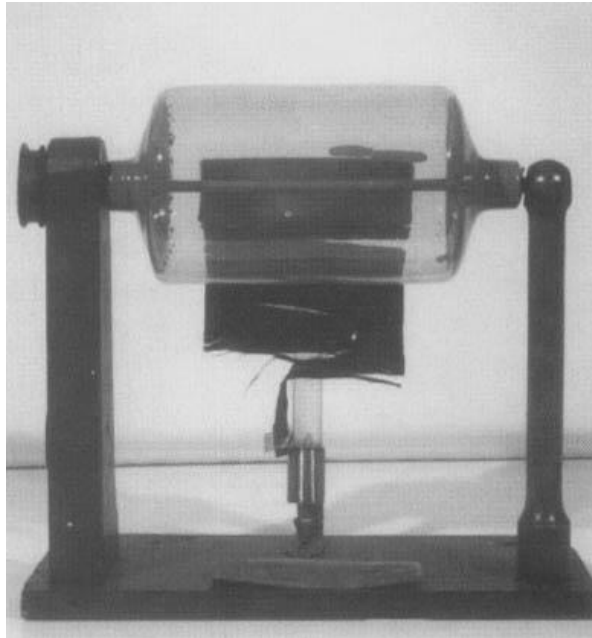


Figure A.4 Frictional electrical machine (Russell 2000: 31)

Electricity was also a prerequisite for the successful use of computers and the Internet. This was recognized by Greenbeger 1964: 1, an Associate Professor in Computer Science at the MIT School of Industrial Management:

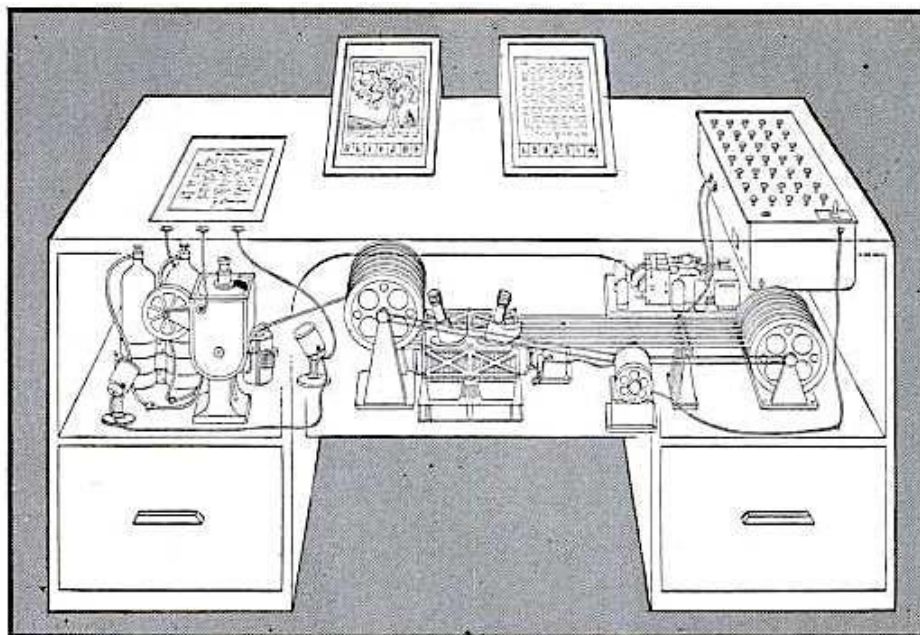
...nineteen years ago, in the July, 1945, issue of the *Atlantic*, Dr Vannevar Bush predicted that the 'advanced arithmetical machines of the future' would be (a) *electrical in nature*, (b) far more versatile than accounting machines, (c) readily adapted for a wide variety of operations, (d) controlled by instructions, (e) exceedingly fast in complex computation, and (f) capable of recording results in reusable form (my emphasis).

He added: "electricity can be harnessed for any of a wide variety of jobs: running machinery, exercising control, transmitting information, producing sound, heat, and light". Greenberger (1964: 3) foresaw the use of computers in everyday life as part of scientific research and a necessity for Industry.



### A.2.2 Scientific vision and discoveries

Concurrent with the advancement of technologies, the hypertext communication theories posited by Bush (also a photography enthusiast) were the precursors of later theories of hypermedia communication. His visionary and groundbreaking article, “As we may think”, in *The Atlantic* ((Bush 1945a), contained in-depth speculation about future technological advances. In this and a later condensed version of his article in *Life* magazine (Bush 1945b), Bush discussed ways to find new projects in which the scientific research developed during World War II could be applied. He also identified the need to establish information storage facilities which could be consulted with incredible speed and flexibility (Bush 1945b: 121). To achieve this aim, Bush proposed a personal information machine called the memex (memory extender) aimed at solving the problems of “locating relevant information in published records and recording how that information is intellectually connected” (Guan and Zhang 2004: 59). An illustration of the proposed memex is shown in Figure A.5.



**MEMEX** in the form of a desk would instantly bring files and material on any subject to the operator's fingertips. Slanting translucent viewing screens magnify supermicro-film filed by code numbers. At left is a mechanism which automatically photographs longhand notes, pictures and letters, then files them in the desk for future reference.

**AS WE MAY THINK** CONTINUED

Figure A.5 Bush's proposed memex (Bush 1945b: 123)

Although the memex was never constructed, the important features of the innovative design included the option that, with the information stored on microfilm, a user could connect personal ideas through trails and share them with the general public (Bush 1945a: 107-108). The memex later became an influential concept, and by the 1980s it was hailed as the inspiration for hypertext and new ways to organise and retrieve information (Guan and Zhang 2004a). One such development is the digital notebook which provides seamless access between text, images, video and audio and allows for the sharing of files with other users. It was also envisaged that the memex would be able to search and retrieve information by the mere click of a button, and would have microfilm storage facilities.

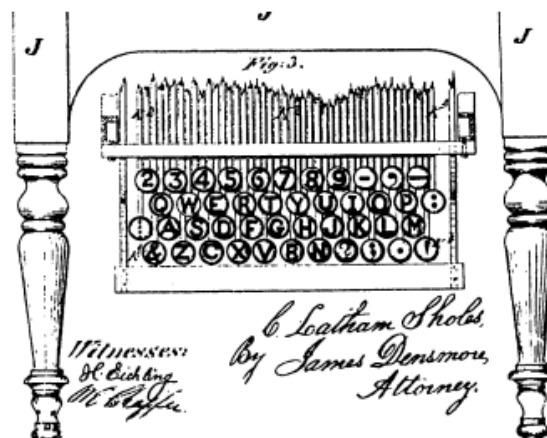


Figure A.6 Prototype mechanical QWERTY keyboard (Figure 1 in Kroemer 2001: 100)

In the article “Living with a computer”, Fallows (1982) offered the following comment on using an early model electrified computer as opposed to using a typewriter with mechanically operated keyboard (see Figure A.6):

When I sit down to write a letter or start the first draft of an article, I simply type on the keyboard and the words appear on the screen...It is faster to type this way than with a normal typewriter, because you don't need to stop at the end of the line for a carriage return...and you never come to the end of the page, because the material on the

screen keeps sliding up to make room for each new line (Fallows 1982: 2).

In a much later article in *The Atlantic*, Kahn (2008) paid tribute to Bush's seminal work on the memex, Greenberger's insight into computer science as part of everyday life, and Fallows' use of the electric-based computer with typing facilities.

### **A.2.3 The development of hypertext**

Computer based hypertext systems were developed in the late 1950s. The two projects included Douglas Engelbart's NLS "System" or "Augmentation", which was similar in function to the memex. Engelbart's aim, as the terms suggested, was to strengthen mental co-operation between humans, so that several people could develop a common idea simultaneously (Berners-Lee 2000: 6). Other developments by Engelbart emerged in 1963, with the ground breaking first use of a prototype mouse at the Stanford Research Institute, a project carried out with his colleague Bill English, as shown in the Linking minds video (<http://www.youtube.com/watch?v=wPS0xu6qUY8>). The mouse functioned as an extension of the human hand "into" the computer. Engelbart and English also developed the use of the tab space bar for the online systems. Hypertext access could then be commanded at the click of a mouse or by pressing the key sequence. The use of computers took a whole new turn in 1968 at a computer conference in San Francisco, where Engelbart took the computer age to a new level with his demonstration of experimental technologies which have since become common to computer users today, such as the mouse, interactive text, video conference, teleconferencing email, hypertext and a collaborative real time editor.

The second developer was Theodore Nelson, a philosopher and film maker, who, in 1963, coined the term "hypertext", which is a new construct for the world of computing and documents (Shneiderman and Kearsley 1989: 78; Berners-Lee 2000: 6). Hypertext could allow users to follow the links to reach the original documentation without limitations and in no particular order (see Figure A.7).

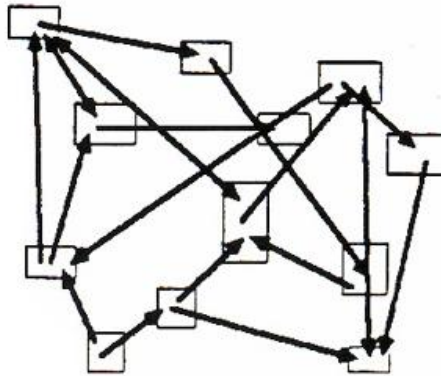


Figure A.7 Nelson's depiction of hypertext (Nelson 1974: 45)

Nelson defined hypertext as follows:

"Hypertext" means forms of writing which branch or perform on request; they are best presented on computer display screens.

In ordinary writing the author may break sequence for footnotes or insets, but the use of print on paper makes some basic sequence<sup>20</sup> essential. The computer display screen, however, permits footnotes on footnotes on footnotes, and pathways of any structure the author wants to create (Nelson 1974: 19).

He was one of the first people to realise that computers could publish in a non-linear format. His project, *Xanadu* (which is still incomplete after over 40 years), was to build a global network where hypertext documents could be linked to each other, when necessary, thus forming a vast repository of subject content which could easily be accessed (Nelson 1974: 45).

Nelson predicted that the introduction of hypertext would give birth to numerous modern kinds of writing. This is because he saw the potential of hypertext in various forms for linking vast amounts of subject knowledge in non-linear ways, that is, at a few mouse clicks: "The real dream is for 'everything' to be in the hypertext" (1974: 45).

---

<sup>20</sup> Nelson is referring to the linear (i.e. sequential) nature of text in written prose.

Ben Shneiderman was a professor at the Maryland University in the Department of Computer Science. In addition, he was an author of several computer books, a public speaker and advisory board member of numerous computer-based journals. He invented the concept called “embedded menus” or “illuminated links” (Shneiderman and Plaisant 2005: 278-279). In 1983, Shneiderman (1987) pioneered the original Nelson concept of the highlighted textual link, which became known as “Hyperties” (Shneiderman and Kearsley 1989: 86), and which was the precursor to the web. Originally called TIES (The Interactive Encyclopedia System), it ran on a commercial version on IBM computers under the DOS operating system using a simple cursor controlled user interface (Shneiderman and Kearsley 1989: 132-133).

In 1989, Shneiderman and Kearsley published the book, *Hypertext hands-on*, which included a hypertext version on two accompanying disks. It was perhaps the world’s first commercial electronic book, and pioneered the highlighted embedded link idea (i.e. hypertext) which is a factor in the success of the World Wide Web. The hypertext system, consisting of embedded links, was part of the Hyperties hypermedia system which was developed at the University of Maryland Interaction Laboratory and marketed through the Cognetics Corporation. The innovative book/software provided the first hands-on, non-technical introduction to hypertext as a print and programme form using hypertext.

Shneiderman and Kearsley (1989: 108-109) saw the potential for using hypertext in the commercial arena, for example, in the travel industry. The fact that hypertext that could combine print, photographs and videos also suggested that it could be used for preparing hyperlinked resumes, job advertisements and magazines. Shneiderman and Kearsley’s book (1989: 115) also discusses the potential of hypertext for presenting information with regard to design issues such as the following: user interface, navigation, authoring issues and collaboration via networks. Thus the stages leading up to the development of hypertext and the Internet illustrate how Bush’s (1945a, 1945b) vision of the proposed memex was being developed by scientists from across the world.

Berners-Lee (1989) gave the following description of the developmental work on Hyperties:

Meanwhile, several programs have been made exploring these ideas, both commercially and academically. Most of them use “hot spots” in documents, like icons, or highlighted phrases, as sensitive areas. Touching a hot spot with a mouse brings up the relevant information, or expands the text on the screen to include it. Imagine, then, then references in this document, all being associated with the network address of the thing to which they referred, so that while reading this document you could skip to them with a click of the mouse (1989: 10).

#### **A.2.4 The emergence of the Internet**

Bush’s visionary hypertext storage device became a reality in March 1989 at CERN (European Organization for Nuclear Research) in Switzerland, with the Internet being used as the carrier; scientists used the “Web” formed in this way to exchange reports. The main technological advance offered by the World Wide Web (www) was the rapid transfer of requested information from the remote computer where it was stored to the user’s computer.

#### **A.3 Graphic visualization in hypermedia communication**

In 1999, Shneiderman co-authored a book, *Readings in information visualization: using vision to think* (Card, Mackinlay and Shneiderman 1999). The book focuses on the function of visualization to discover relationships, including interactive graphics to amplify thought. The primary intention was to provide a research tool for academics and related industry, and today the World Wide Web uses hypertext to link tens of millions of documents together. The University of Maryland contracted with a software development firm, Cognetics, to support commercial applications and distribution of Hyperties (Shneiderman 1987: 193). Empirical studies to test the design features were presented at the Hypertext’87 Workshop. These included the use of features such as a mouse, touch screen and arrow jump. In addition, earlier in 1986, a version of the Hyperties was used in photographic exhibition to determine reading patterns of visitors (Shneiderman 1987: 192).

To sum up, hypermedia communication comprises elements which are dynamic and interdependent. The Internet itself can be classified as a multimedia distribution system, and its associated technologies are rapidly being developed to provide faster, friendlier service and are becoming more interactive. The use of hypermedia can facilitate access of various graphic and verbal communicative resources to assist students in learning, bringing to fruition Bush's innovative memex concept developed in 1945. "Perhaps in today's terms it could function as a handy information pod, with certain memex features, serving as an extended personal memory" (Veith 2006: 1).

#### **A.4 The development of networks**

Originally, specialist knowledge was transferred individually from person to person, and it was becoming necessary to avoid repetition and accelerate the sharing of existing research, as Bush (1945a: 108) had predicted. In addition, the U.S. military wanted to develop a decentralized computer network so there would not be a main hub for their enemies to destroy. The existing SAGE system presented an option for achieving this (Campbell-Kelly and Garcia-Swartz 2013: 20-21). In order to address this problem, in 1957, a remote connection was developed to work on computers and this is where the idea to share the power of one computer with multiple users originated. This network would include joint contributions by the American ARPANET (Leiner *et al.* 1997: 103), which was part of the Defence Advanced Research Project Agency (DARPA), the RAND Corporation in America, the NPL (National Physical Laboratory in England) and CYCLADES of France. The scientific, military and commercial approaches to the concepts developed by the military laid the foundations for the Internet as we know it today.

One of the most important contributions to networked computers was the contribution by the French company CYCLADES (Campbell-Kelly and Garcia-Swartz 2013: 25), which worked with a small budget and focused on the communication of other networks. Their contribution was to distribute networks to cover long distances with a minimum of interference. In this way, the term "Internet" was born. A design feature was that, during communication, the

receiver's computer would not serve as a transfer node for further communication. The protocol went through all of the machines through a physical layer which was incorporated into the hardware, providing a direct connection with the receiver and end-to-end structure. Inspired by the CYCLADES network and driven by the incompatibility between networks, the notion of a standard connection gained importance.

The phone companies designed the x.25 protocol (Deasington 1985: 15), which enabled communication through their servers in exchange for a monthly basic charge. Transmission control to the computers was designed through gateways, and the International Organisation for Standardisation (ISO) standardised the networks into separate layers. Finally, the Transmission Control Protocol (TCP) gave way to the TCP/IP protocol, a standard which guaranteed compatibility between networks, and finally merged them to create the Internet.

## **A.5 The availability of online videos**

An important development in the evolution of the multimedia era was in the year 2005 with the availability of videos through the Internet with YouTube, which has been highly successful. YouTube started off with user-generated content (UGC), and developed into a website with professionally generated content (PGC) after its purchase by Google (Kim 2012: 53). YouTube has thousands of videos on every topic available and related software for play back either on mobile communicators or computers. However, it suffers from the same copyright constraints as more traditional media, in having repeatedly to be asked to withdraw unauthorised clips by corporate copyright holders (Kim 2012: 55-56). YouTube cannot be considered an entirely "revolutionary" medium, because it has been influenced by traditional media agents, content and institutions (Kim 2012: 53).

## **A.6 The emergence of social media**

Following on the success of YouTube, the next significant step was social media. According to Qualman (2009), the development of social media



represents the biggest shift since the Industrial revolution. As Qualman's (2009: 1) Chapter One heading suggests, the social media have so expanded and accelerated our social connections that "word of mouth" has now gone "world of mouth" in terms of near instantaneous social updates and referrals. The social inter-connectedness available on the Internet, according to Qualman (2009: 32):

1. allows people to satisfy their need to know what other people are doing;
2. makes people more productive (socially and professionally);
3. requires a shift in business models;
4. has caused traditional magazines and newspapers to struggle for survival online as the news "experts" are now freelance bloggers;
5. not only brings news to us, but allow us to create our own news;
6. lets us "tag" items in ways which make it easier for others to find them;  
and
7. offers successful grassroots models for marketing.

Qualman (2009: 42) also suggests that people (in the private and business world) are living their lives more responsibly in terms of more easily being found out; it is also easier to keep track of people with the advent of the social media. He sees the transparency brought about by social media as creating a society with "more rounded" - and more honest – individuals (2009: 134). In the commercial sphere, the social media facilitate the immediate venting of customer dissatisfaction, which allows suppliers the option of promptly identifying and rectifying product or service defects.

According to Qualman (2009: 59), the new media prompt better behaviour in people's private lives, too. He comments on the use of social media by politicians, in particular during Barack Obama's U.S. 2008 Presidential campaign (2009: 87). Politicians are not the only ones using the social media to bring about political change, however. In the "contradiction" noted by Khondker (2011: 675), the tables were turned when the people used the social networks, set up by the government, to unseat that same government, in the now famous "Arab Spring" movement. Qualman concludes with this prediction: "The overall achievement of individuals and companies will be largely dependent on their social media success" (2009: 237). However, he also points out that the Net

Generation's interpersonal skills are declining as a result of using mainly nonverbal distanced communication on the Internet.

## A.7 The semantic web

Another important development, yet still in its infancy, is the introduction of the semantic web, as conceived by Tim Berners-Lee (2000: 157):

The Semantic Web is not a separate Web but an extension of the current one, in which information is given well-defined meaning, better enabling computers and people to work in cooperation (Berners-Lee, Hendler and Lassila 2001: 38).

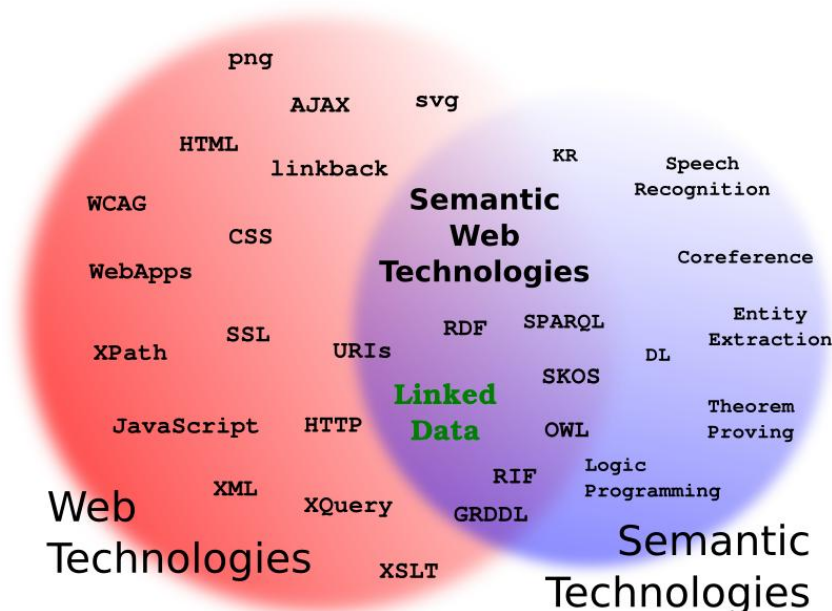


Figure A.8 Merging of web technologies with semantic technologies (Hawke 2010: Slide no 3)

The movement towards developing the semantic web addresses the problem of the computer's being able to store information without "knowing" what it is for unless so programmed by humans. As Berners-Lee *et al.* comment: "Most of the Web's content today is designed for humans to read, not for computer programs to manipulate meaningfully" (2001: 18). Much of the data already on the web contains metadata (i.e. information about information). However, so far

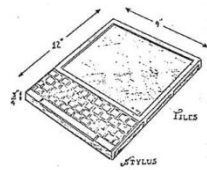





no standardised overall worldwide system for organising, classifying and naming has been developed or agreed on by stakeholders. While eXtensible Markup Language (XML) and the Resource Description Framework (RDF) are two important technologies for developing the semantic web (see Figure A.8), these merely categorise data, and do not deal with the issue of meanings or understanding (Berners-Lee 2000: 184). While the semantic web movement works towards enabling machine to “understand” the data they display, the intention is to enable computers to understand “semantic documents and data, not human speech and writings” (Berners-Lee, Hendler and Lassila 2001: 40).


### **A.8 The development of mobile computing**

Many students entering tertiary institutions are already computer and technology literate, as evidenced by their use of mobile phones with the Internet, short message services (SMS), and instant messaging (BBM) via Blackberry mobile communicators. Students have also been exposed to the practice of footage being used from camera phones captured by ordinary citizens to disseminate global news events such as the 2011 tsunami in Japan (Aamoth 2011: 1) as well as local events such as hail damage in Durban (Sanpath and Comins 2012: 1). In addition, the use of mobile communicators for both social and educational purposes raises the issue that, although traditional photography may not completely die, if something else does the job well enough, there may be interesting advancements and challenges emerging in the near future.

As photography becomes more popular, more photographic advancements are built into the design of mobile phones. Kjeldskov (2013) identifies seven eras of development which gained popularity in mobile computing (see Table A.1). The statistics reveal that eighty-three per cent of users accessed alerts, seventy-one per cent accessed events, directory usage was sixty-four per cent, emails constituted sixty-four per cent and the viewing of schedules comprised sixty-two per cent.

Table A.1 Seven eras of development in mobile computing

Eras	Functions	Illustrations
Portability	Easily moved around.	 <p>Dynabook 1972</p>
Miniaturization	Significantly smaller.	 <p>Apple 1990s</p>
Connectivity	Wireless data networks.	 <p>Motorola 1983</p>
Convergence	Integrating phones, cameras and games.	 <p>IBM 1992</p>
Divergence	Designed for a specific task.	 <p>iPod 2001</p>
Applications	Apple introduced touch screen with swipes and pinches and removed the physical keys (2007).	 <p>iPhone</p>

Digital ecosystems	Builds on the past achievements Blackberry Z10 launched (2013).	 <p>Blackberry Z10</p>
--------------------	--------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------

The World Health Organisation (2011) conducted a global survey in the year 2009 on the use of mobile and wireless technologies to support mHealth (mobile health). The technologies used in the survey included the use of cellular phones and handheld computers (Figure A.9), and the investigation revealed that the continued growth of mobile cellular networks had given rise to new opportunities for the integration of mobile health into existing eHealth services.



Figure A.9 World Health Organisation (World Health Organisation 2011: 41)

They conclude on their findings as follows:

The world is experiencing an extraordinary phenomenon: the exponential growth of mobile communications not only in developed countries but also in the developing world, where such technology is bypassing conventional telephony systems and allowing people to

communicate across vast geographical distances which until now were inaccessible. The ITU estimates that by the end of 2010 77% of the world's population had a subscription to a mobile phone, and over 85% were covered by a mobile phone network (1). With the rise of mobile broadband through 3G innovation, increasing numbers of people will have access to the Internet, particularly in low-income settings such as Africa, where inadequate infrastructure makes 'traditional' access to the Internet cost-prohibitive (World Health Organisation 2011: 75).

## **A.9 Conclusion**

This appendix reveals the ways in which human abilities have been extended exponentially, particularly in the case of the Internet. It also shows the complexity, layering and rapidly evolving nature of the Internet as a techno-system spiralling out of human control (Aunger 2010: 776). To be on the cutting edge of developing Internet and computer technology options is particularly appropriate for a "University of Technology". This study, then, not only focuses on the development cutting edge technology (i.e. hypermedia communication), but also at making this technology accessible to all DUT staff and students (see Du Pré 2006). In terms of Archer's concept of historicity (1998: 196), this appendix illustrates how the technological advancements leading to the inception of the Internet came well in advance of the marked changes in social behaviour brought about by use of the Internet. Neither the technological advancements nor their combinations and permutations were developed with their ultimate end application/s in view. As Campbell-Kelly and Garcia Swartz point out:

Their [i.e. the technologies'] rise should be interpreted within the economic framework of industries with network effects, in which historical accidents bring about tipping points that lead to universal acceptance (2013: 18).

In support of Archer's emphasis on historicity (1995: 154), they conclude: "We thus show that history matters for understanding why information systems function in the way they do" (Campbell-Kelly and Garcia-Swartz 2013: 18).

## **APPENDIX B: TECHNOLOGICAL DEVELOPMENTS IN PHOTOGRAPHY**

### **B.1 Introduction**

According to the timeline given in the *Studio Light Centennial Issue* (Collinsworth 1980: 5), photography, as a science, has developed since circa 1000, when Alhazen first described the principle of the Camera Obscura, followed by Leonardo da Vinci in 1490 who described the actual camera. Much later, in 1835, Fox Talbot, a wealthy university graduate in astronomy, mathematics and optics, made camera pictures on paper. Rosenblum (1997: 245) identifies the growth of the chemical and dye industries, especially in Germany in 1871, as the stimulus for the realization of the potential of photography as a tool for the first scientific and sociological photographs ever seen in that era. This appendix will show how various developments in technology and manufacture led to further advances in both the material forms and techniques used in photography, as well as their applications. It will also look at how developments in photography were applied in the teaching and learning of photography, as well as in teaching and learning generally.

### **B.2 Developments in various areas of photography**

This section deals with developments in various areas of photography, showing how photography both influenced and was influenced by a wide variety of real life uses and applications. The developing technology solved problems of capturing accurate records on moving targets, and providing evidence of the human condition in documentaries and social commentary. It also made possible operation under unfavourable conditions, as in marine photography. Widespread use of photography by the public also led to further technical problems which needed to be solved, leading to a focus on these in “pure photography”. Increased amateur use led to the provision of commercial software which could easily be used by non-specialists, but which, in turn, paved the way for a whole new area of technical and aesthetic effects. It also

led to a blurring of the distinction between professional and amateur photographers.

### **B.2.1 Capturing movement in still photography**

The most dramatic developments and claims occurred in the study of capturing movement, as the camera was the only tool which provided artists, scientists and the lay person with visual evidence of events. This was evident in Muybridge's training programme for horses in 1877. The series of photographs demonstrated that all four hooves left the ground during a gallop, as opposed to the artists' conception that this was not the case. This experiment, carried out with specially built cameras, was widely published in America, Britain, Berlin, and Paris journals, thus creating a position for Muybridge as a lecturer in America and Europe (Rosenblum 1997: 249-250).

### **B.2.2 Portraiture in photography**

The first successful formal portrait photograph was created in 1839 at New York University by John Draper, a Chemistry professor. His image of his sister was warmly praised by Daguerre, whose work, at that time, was limited to static images on a silver plate (Rosenblum 1997: 46). Draper applied the early discoveries of Daguerre and Niepce to the new profession of portrait photography. The image took an exposure of 65 seconds, which was still problematic in those days. However, it was an improvement on earlier exposure times of 10-20 minutes, which had meant that many of the resulting portrait photographs had showed subjects with their eyes closed. The first commercial portrait studio was established in New York City by Alexander Wolcott and John Johnson in 1840. Improvements in daguerreotype technology progressed rapidly, with lenses and plates being imported (Rosenblum 1997: 47).

### **B.2.3 Documentary photography**

Lewis Hine used the camera as a "tool of social upliftment", and, between the years 1906-1918, pioneered the art of documentary photography. He produced over 5 000 photographs for the American National Child Labour Committee (NCLC) showing the reality of child labour in America. He detailed photographs



from over thirty American states, revealing children employed as textile workers, telegraph messengers, street vendors and agricultural labourers (Rosenblum 1997: 363). Included with the photographs were names, ages, place of employment, hours worked and working conditions of the child labour. He later documented the construction of the Empire State building in 1930 (Garner 2007: 196). His images provided an invaluable library source for early twentieth century photography of children in America and serve as a model of inspiration for documentary photography (Osterman 2007: 71). A digitised collection is available online through a pilot project in 2008, titled *For the common good: The Library of Congress Flickr Pilot project* (Springer et al. 2008).

#### **B.2.4 Marine photography and filming**

Charles Williamson, a sea captain, invented a tube which, when suspended from a specially fitted ship, could be used to communicate as well as provide airflow down to a depth of almost 250 feet (Taves and Munro n.d.: [1]). In 1912, his son, John, realised that his father's invention could be adapted for undersea photography, and built a funnel shaped glass observation chamber called the "Williamson Photosphere", as shown in Figure B.1.



Figure B.1 Williamson photosphere (Munro n.d.: 5)

Working with his brother, George, with the new equipment, he produced the first underwater motion picture in the Bahamas, *Thirty leagues under the sea*. The film illustrated how the Bahamians depended on the ocean's ecosystem to support their own. In addition, the equipment made it possible to produce the first undersea fiction film, *Twenty thousand leagues under the sea*, which was greeted with wide acclaim in London, Chicago and New York. Several years later, Williamson joined the American Museum of Natural History to collect specimens for a coral reef diorama. In 1924, his specialised equipment was used by a team of scientists for a large scale study and collection of Andros reef coral, which was lifted off the seafloor for the museum collection. He continued to educate visitors, including Alexander Graham Bell (inventor of the telephone), through his popular lectures, tours and films of the world beneath the sea. In 1988, he was featured in the *National Geographic* video presentation of "Cameraman who dared". Taves and Munro (n.d.) conclude that his legacy of dedication to marine photography continues to benefit those in pursuit of marine knowledge.

### **B.2.5 "Pure photography"**

Ansel Adams, who started off as a landscape photographer, later went on to teach techniques of "pure photography" to thousands of amateur photographers. His workshops and publications (such as *The camera, the negative, the print, the natural light and artificial light photography*) still form part of the photography curriculum at most universities. In addition, Adams, together with Fred Archer, pioneered the *Zone* system in the 1930s, a technique for translating perceived light into specific densities on negatives and paper, thus giving photographers better control over the finished photographs (Hart 2007: 239). The *Zone* system is the forerunner of the modern histogram found in most modern digital cameras, as will be explained in the next section.

### **B.2.6 Photography as social commentary**

In 1935, Roy Stryker documented the *Face of America* with the newly formed Farm Security Administration (FSA) group of photographers who captured images of the Great Depression. President Roosevelt considered this genre of photography as a public relations effort to popularize his farm reforms (Hart

2007: 239). The work of the FSA can be seen to demonstrate the potential power of visual images which can be used to influence one's thinking of an event or political agenda.

Stryker later used Gordon Parks to “use his camera to put a face on racism and injustice” with the resultant photograph of the cleaning lady, Ella Watson, in front of the FSA, with a broom in one hand and a mop in the other (Hart 2007: 236). However, there was also the question of objectivity when Stryker and his agency of photographers were asked to capture propaganda photographs during the Second World War. The photographs started appearing more often in newspapers and were popular until the Seventies, despite competition from television.

### **B.2.7 The influence of commercial imaging software on photography**

Another major development which has impacted on the practice of photography was the availability of Photoshop software in 1990. The use of this popular software is shown in Figure B.2 by Friedman (2010: [1]) where the boundaries between artist and photographers start to blur. The statue was photographed first, a male model was subsequently photographed under the same lighting conditions, and, finally, the human eyes were inserted into the statue.



Figure B.2 Untitled (Friedman 2010: [1])

It was these types of scientific and technical developments and processes by various inventors and photographers, who often later became academics, which

impacted on the practice of learning photography for those students seeking a formal and structured education at universities.

### **B.3 The development of digital photography**

Digital Photography Tips (2011: [1]) revealed the following information on the early users of digital images:

In 1952 the first video tape recorders were used to record TV programs. Before this, most television was either live, or was a broadcast movie. With video tape an image was recorded, not as an image in itself, but as a coded signal on tape. Later the coded tape was run through a decoding machine (i.e. a video tape player) and the machine converted the coded signal back into pictures.

This is an important step in the history of digital photography. Video differed from the films that had gone before because film records an actual image, frame by frame. Pull out an old cinema reel and you'll see the frames. Pull out cassette tape and you'll see nothing! It needs to be decoded for you first.

The effect is the same as comparing film vs. digital photography. Look at a developed film (the negative or slide) and you will see an image. Pull a memory card out of a digital camera and there's nothing to see. The image held on the card needs to be decoded first with the use of a computer either in the camera itself or as a stand-alone unit (2011: [1]).

The next step was the invention of image scanners used to copy a photograph electronically. In 1957, Russell Kirsch developed a "drum scanner" (Carter 2007: 15), which picked up the different intensities of light and shade as shown in the picture of his son, and many years later with improved scanners in the colour image (on the right hand side of Figure B.3).



Figure B.3 Scanner and image (Kirsch 1957: [2-3])

*The History of digital photography* (2011) continues the narration on the importance of the space race in the history of digital photography: politicians on both sides of the cold war realised that, if a satellite could be launched into space, it could carry a camera to spy on the enemy.

Taking pictures on film meant you had [to] bring the film back to Earth somehow. And if it didn't make it back to Earth – no pictures at all! So a new system was invented that didn't need film.

Digital cameras were the answer. They could record photographs and 'beam' the digital signal back to Earth. The signal was then decoded and the image could be viewed. This then is clearly a big development in the history of digital photography (2011).



Figure B.4 Lunar camera (Greenfieldboyce 2009: [3])

Stan Lebar worked at the Westinghouse Electric Corporation and led the team which designed and built the lunar cameras used on the Apollo 11 space missions. The camera on the left in Figure B.4 was the colour camera that transmitted live colour television inside the Apollo 11 command module. The camera on the right shows the camera that transmitted live video of the Apollo 11 astronauts moonwalks (Greenfieldboyce 2009: [1]). In addition, in 1969, the first images of man on the moon were captured by Armstrong and Aldrin with a Hasselblad camera (Peres 2007b: 308).

Following the exploits of digital cameras used in space, the concept of photography without film started to evolve around 1969 with the development of the charge-coupled device (CCD or image sensor) by George Smith and Williard Boyle (Peres 2007a: 15). The image sensor is the heart of all digital

cameras. Today, CCD technology is available in all digital applications (security monitoring, high-definition television, endoscopy, facsimile machine, image scanners, digital still cameras and bar code readers). In 1981, the Sony Corporation produced the first prototype digital camera called the “Mavica” (Magnetic Video Camera), which recorded images on a compact two-inch still-video floppy disk.

#### **B.4 The emergence of computational photography**

2006 saw the emergence of computational photography with the subsequent development of the Light Field camera based on Ren Ng’s research project from Stanford University. In that year, Ng won a worldwide competition for the best doctoral dissertation in Computer Science from the Association for Computing Machinery (Lohr 2011: 4). The thesis (Ng 2006) argues that the practical difficulties experienced by both early photographers (i.e. around 1839), as well as current ones, were due to the fact that it was taken for granted that the focus could not be changed after the image was captured. Ng’s investigation continues the development of the scientific knowledge of Ibn al Hathim, the 10<sup>th</sup> century Muslim mathematician, who invented the Camera Obscura, which was also known as the first pinhole camera (Vallely 2006: 1). The application of digital technology suggested by Ng overcame the limitations of mechanical, and, later, chemically based technology.

Following his doctoral submission (2006), Ng undertook the task of commercialising his research findings with the creation of the Lytro Light Field camera. The project investigated the use of a commercially available digital Contax 645 medium format digital handheld camera that would capture a photograph and then explore different focus points using a computer after the image was captured, as shown in Figure B.5.

When discussing the commercial light field camera in a Stanford Technical report, Ng *et al.* (2005) state:

Externally, our hand-held light field camera looks and operates exactly like a conventional camera: the viewfinder, focusing

mechanism, length of exposure, etc. are identical. Internally, we augment the 2D photo sensor by placing a microlens array in front of it, as proposed by Adelson and Wang [1992] in their work on the “plenoptic camera” (They did not build this device, but prototyped a non-portable version containing a relay lens.) Each microlens forms a tiny sharp image of the lens aperture, measuring the directional distribution of light at that microlens (2005: 2).



Figure B.5 Lytro Light Field camera (Cheng 2011:[1])

Ng (2006: 24) explains that the light field camera comprises “a main lens, microlens array and a photosensor”. The main lens focuses the subject onto the microlens array, which separates the converging rays into an image on the photo sensor behind it, as shown in Figure B.6. As Lohr states:

...according to the theory and the prototype results the Lytro camera captures far more light data, from many angles than is possible with a conventional camera in a single exposure ....However, the raw light data comes to life only with sophisticated software that lets a viewer switch points of focus. This allows still photographs to be explored as never before...They become interactive, living pictures (2011: 1).

Hernandez, a photojournalist, who tested a prototype version, immediately recognised the potential impact, saying: “the Lytro technology means the headaches of focusing a shot go away”. He continued: “you just concentrate on the image and composition, but there’s no need to worry about focus anymore”.

One of the other advantages over conventional cameras is that there is no “shutter lag” or waiting for the autofocus device to work (in Lohr 2011).

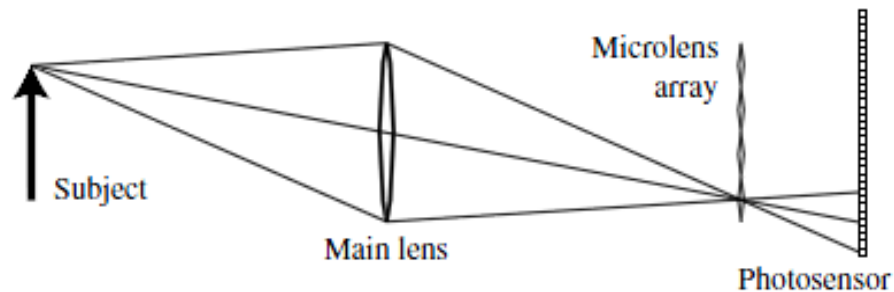


Figure B.6 Conceptual schematic camera (Ng *et al.* 2005: 2)

Ng’s Light Field camera is an example of how theory applied in practice can improve the everyday quality of life, which is a critical realist principle (see Bhaskar, 1986: 169). Its subsequent and current empirical value can overcome the problem facing photographers of capturing the single and, perhaps, most important and perfect photograph. They will be able to implement the popular phrase by photojournalist Henri Cartier-Bresson on what he terms the “decisive moment”: “the creative act lasts but a brief moment, a lightning instant of give-and-take, just long enough for you to level the camera and to trap the fleeting prey in your little box” (Ng 2006: 167). As Orlikowski (1992: 409) comments: “once created, technology is deployed in organizations but remains inanimate and hence ineffectual unless it is given meaning and is manipulated - directly or indirectly - by humans”.

On a larger scale, the Light Field camera can be beneficial to the security industry globally in identifying individuals from crime scenes or instances of malicious damage to property. According to experts, Ng’s achievement has been “to take research projects of recent years, requiring perhaps 100 digital cameras lashed to a supercomputer - and squeeze that technology into a camera headed for the consumer market later this year” (Lohr 2011: 1).



Computational Educational camera experiments headed by Raskar and carried out at Massachusetts Institute of Technology (MIT) research laboratories include sophisticated cameras which work without a lens. The experimental camera uses reflected light and sophisticated computer processing to look around the corner beyond the line of sight using Femto-photography or transient imaging (Raskar *et al.* 2009: [1]). As Eisenberg states: “The technology of computational photography may guide rescue robots or endoscopes that need to peer around blocked arteries”, as is shown in Figure B.7 (2010: [1]).

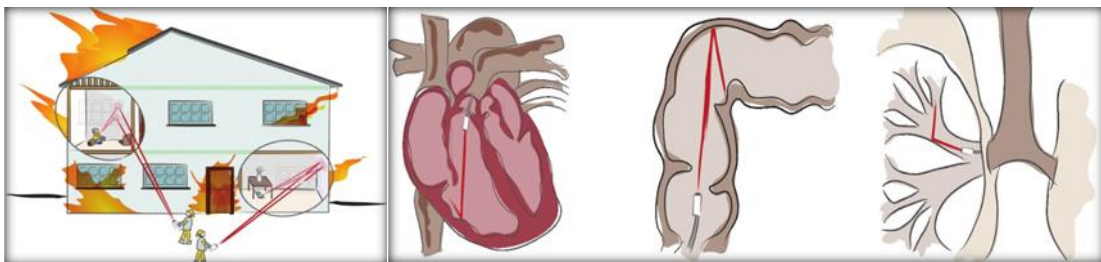


Figure B.7 Rescue planning and endoscopy procedures (Allen 2009: [4])

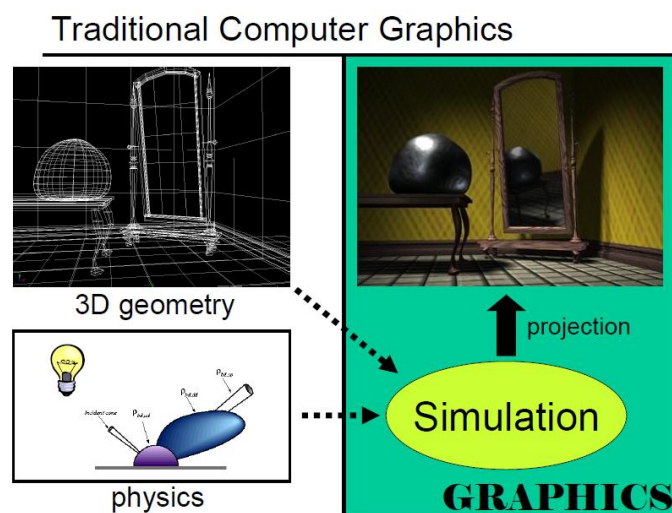


Figure B.8 Computational photography (Efros, Collet and Trutoiu 2010: Slide no 30)

Based on published research findings of computational imagery, the Carnegie Mellon University expanded their curriculum to include Computational

Photography as a graduate course. As their course overview states: “computational photography is seen as an emerging new field created by the convergence of computer graphics, computer vision and photography”. They further comment: “the advanced undergraduate course is designed to study ways in which samples from the real world (images and video) can be used to generate compelling computer graphics imagery”, as illustrated in Figures B.8 and B.9 (Efros, Collet and Trutoiu 2010).

## The Realism Spectrum

---

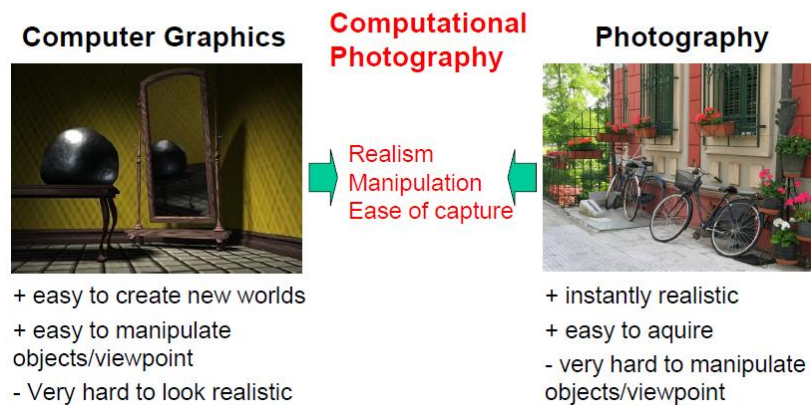
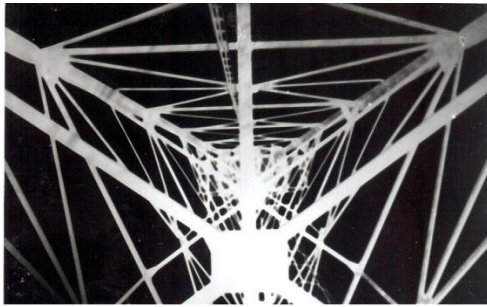


Figure B.9 Computational photography (Efros, Collet and Trutoiu 2010: Slide no 40)

The Harvard Extension School, with Armendariz as its photography instructor, offered Digital Photography as open courseware through the Academic Commons Attribution. Their syllabus highlights the importance of understanding the technical aspects of digital technology, including computational artefacts. Armendaritz wrote the following about the course:

The course strives to offer students a more thorough understanding of digital photography through an exploration of technical, rather than strictly artistic, details. With a better understanding of the limitations and compromises behind digital photography, students will be better prepared for unexpected and dynamic photographic situations (2010: [1]).

In Figure B.10, photographs a. and b. demonstrate the traditional Camera Obscura (i.e. pinhole) technique, which is still taught to First-year students at DUT. Menezes' (2011) photograph, captured traditionally, is compared with the Harvard instructor's digital format, shown in Armendariz's photograph (B.10b.)



a.



b.

Figure B.10 Pinhole photographs a. (Menezes 2011) and b. (Armendariz 2010)

In addition, Armendariz's lectures and practical assignments are hyperlinked to professional websites and blog pages such as *Ironicsans.com* (Friedman 2007: [1]). A challenging posting, based on the conventional high contrast line-film principle of producing black and white images, was created using the histogram idea, in "a bar graph representing all the tones in a digital image that typically looks like a range of mountain range", as a guide to techniques available on digital camera. The idea was introduced interactively on Friedman's blog of an embedded New York skyline in a histogram which appears as an image only by manually adjusting the levels control using Photoshop software, as illustrated in Figure B.11.

An online viewer, Millard (2007: [2]), subsequently produced the altered and downloaded Miami skyline image (Figure B.12), also using Photoshop software but "combined the histogram and the source image to produce a new 'original' by adjusting the brightness levels to make it fit the target histogram". Millard reiterated a technical principle in his return posting by emphasising the importance of a first generation and perfect exposure that should contain "an image with a good range of tones in the original to improve the final image output".

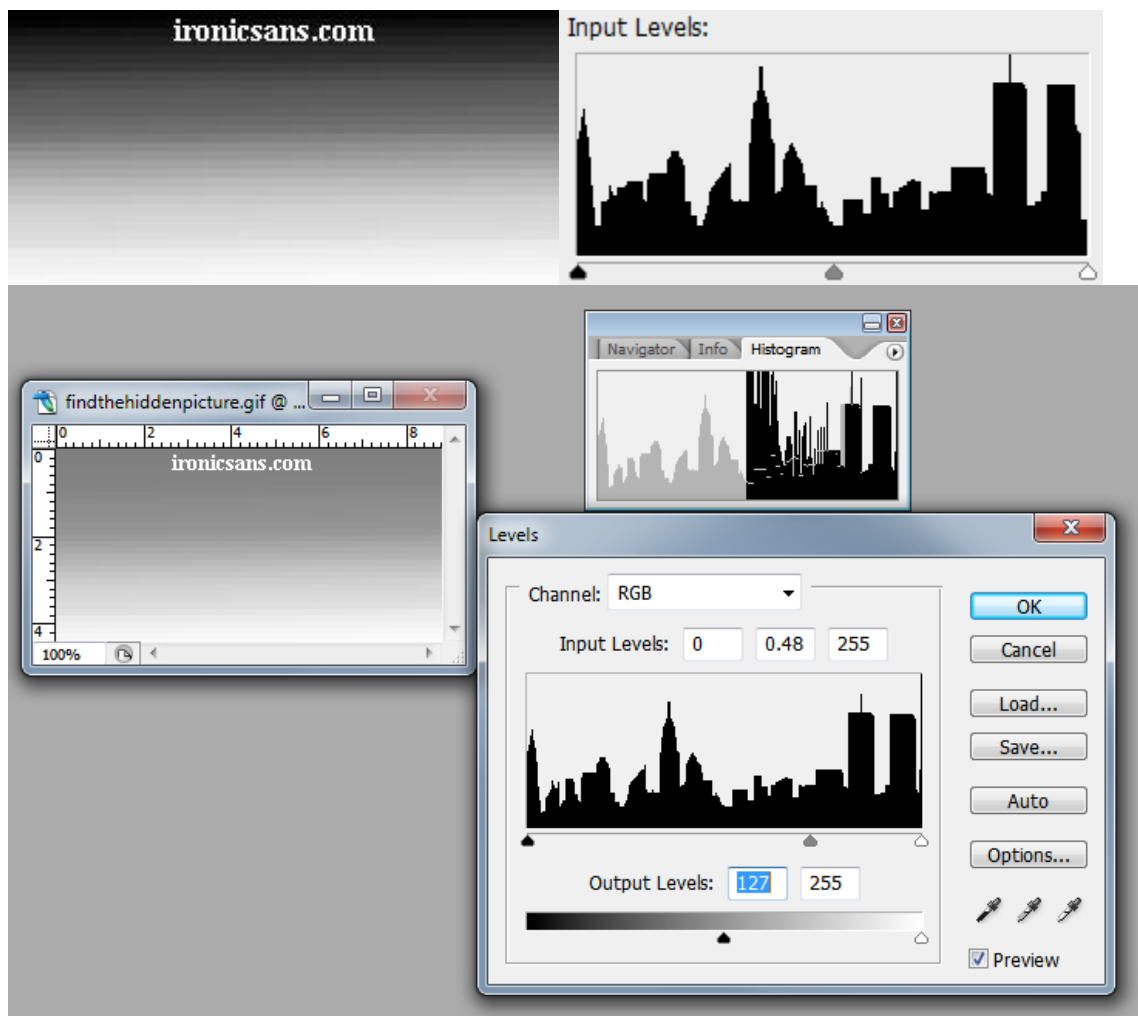


Figure B.11 Find the hidden image (Friedman 2007: [1])



Figure B.12 Retro-histo: making an image fit your histogram (Millard 2007: [2])

These examples by academics, using computational photography (Armendariz 2000; Ng 2006; Efros 2010), illustrate the combination of conventional

photography principles in the hands of skilled practitioners using computers and related peripherals to enhance hypertext digital images. The application on the original blog posting by Friedman (2007) was tested by the researcher using the “Levels adjustments” function to locate the hidden image (shown in the lower section of the screen image in Figure B.11).

## **B.5 The impact of technical developments in photography on teaching/ learning in general**

The idea for the use of images in modern formal education appears to have been derived from the lantern slide invented in the 1850s (Kapechki 2007: 693). As the technology developed, images were captured in the form of the 35mm slide, which was the most commonly utilised and cost effective teaching/presentation medium used both locally and internationally. The slides were used either in a single projector or, for the more adventurous, a multi-projector system. In 1994, George Eastman, in conjunction with the University of Illinois, launched a pilot project to capture and archive the University’s Art slides with digital equipment (Sandore and Dunkelberger 1996: 2). The findings were published electronically on the Kodak website, which drew wide interest and led to further experimentation by educational institutions in using this new medium. Some institutions are still inexperienced in digital imaging, or their lecturers hold the view: “It doesn’t matter what you say, as long as it lasts for 45 minutes!” (Reddy n.d. cited in Taylor 1997: 4), and are hesitant to develop multimedia. However, others have marketed their programmes aggressively and have also introduced video conferencing facilities.

To reinforce the importance of using visuals, research has shown that people remember nearly ninety per cent of the information from presentations that use visuals when compared to presentations not supported by any visual aids (Eastman Kodak 1994: 1). In recent years research has seen an increase in the use of visual methods in the gathering of data (Pole 2004). According to Hurworth (2004: 178), “the visual image can be a particularly useful, powerful and rigorous tool that can be used in a range of both qualitative and quantitative

evaluation designs". However, she reminds us that research rigour and ethics apply equally to visual data as they do to any other data medium.

Friedman (2011), as editor of the *Ironic Sans* website, curates articles from the *New York Times*, some of these written 100 years ago, and includes personal comments on the original articles. One posting narrates the first use of photographs in education captured by Fairchild under the topic of "Teaching morality to children" (New York Times 1911). Fairchild developed a series of lessons accompanied by photographs and projected as lantern slides. An example included one boy who refused to give up a marble he had found which another claimed he had lost. Another example illustrated a bicycle race in which it could be seen that the boy who was losing the race was deliberately running into the winner to foul him. In the article (New York Times 1911), Fairchild is cited explaining how a programme of instructional lectures based around lantern slides took some years and thousands of dollars of funding to produce, as the photographs needed to be captured so as to deal with specific themes. A "Moral Education Board" was appointed to produce a set of sixty illustrated lessons. The moral educational programme based on Fairchild's photographs was supported with donations, and the visual mode of instruction was enthusiastically accepted by many educators.

Cruickshank and Mason (2003: 1-20) carried out an investigation into the use of photography as a reflexive inquiry in Art Education. Part of their fieldwork included collecting and evaluating visual data during a curriculum development project. The investigation arose out of their observation of the lack of photographs appearing in journal articles and research reports in Brazil. The process involved the use of images produced by a professional photographer, and five Brazilian housewives with children, as part of their focus group investigation. The role of photography was threefold: firstly, it was used as a reference point for the project team members, secondly, it was used as a visual collection of data based on the housewives home industry, and, finally, as visual content for curriculum experiments in the schools. The theory in using photographs was based on Templin's paper, which stresses the importance of "findings on the concept of the photographic gaze, which is central to the theory

of photographic meaning, especially when used in ethno-graphic fieldwork” (1982, in Cruickshank and Mason, 2003:5).

Cruickshank and Mason found that, while the professional photographer implemented skills to produce images based on composition and aesthetic values, the housewives’ photographs were both subjective and objective. The latter included photographs of children in their bedrooms, either posing as models, or with pets and toys, or capturing the photographs themselves. The findings revealed that the photographs functioned as a language that was both understood and simultaneously misunderstood more easily than the typed words. The findings reflected on the comparisons of photographs taken by professional photographers and housewives, and provided a data collection tool for the art education project (2003).

Raggl and Schratz (2004: 148), in their paper *Using visuals to release pupils’ voices*, cite Schratz and Walker as follows:

...there has been a curious neglect of visual imagination in the social sciences. Despite enormous research literature that argues contrary, researchers have trusted words (especially their own) as much as they have mistrusted pictures (1995: 72).

An additional study of the theoretical background convinced these researchers of the power of pictures when conducting research; pictures could also be used as instruments in helping pupils to enhance their thinking and to reflect on their learning experiences. Raggl and Schratz refer to Elliot Eisner (1991:68), who used the term “epistemic seeing” as a kind of knowledge secured through sight. They further cite Sontag (1979: 167) who states: “we use photography as a silent voice to point towards a greater story, as it offered both participation and alienation in their own lives as well as those of others”. Raggl and Schratz (2004: 149) conclude by highlighting the use of photographs as tools and methods to capture learning from a more holistic perspective; they comment that this has proved to be a valuable tool in self-evaluation reflection on their learning.

Smith and Donnelly (2004) cite Evan's comment on the lack of investigation into photography as a pedagogical medium:

...photography remains the least investigated media, under-examined even in the mainstream of cultural studies, when paradoxically photography remains the prevalent form in which visual images intrude upon us, are transmitted and viewed (Evans 1999: 129 cited in Smith and Donnelly 2004: 123).

Smith and Donnelly explored the possibility of developing a visual image based approach to help sociological development amongst students. They also anticipated that responses to images would provide important data relevant to understanding the significance of using visual imagery in the contemporary world. One such image obtained from the London-based independent news agency (Panos Pictures, specialising in Third World, development and global social issues) was used in their questionnaire, and is shown in Figure B.13.



Figure B.13 Untitled (Shirley 2004: 141)

Participants' responses included comments that the image was unbelievable ("...is it real?"), questions such as: "Why would Coca Cola advertise here?" and conclusions such as: "Perhaps it is a publicity shot". These types of responses could provide teachers with the basis for



opening discussions and dispelling confusion by using analytical processes. Smith and Donnelly (2004: 142) conclude that the generated data demonstrated the potential use of photographs as a pedagogical tool within developmental studies through its analytical perspectives.

## **B.6 The impact of technical developments on the teaching/learning of photography**

According to Garner (2007: 187), it would have been difficult to imagine a technology that had more impact on 20<sup>th</sup> century life than photography. This is because the advances in photography were accessible to - and used by - the public almost immediately after the development of the requisite chemicals and optics. Dating back to 1839 where the technology of photography originated (i.e. as partly chemical and partly optical), the 19<sup>th</sup> century saw photography becoming prominent in the hands of professional and/or self-educated entrepreneurs. They viewed photography as a lucrative business that did not require any form of professional licensing. The amateurs of this hobby were well educated people who wanted to use photography to produce works of artistic merit which would later earn them renown as pictorialist photographers. These “pictorialists” then formed themselves into societies and clubs, which Magazines such as *American Amateur Photographer* kept on hand as a source of technical information as well as aesthetic criticism. Many of these clubs sponsored journals such as *Camera Notes* (originally edited by Alfred Steiglitz (Garner 2007: 188).

In the 1900s, using the common advertising slogan, “you press the button, we do the rest” (Garner 2007: 188), the George Eastman Kodak company produced the first commercial based Brownie camera for one dollar. Their advertising strategy was the fact that it could be loaded in daylight and was simple enough to be used by a child. Its primary aim was to teach visual literacy to students (Brown *et al.* n.d.: [1]). The educational potential of using motion pictures was introduced to schools through the availability of the Kodak range of photographic products (films and projectors) in the late 1920s, bringing into the classroom 16mm film based on various topics, including Science.

During World War II, America needed to mobilise its civilians for active training, and the use of film as a training medium was used successfully to speed up the training process.

The effectiveness of using educational films for the military stimulated the production of industrial training films after the war (Collinsworth 1980: 42). The Kodak multinational company were involved in the application of the necessary technology, and, through their philanthropy, helped many commercial and educational ventures to transform their communication methods. The *New York Times* reported in an editorial following his death in 1932: “Eastman was a stupendous factor in the education of the modern world” (Kodak n.d: [5]).

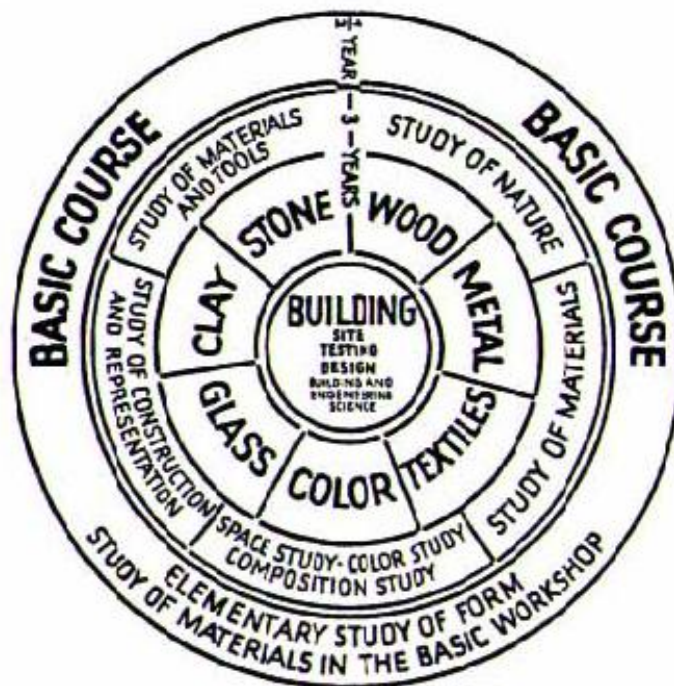


Figure B.14 Concepts and styles (Gropius 2012: [3])

The period between 1919 and 1933 saw the establishment of the Bauhaus Art School in Germany by architect Walter Gropius (Stuart 2007: 212). The German name translates into “House of Building”, and the school was formed in order to reunite applied arts and manufacturing and to reform education. Gropius saw the Bauhaus as “encompassing the totality of all artistic media, including fine art, industrial design, graphic design, typography, interior design,

and architecture". Its main purpose was to solve problems for a modern industrial society. Furthermore, it was claimed that "the stress on experiment and problem solving at the Bauhaus proved enormously influential for the approaches to education in the arts". The main features of the school's curriculum were represented by Gropius (2012: [3]) in the form of a wheel (see Figure B.14) with the outer ring representing a six-month preliminary course which concentrated on practical work (i.e. with reference to form, colours and materials). The two middle rings represented problems related to form, and a practical workshop which emphasised technical skills (Bauhaus, 2012).

An exhibition of Bauhaus abstract art was presented at the Oakland Art Gallery in 1930, and included photographic material of German posters (Heyman 1996). These types of travelling exhibitions, publications and catalogues kept many Americans in touch with modern ideas. It was in 1932 that a group of purist photographers decided to form the F64 group (a catch term based on the smallest aperture opening on a camera that will give maximum depth of field for a photograph). The group's mission statement was as follows:

The members of Group f.64 believe that Photography, as an art-form, must develop along lines defined by the actualities and limitations of the photographic medium, and must always remain independent of ideological conventions of art and aesthetics that are reminiscent of a period and culture antedating the growth of the medium itself (Heyman 1996: 252).

While newspapers were important, magazines soon became the main platform for sharing photographs, owing to the high quality of reproduction and the ability to present more featured articles on items such as fashion and social events. These publications created a distinct visual appeal in magazines such as *Vogue*, *Vanity Fair* and *Life*. It was no doubt the varied and vivid contents of *Life* magazine, which included featured articles on machines, armies, discoveries, jungles, which gained it its popularity. However, 1972 saw the demise of *Life* magazine due to the advent of television. In its heyday, many professional photojournalists, such as W. Eugene Smith, contributed significantly to the development of photo-essays, a practice which is still followed by academic institutions today (Garner, 2007: 193).

In the late 1940s picture magazines such as *Picture Post* served as educational tools for photojournalism in the 20<sup>th</sup> century and provided a source of inspiration in the pre-television era (Cayley n.d.). Many students and professionals alike drew inspiration from this type of commercial newsprint, and, perhaps, the most popular book to appear was the *British Journal of Photography*, which carried various technical and solutions. Before the 1960s very few books on photography were published. However, this period (from 1960s on) saw the emergence of glossy fashion magazines such as *Vogue*, with images by photographers such as Avedon, Beaton, Bailey and Munkacsi (Photography Art Cafe 2012: [9-18]).

In the traditional school environment, the Harley School (1972), based in Rochester, used Kodak products to teach students photography as part of a visual literacy curriculum. The entire school was involved in this project, with senior students capturing, processing and printing the photographs. Alphabet books were produced for the junior classes, using photographs, drawings and magazine pictures (Lasser 1972: 3). In a personal communication, in 1998, Lasser wrote: “all those images are there to create atmosphere and to support that which tells a story. A picture may be worth a thousand words, and a word may be worth a thousand pictures. It depends on the pictures and words.”

The next development was the use of multiple media formats within education. The researcher’s master’s study discussed the introduction of multimedia as follows:

Burke (1972: 43) discussed the relationship between the performing and visual arts which eventually led to the original development of the term multimedia. There have been strong synergies between arts disciplines which utilize electronic communication media in various forms. According to Burke (1972: 7) the presentation given by John Cage at Black Mountain College, North Carolina in 1952 is considered to be the first multimedia event. Burke (1972: 8) claimed that this event was a “Happening, or Theatre Piece or Theatre of mixed means production or the first true multimedia presentation” and is the forerunner for today’s multimedia based educational use (Bhorat 2006: 11).

## B.7 Curriculum transformation reflecting realist principles

Two exemplars relevant to curriculum transformation are discussed here, both congruent with the critical realist principle of social transformation through practical application of scientific principles. The first example is the teachers' curriculum guide produced by Amnesty International (Garvie, Khemchandani and Robinson 2007), based on the film *Born into brothels*. The documentary was produced in Calcutta, India, highlighting the plight of marginalized children. The second example is the production of the "Bigshot" camera developed at Columbia University as a teaching and learning resource, in particular, to inspire the learning of mathematics and science in schools. Both are independent examples, yet are inter-related.

### B.7.1 The *Born into brothels* project

The film *Born into brothels* (2004), produced by photojournalist Zana Briski and filmmaker Ross Kauffman, received the award of "Best Documentary Featured Film" in 2005 in New York. The story revolves around a group of children (Figure B.15) who lived in desperate poverty, cruelty and misery in the red-light district of Calcutta where their mothers worked as prostitutes.



Figure B.15 The children of *Born into brothels* around 1995 - 2006

Briski began her project in 1997 by living with the mothers, and then started teaching the children photography. The film records the results of Briski's

donation of ten simple “point and shoot” cameras and the development of the children’s latent talent. The press release stated: “The results reflect art as an immensely liberating and empowering force”. It went on to say: “Their photographs are prisms into their souls, rather than anthropological curiosities or primitive imagery, and a true testimony of the power of the indelible creative spirit” (Kids with cameras n.d.)

When expressing her thoughts in *Born into brothels: companion curriculum* (Garvie, Khemchandani and Robinson 2007), Briski shared her experience as follows:

When I first went to the brothels of Calcutta I had no idea what I was doing. Circumstances had led me there and I had a deep visceral reaction to the place. It was as if I recognized it on a very personal level. It took me two years to get inside, to be able to live in a brothel. I knew this was the only way I would move from visitor to resident, to fully experience, as much as possible, what it was like for the women and children living there. It was a difficult but precious experience and one for which I will always be grateful. I had the opportunity to understand lives lived behind closed doors, to help - when it was asked of me - in any way I could, and to communicate powerful stories with the outside world (2007: 4).

The spin off from the film led to the publishing of the photographs in book form illustrated with the photographs taken by the children (Briski 2004). Dr Robert Coles, the James Agee Professor of Social Ethics at Harvard University, wrote the Forward, and there was an introduction by the renowned environmentalist, entrepreneur and author, Paul Hawken. The book retraces the inception of the Calcutta workshops and the birth, in 2002, of the non-profit organisation’s workshops in Haiti, Jerusalem and Cairo. The proceeds from the book sales support and empower marginalized children through the art of photography. The *Kids with cameras* initiative is based on these principles:

We believe that photography is an effective tool in igniting children’s imagination and building self-esteem. We believe in the power of art to transform lives, for both the artist and the viewer” (<http://www.kids-with-cameras.org/aboutus/>).

With the assistance of The Human Rights Education Team at Amnesty International, which included Garvie, Khemchandani and Shpiro, a high school curriculum guide was developed (Garvie, Khemchandani and Robinson 2007). It was centred on the following topics: *personal and collective responsibility, the transformative power of art, and discrimination and the right to education*. Included in the guide are practical activities, questions on critical thinking and appendices of additional resources. The *Born into brothels* curriculum is also available on the free-to-use website TakingITGlobal (<http://www.tiged.org>). This additional online resource “allows educators access to global perspectives on global issues, new ways to express their creativity and tools to better engage their students - all in an environment that they can control” (TakingITGlobal 2007: [1]).

### **B.7.2 The Bigshot camera project**

The second project, which is based on improving the quality of life in ways congruent with Bhaskar’s (1998) philosophy, was carried out at the Computer Vision Laboratory at Columbia University by Nayar (2009a: [1-12]) to develop the Bigshot camera. The project was based upon an idea which arose after a review of the *Born into brothels* documentary, and was intended to produce an educational resource. The stimulus of *Born into brothels* resulted in a research project headed by Nayar to construct digital cameras which children could use, and was intended to inspire children towards mathematics and science. This goal was achieved with three basic concepts for the design, namely: Learn by building, Create by using and Express by sharing. The prototype cameras were tested at various schools in America, Vietnam and India. One of the major challenges to the Bigshot design (Figure B.16) was the manufacture of the camera as a building block.

Nayar explains the learning process in his video posted on YouTube (2009b). Firstly, the children receive the camera in kit form, and while learning to assemble the camera, they develop a first-hand knowledge of how it works and how it can be used as an important scientific tool (Nayar 2009b). Once the Bigshot camera is assembled, it can be used to tap into the student’s creative



potential as a photographer. The students then digitally capture moments from their everyday lives, while experimenting with framing, lighting and motion.

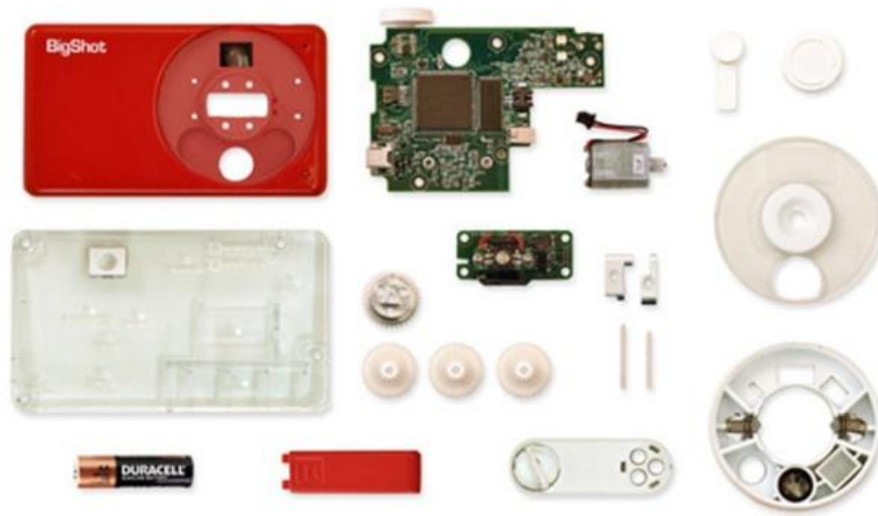


Figure B.16 Bigshot camera (Phillips 2009b: [1])

Nayar embarked on the project with a group of contractors, and selected graduate students in the design to build the first set of working prototypes, developed the online educational materials for the Bigshot website, and conducted various field tests. One of the unique features is a hand crank coupled to a generator (to convert mechanical energy into electrical energy) through a set of gears to create power that can be stored on a capacitor (to store the energy). This feature allows the capture of between six to ten photographs if the camera batteries became exhausted. The power generator feature exposed the students to the concepts and practical applications of mechanics and electromagnetism.

The polyoptic lens wheel, as shown in Figure B.17, is similar to a Swiss Army knife (a compact knife that includes various tools) in that by rotating a wheel the user could choose between three views: normal, panoramic and 3D. After the camera is assembled, the students learn the workings of the camera with detailed sketches and simulations using hypertext and multimedia (Nayar 2009b).



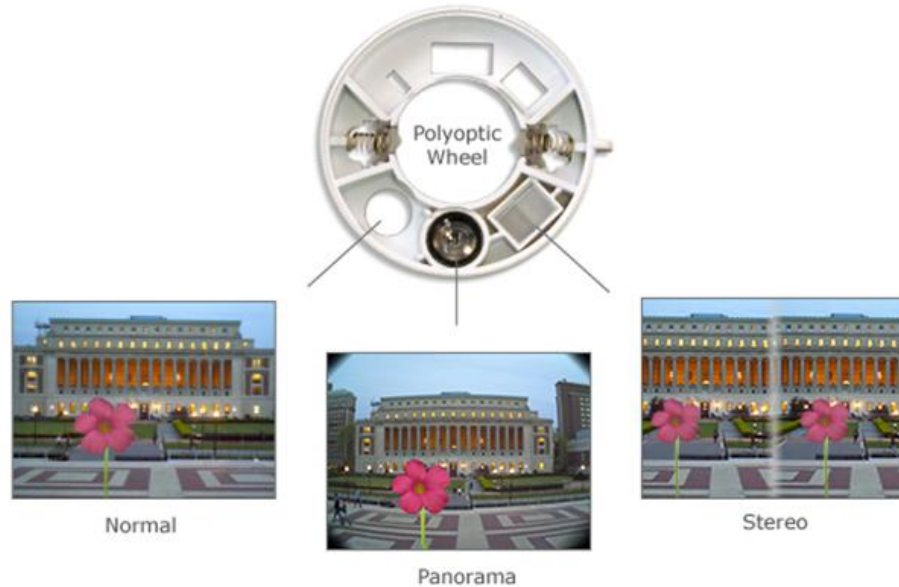


Figure B.17 Bigshot's polyoptic wheel (Phillips 2009a: [1])

## B.7 Conclusion

This appendix shows the close connection of a high technical process such as photography (both in technology and technique) with all aspects of human social behaviour. Photography may be the optics researcher's dream, the scientist's tool, and the media's means of generating sales or swaying public opinion, but it is also "the people's art", now come into its own through developments as widely apart as the latest digital device and the humble Bigshot camera. It is both the subject of and tool for tuition in the Photography Programme, which means that what is being learned and the way in which it is being learned have a unique connection.

## APPENDIX C: AT RISK STUDENTS

### ATTENTION ALL 3<sup>RD</sup> YEAR STUDENTS!

The meeting with Abdul was rescheduled to 9am this Friday morning. R and I attended and basically pleaded with Abdul for mercy regarding overdue assignments...

His concession was this...

For all Viscom Assignments the current marks will stand for the mid-year report as seen on the mark sheet. However those assignments, which were marked '0', must be handed in by NO LATER than **Thursday the 18<sup>th</sup> June 2009**. They will then be marked and submitted for the final end of year mark with a penalty of -50%.

I.e. if your mark is 85% then it will be given as 35% ... I know this is not ideal but it's far better than a ZERO mark

For all Applied Photographs...all photographs must be displayed by the **22<sup>nd</sup> June 2009**...(the first C week after the holidays)...the lecturers want to see all the applied work we have done for the year as well as work that we didn't hand in and were marked zero...**these will then be marked with a penalty of -50%**. So it's an opportunity to improve on previous marks or things that needed to be reshot as well as to avoid further penalty.

All the images must be printed and mounted using the correct format as originally prescribed and have your names printed on the back of the mounting board. We will divide into groups and present ourselves on a specific day.

**This is our final opportunity for remarking so make sure you do not miss it! As after this the mark will stand as they are.**

**Note:** There will be a Compulsory meeting on Monday the 15<sup>th</sup> June at 9am...for those people to hand in overdue assignments and sign a formal letter stating that you understand that this is your last chance for submitting overdue assignments...So No person can say that they didn't know about it!

12 June 2009

STUDENT NAME :  
STUDENT NUMBER : 207  
DATE : 19 June 2009  
SUBJECT : AT RISK STUDENTS

I the undersigned.....  
hereby agree to the following regarding the submission of my outstanding  
Visual Communication 3 and Applied Photography 3 assignments.

1. I accept an extension to the 18th June 2009 to hand in my VISUAL COMMUNICATION 3 assignments containing Zeros and accept a penalty of minus 50%.
2. I accept an extension to the 22nd July 2009 to hand in all APPLIED PHOTOGRAPHY 3 assignments in their original required format and accept a penalty of minus 50%.

I also acknowledge that I fully understand that my failure to comply to this extension of submitting my outstanding assignments will result in my Duly Performance Certificate (DP) being withdrawn thus disqualifying me to submit my Visual Communication report and Applied Photography portfolio for examination in August and October 2009 respectively.

Signed at Durban this Friday Day of 19 June 2009.

Signature of Student:

Witness: 1.....

Witness: 2.....



D U R B A N  
UNIVERSITY of  
TECHNOLOGY

DEPARTMENT OF VISUAL COMMUNICATION DESIGN: PHOTOGRAPHY

MID TERM REPORT 2009

207

CODE	SUBJECT	1	2	3	4	5	6	TOTAL
APHT301	APPLIED PHOTOGRAPHY III	50	72					
PFPR301	PROFFESIONAL PRACTICE III	91	72					
THPH302	THOERY OF PHOTOGRAPHY III	90	91					
VCOM302	VISUAL COMMUNICATIONS III	54	72	0				

LECTURERS COMMENTS

APPLIED III ☒

THEORY III *Very focused, Excellent*

PROF. PRAC. III ☒

VISUAL COMMUNICATION III *fair*

PROGRAMME CO ORDINATOR'S COMMENTS:

*Overall performance disappointing. Student needs to handin assignments by due date*

AH BHORAT

 D U R B A N UNIVERSITY OF TECHNOLOGY  
DEPARTMENT OF PHOTOGRAPHY  
M.L. SULTAN CAMPUS  
P.O. BOX 1334, DURBAN 4000  
TEL: 031-3735405 • FAX: 031-3735430

## APPENDIX D: PROGRAMME REVIEW

### Section 1



#### PROGRAMME REVIEW & EVALUATION REPORT

<b>FACULTY:</b>	Art and Design
<b>DEPARTMENT:</b>	Visual Communication Design
<b>PROGRAMME:</b>	Photography
<b>QUALIFICATION/S</b>	N D; B. Tech; M. Tech
<b>SITE(S) OF DELIVERY</b>	M L Sultan Campus
<b>CHAIR OF PANEL</b>	[REDACTED]
<b>PANEL MEMBERS</b>	[REDACTED] Acting Dean: Faculty Arts & Design [REDACTED] : Industry Representative [REDACTED] : Industry Representative [REDACTED] : Student Representative [REDACTED] : Student Representative [REDACTED] : Faculty Representative [REDACTED] : Faculty Representative [REDACTED] : Specialist: CQPA [REDACTED] : QPO: Faculty Arts & Design
<b>DATE OF REVIEW</b>	01 – 02 June 2010
<b>SIGNATURE OF CHAIR</b>	

## CONTENTS

	<b>PAGE</b>
<b>TABLE OF ACRONYMS</b>	<b>iii</b>
<b>1. PREAMBLE</b>	<b>1</b>
1.1. BRIEF OVERVIEW OF THE PROGRAMME	1
1.2. THE REVIEW PROCESS	1
1.3. THE SELF-EVALUATION REPORT & REVIEW VENUE	2
<b>2. REVIEW FINDINGS AND RECOMMENDATIONS</b>	<b>3</b>
A: PROGRAMME MANAGEMENT AND CO-ORDINATION	3
B: PROGRAMME DESIGN, DELIVERY AND ASSESSMENT	6
C: STUDENT RECRUITMENT, SUPPORT AND SUCCESS	12
D: POSTGRADUATE PROVISION	15
E: POLICY IMPLEMENTATION	16
<b>3. CONCLUDING COMMENTS</b>	<b>16</b>
<b>4. ACKNOWLEDGEMENTS</b>	<b>17</b>

## TABLE OF ACRONYMS

B. Tech	Bachelor of Technology
CAO	Central Applications Office
CELT	Centre for Excellence in Learning and Teaching
CHE	Council on Higher Education
CQPA	Centre for Quality Promotion and Assurance
DUT	Durban University of Technology
FET	Further Education and Training
HEI	Higher Education Institution
HEQC	Higher Education Quality Committee
HEQF	Higher Education Qualification Framework
HoD	Head of Department
M. Tech	Master of Technology
ND	National Diploma
NSC	National Senior Certificate
PCO	Programme Co-ordinator
PQM	Programme Qualification Mix
Programme	Photography Programme at Durban University of Technology
QA	Quality Assurance
SADC	South African Democratic Convention
SAQA	South African Qualifications Authority
SER	Self evaluation report



## **1. PREAMBLE**

### **1.1. BRIEF OVERVIEW OF THE PROGRAMME**

The Photography Programme (hereinafter referred to as the programme) at Durban University of Technology (DUT) is a small sized offering. It is placed within the Department of Visual Communication Design in the Faculty of Arts and Design together with the Graphic Design Programme. A programme coordinator, currently vacant, who reports to the Head of Department (HoD) manages the day to day operations of the programme. It has an academic staff complement of five full-time members and one part-time member, supported by two student tutors; two full-time technicians and a half-day secretary. The programme is presented to about 90 students at its physical location on the ML Sultan Campus. Qualifications offered are: National Diploma (ND), Bachelor of Technology (B. Tech) and Master of Technology (M. Tech), which are all approved by the South African Qualifications Authority (SAQA).

### **1.2. THE REVIEW PROCESS**

The review process for the programmes relied on the integrity of panel members to perform their task of reviewing the programme with due diligence and fairness. The framework as set out in the institution's Guidelines for External Programme Review, guided this review. The Photography Programme was reviewed in 2003 and the then review panel made recommendations. This review, therefore, also looked at how well those recommendations were consolidated, how the identified areas of risk have been improved, and how the identified areas of good practice were strengthened.

Most importantly, the qualifications offered by the Programme are registered with SAQA. As such, the task of the review panel was also to assess whether the Photography programme at DUT meets the standards required by the Council on Higher Education (CHE) through the criteria set out in the Higher Education Qualifications Framework (HEQF) as addressed in the Quality Assurance Policy of DUT. All of which had to be elicited from the programme's Self-evaluation Report (SER), documents scrutinised, interviews conducted and sites visited.

The review panel's findings allowed for flexibility in interpretation conducive to the location of the programme at DUT. It looked for areas for improvement, areas of risk, and areas of good practice. The panel applied themselves with "good faith" and endeavoured at all times not to be unduly judgemental in the review process. Confidentiality is maintained throughout the process.



### **1.3. THE SELF-EVALUATION REPORT & REVIEW VENUE**

The SER which was the guiding document for this review, was not compiled according to the framework and guidelines provided by the CQPA. This deviation from the required outline, made the work of the panel extremely difficult. The report was also not language edited as it had numerous grammatical and language errors, it had copious repetitions, and lacked coherence. It came across as being hastily put together, and accordingly, lacking in professionalism and not adhering to the academic standards as is expected of a Higher Education Institution (HEI).

There seems to have been little improvement since the last review in 2003. There is silence in the SER with regard to this review and the evidence files provided of the impact on the programme especially after the restructuring (period between 2005-2009) was not reflected upon.

There being no boardroom for this programme, the panel consequently had to meet in another venue, which was not an optimum arrangement. The 'feel' for the programme was lost by not being in close proximity during a review such as this.

## **2. REVIEW FINDINGS AND RECOMMENDATIONS**

### **A: PROGRAMME MANAGEMENT AND CO-ORDINATION**

#### **Findings**

- i. One academic staff member has a ND, two staff members have a NHD and one has a B. Tech. This academic profile is not aligned with the national requirement that 50% of staff must have relevant qualifications one level higher than the exit level of the programme taught. Of the five academic staff teaching on the programme, only one staff member has a completed M. Tech. Inadequate staff qualifications do not achieve the vision of the programme i.e. 'developing professional photographers through a balance between teaching, learning and research'.
- ii. The evidence file had only three staff members' CV's although there are five permanent staff teaching on the programme.
- iii. There is a lack of evidence of clear plans for the migration of the programme to the new institutional PQM. Most staff are unaware of the HEQF. The programme coordinator stated that there have been only limited informal discussions (pertaining to the possible impact of entrance requirements) of the HEQF. There is a seeming reluctance of staff to engage with the HEQF in particular and the accreditation requirements of the Higher Education Quality Committee (HEQC) in general.

- iv. The department has been restructured since 2007 with a HoD located at City Campus and a programme coordinator based within the programme at M L Sultan Campus. The practical aspects of the restructuring has not been given due consideration by Executive Management as the HoD is not always available to provide guidance to this programme. The present incumbent teaches in Graphic Design and is also the programme coordinator for Graphic Design, leaving little time for management of the Photography Programme based at M L Sultan Campus.
- v. The programme coordinator for Photography has responsibility for the day-to-day running of the programmes with no lecture load reduction, no incentives, seemingly little to no cooperation from staff and no authority. In addition he was not provided with a job description. All these factors have resulted in him resigning from this position. There is a lack of overall leadership with regard to programme management, coordination, design and delivery. It was of concern to the panel that the programme coordinator had seen the improvement plan from the previous review only in March of 2010. The credibility of programme is negatively impacted because a lack of any meaningful leadership curtails decision-making in the programme.
- vi. There is a seeming lack of commitment within the department, which is evident in the lack of input in the compilation of the SER. It is apparent that there is no team approach to teaching, and assessment and research.
- vii. There is no clear, formal process to incorporate recommendations from moderators, industry partners, other HEI's and students into the programme.
- viii. Although staff had an annual planning meeting regarding, for example, the curriculum or what is to be taught the following year, staff and students reported that there are often arbitrary changes to the plan. Some staff do not have the knowledge to teach the new sections. Technical software training for staff is lacking.
- ix. There is a lack of a staff development plan. This impacts on staff release for study purposes and the use of Skills funding.
- x. The programme has no cohesion in terms of teamwork and there is an undercurrent of tension. Some staff are doing hard work but this is often being undermined by others.
- xi. There is no integration and continuity between the different levels of study.
- xii. No evidence was found that the DUT approved policies for Assessment or QA are being discussed or implemented in the Programme.

## **Recommendations**

- i. Staff are to prioritize registering for higher qualifications and also to complete relevant short courses to improve their skills. They need to do their own photography and keep up to date with changing technology in order to impart this knowledge to the students. The department has been provided opportunities (for example, the half day Research Methodology workshops for the entire 2009) and DUT has financial incentives in place to support staff for lecturer relief.
- ii. All staff members need to submit their CV's and update these continuously.
- iii. The mission and vision of programme is to be displayed prominently on the premises to constantly remind staff and students of the direction of the programme.
- iv. The programme staff need to have a specific meeting/s to discuss the future of the programme/s in line with the HEQF. This meeting can be later broadened to include other relevant stakeholders. Benchmarking with other HEI's nationally and internationally is also recommended.
- v. The university must explicitly define the role of the programme coordinator. This definition must include the relevant authority indicative to this leadership position with incentives attached to such a portfolio.
- vi. The DUT as a matter of urgency needs to look at relocating this programme to the City Campus as there are huge challenges with the management of the programme. With the limited space in the department, the HoD does not have office space to perform his duties effectively and support this department in any meaningful way.

## **B: PROGRAMME DESIGN, DELIVERY AND ASSESSMENT**

### **Findings**

- i. There is limited integration within the department as a whole, although there is possible synergy between the two programmes (Graphic Design and Photography). This would be nurtured if the photography programme relocated to City Campus.
- ii. There is not enough contact with professionals in the field and a network from programme alumni does not exist.
- iii. The B. Tech programme was re-introduced after a period of eight years during which time staff were expected to gain the required qualifications. Only one staff member has so far completed a Masters degree to teach at the B. Tech level.

- iv. The B. Tech file is incomplete – TAB 1, TAB 5 and TAB 7 have missing documentation.
- v. Photography services for the university graduation are too limiting and do not achieve the outcomes for WIL and it has minimal benefits for the students.
- vi. The B. Tech proposals are unsigned.
- vii. The department plans to develop a website to showcase students' work within the programmes offered. This would also be a marketing tool for the programme and students. Facebook, Twitter or similar social networks should be investigated.
- viii. The panel did not have access to the actual finished hard copies of student tests and assignments. The panel did see student work displayed in the Photography studios and the DUT Art Gallery.
- ix. No moderation of tests takes place prior to it being written nor are the scripts moderated. This contravenes DUT Assessment Policy. Staff did not seem familiar with this policy.
- x. Rubrics have been implemented in 2010 for marking of student work for some subjects. The criteria are clearly spelt out and project brief requirements are met in the assignment. This helps minimise subjectivity. However, rubrics are not always provided with project briefs and assignments. For example, Professional Practice I had no rubrics and students are unsure of how their work has been graded.
- xi. There is apathy from students to hand in work on time, which results in zeros being given. Late submission is a minus 10% per day, a process which is applied. This forces students to recognise the importance of deadlines. The students often cite financial reasons for non-submissions. During student orientation, time management and photography costs should be stressed.
- xii. The use of the 'Block System' is not based on any educationally sound reasons. It often results in a mismatch between the theory and practicals being implemented. Often the techniques are not taught. In addition, it is unclear if the programme outcomes have been addressed.
- xiii. The B. Tech programme has been restructured but not approved by the CQPA, Faculty Board or Senate. It has not been peer reviewed by other HEI's.
- xiv. Most study guides are not aligned to the 2009 Senate approved template. The rubrics used for projects' must be included in the study guide.

- xv. The panel had concerns with moderation: there was limited evidence of moderation reports in subject files. It is of concern that the moderators approved at Faculty Board were changed without the new moderators being approved at either Faculty EXCO or Faculty Board. This is especially evident with Professional Practice II, 2009 final paper.
- xvi. The department has already identified problems with late submissions of marks by some staff. This was evident in the Applied III, Practical Photography 2009 examination, as all examiners did not sign off the moderators' reports.
- xvii. There is a lack of evidence that subject reviews and programme reviews have been undertaken.
- xviii. Students do not see value in the administering of subject and lecturer questionnaires, as there is no feedback provided.
- xix. Staff use *ad hoc* quality assurance processes and do not adhere to the DUT QA policy.
- xx. The SER is silent on library resource usage, although a report from the library was found in the evidence files. It is alarming to note from this report that only 1208 books were used since 2007. There are plenty of new books purchased but students are not made aware of these and many books have never been used. There is a poor integration of books and the assessments. Only basic orientation is provided by library. There are only a few Specialist Photography books. There is no librarian dedicated to helping the photography students at this campus. Some students did not know that there is a faculty librarian based at City Campus.
- xxi. Work integrated learning (WIL) is integrated into the B. Tech Programme but it does not meet the professional requirements of the industry. The period for WIL in the B. Tech documentation is two months. However, 'work exposure' during the university graduation is very limiting in terms of meeting the necessary outcomes. All the B. Tech students are not actively involved in the photography for graduation (some first years are also involved). There is no WIL component at the diploma level, where it should ideally be placed.
- xxii. The photography services provided during the university graduation are also used as a third stream income. No evidence was available of its approval and it is poorly managed, as there is no roster of students for the different days. Thus, not all students get an opportunity to take photographs. The post-production and sales part of the process is also problematic as there is inadequate control and monitoring of the funds and sales distribution of the photographs.
- xxiii. Staff resources are stretched during graduation and there is a negative impact on the running of the academic Programme.

- xxiv. Evidence was not provided for the Extended Curriculum Programme. This is based at City Campus with little input from the staff from this programme.
- xxv. There is a lack of a functioning advisory board.
- xxvi. The structure and delivery of the B. Tech is not optimum and causes frustration on the part of the students. There is a lack of proper guidance from staff teaching on the programme. Moreover, some students have been charged twice for the B. Tech.
- xxvii. It is of concern that in the Visual Communication III 2008 year-end and supplementary examinations, there are a number of identical questions in both examination papers. In addition, in the Professional Practice III 2008 final paper, there were repetitions within the same paper.
- xxviii. The theory is not taught in an integrated fashion and is not related to the practicals. Students do not want to change the 'Block system' as they seem to enjoy having all the time to do the shoots & reshoots. However, they are lacking in essential theoretical knowledge.
- xxix. The poor infrastructure and physical location hampers delivery and is not a conducive learning environment. The programme is currently housed in a building that was originally condemned, namely, a workshop that was converted for the programme. It still has three-phase power, which is a safety concern. Power surges occur at inopportune times that often cause equipment to fail.
- xxx. The lack of clarity of the roles and responsibilities for technicians and the lack of collaborative work among staff are of concern.
- xxxi. The assignments for second year do not align with the portfolio requirements. The questions for Theory of Photography III (THPH 302) are at an inappropriate level; as it has pure recall and minimum cognitive and application type questions. Mark allocation ranges from 1 – 4.
- xxxii. Students are given the opportunity to resubmit practical work once it has been assessed so that they can implement the suggested changes.
- xxxiii. It is unclear how comments from moderators' reports are implemented.
- xxxiv. The department has implemented a credit system for students to purchase film so that they can complete their assessments.

### **Recommendations**

- i. Records of student consultations and critiques need to be maintained for review purposes.

- ii. A departmental strategy for assessments is needed especially to maintain standards. Integrated assessments need to be formalised. The Centre for Excellence in Learning and Teaching (CELT) should be consulted to assist all staff to look at different types of appropriate assessments.
- iii. The 'Block system' for delivery of the programme has to be urgently reviewed. It is recommended that theory is taught everyday to promote integrated learning which is vital for the students learning. The lack of teaching venues cannot be used as an excuse for using the 'Block system'. Staff to contact the timetable allocation officer and use other teaching venues that are available at this campus.
- iv. The university and the department should seek ways to establish an effective and functioning Advisory Board. Whilst one meeting could be face to face, the department should explore teleconferencing for at least one other advisory board meeting per year.
- v. The university must implement a system that enables second year students not to be charged twice for the B. Tech re-registration.
- vi. All academic practices must be aligned to the QA policy to promote continuous improvement and uniformity of standards. For example, assessments must be moderated, subject and lecturer evaluations implemented, industry engagement must be formalised, annual programme reviews must be undertaken and annual quality monitoring systems must be implemented.
- vii. There must be more formal meetings amongst staff to discuss policies that have an impact on teaching and learning, for example, the Assessment Policy.
- viii. All learner guides must be aligned to the 2009 Senate approved template.
- ix. Improve the effectiveness of students' engagement in staff meetings.
- x. WIL must be incorporated into the Diploma. Contact the CQPA for assistance in this regard. WIL must be expanded to include other fields of photography and give effect to the vision and mission of the programme. There is a need to provide diverse types of WIL experiences other than the graduation. Investigate collaborative work with other departments, for example, Fashion, Food and Nutrition, etc. Industry and employers should be invited to the third year exhibition. Staff should develop a database of individuals and companies that are willing and able to provide relevant WIL for students. Research the industry where the students will be placed or find employment. A staff member should be allocated the task of WIL coordinator.

- xi. The changes to the B. Tech Programme, as an immediate priority, must be submitted to Faculty Board, CQPA and the other structures for approval.
- xii. A session of library training be implemented in terms of what is on offer at the library, how to search for books (catalogue system), orientation to the library and database searches especially for senior students. Most importantly, that a dedicated librarian be assigned for Department of Visual Communication Design at the M L Sultan Campus.
- xiii. Assignments must be aligned with the portfolio requirements. The level of questions to be reviewed so that it is appropriate for the level of study.
- xiv. It is imperative that all moderators be approved at Faculty Board, including changes to the examiner and /or moderator.
- xv. It is imperative that marks are submitted timeously so that students' work can be moderated and published on time.
- xvi. The urgent relocation of this programme to the City Campus to allow for integration with Graphic Design is of utmost importance. The physical isolation could be a major factor in de-motivating staff and students.

### **Good Practice**

- i. A pre-portfolio assessment is performed which is valuable to the student for compilation of the final portfolio assessment.
- ii. Class representatives are invited to programme meetings which is a good practice for student engagement in department progress. However, there should be a structured process of how flagged issues are actioned.
- iii. The first and second year student work has been exhibited in a 'curated exhibition'.
- iv. The examinations department is doing a good job of safeguarding and providing security for exam papers and marks. Surveillance cameras monitor exam venues. Exam scripts are well archived together with moderators' reports, exam question papers and student scripts.

## **C: STUDENT RECRUITMENT, SUPPORT AND SUCCESS**

### **Findings**

- i. Student representatives from each level are invited to participate in staff department meetings once per month so that they can air their concerns. However, it is unclear how student concerns are resolved as there is a lack of action or 'matters arising' in the staff minutes.



- ii. School visits have been undertaken to market the programme, for example, Kloof High School.
- iii. Tutors have been appointed and trained by CELT. However, some staff use the tutors to teach the subject instead of the tutors providing academic support for students. The staff do not monitor the work of the tutors.
- iv. There is minimal interaction with industry. This has resulted in a lack of consultation with industry with regards to an environmental scan being conducted for numbers of students to be recruited and for ensuring that the curriculum is up-to-date and relevant.
- v. Selection criteria are explicit in the handbook. However, the SER did not include the National Senior Certificate (NSC) requirements.
- vi. There is a lack of documentation of the interventions implemented to assist the 'at risk' students.
- vii. There is a 'credit system' for students to purchase equipment from the department.
- viii. It is unclear how the proficiency test assists with selection.
- ix. Although it is stated in the SER that there are staff consultations to assist students, there is no evidence of staff consultation times for students who need their advice and guidance.
- x. There is a general lack of communication between staff themselves, staff and students and between students.
- xi. Students report that some staff are often absent and that they do not benefit from their guidance. The lack of support from staff often results in mediocre to poor performance from students. There is inadequate briefing or complete lack thereof for students from some staff for the assignments given.
- xii. Some subject files do not have learner guides. Students reported that they often receive learner guides after the term has commenced.
- xiii. PRE 001 (student evaluation of subject) has been implemented for most subjects. However, there have been no staff discussions for planning and implementing improvements. Students are not informed of the improvements arising from their input via PRE 001 and PRE 002.
- xiv. Some South African Democratic Convention (SADC) students have applied directly to the department and have been admitted into the Programme without the involvement of the International Office.

- xv. There is an initiative to provide lectures in an electronic format. One staff member has tried to implement blended learning but implementation has been limited due to a lack of computers for students.
- xvi. It was unclear how students with poor writing skills are given assistance. The Writing Centre provides skills for staff to assist students.
- xvii. Students claim that they are not technically stimulated enough.
- xviii. The students reported that the critiques are too subjective. There are no rubrics as to how the work is marked. Insufficient technical advice, for example, on lighting is given.
- xix. The poor graduation rates are of concern and do not correlate with the good pass rates. The reason provided was that students drop out due to the cost of the equipment needed. The high drop out rates needs further investigation by the faculty and department.
- xx. The purchase of the 40 computers for students has not alleviated the problems of access to computers as these are often out of order.
- xxi. Students are not encouraged to project or plan where they are going, that is, no goal setting is encouraged.
- xxii. There was no evidence of an orientation programme.
- xxiii. Delay with students' hand in of work results in lack of timeous feedback from staff. It is important that staff and students develop time management skills.

### **Recommendations**

- i. Staff must closely monitor and give guidance to the tutors.
- ii. The early identification and assistance for 'at risk' students must be a priority.
- iii. Student progress should be scrutinised on an ongoing basis (use of MI stats, first test results, etc) and suitable interventions implemented.
- iv. Clear criteria should be used for the panel interview for student selection, as currently it appears to be a completely subjective activity.
- v. Staff should consider targeting schools that offer photography as a subject.
- vi. The CAO process should be clear for SADC students to be admitted into the programme and the International Office duly informed.

- vii. Invite guest lecturers and organise field trips to companies to give students a clearer understanding of the varied careers that they could embark on.
- viii. Students are to be given feedback from PRE 001 and PRE 002 and informed about improvements to be made. The planning and implementation of the improvements should be an item on the staff and student meetings.
- ix. Students are to be encouraged to have a 'visualisation diary' to show development of concepts.

## **D: POSTGRADUATE PROVISION**

### **Findings**

- i. The programme has only one registered Masters student, who is still in the process of identifying a topic. The student has been referred to experienced researchers in the Graphic Design programme to help develop the topic. The Faculty Research Committee and the Research co-ordinator will be consulted in finding suitable supervisors.
- ii. B. Tech students participated in the Graphic Design Research Methodology Seminar series. Thus, there is evidence of the programme developing research capacity.

### **Recommendations**

- i. Further Masters registrations should be suspended until a focus area for the postgraduate Programme has been identified. The support of the Faculty Research Committee and experienced researchers in Graphic Design and Fine Art should be called upon in this process.
- ii. Possible focus areas could be identified by consultation with Advisory Board members, and the chosen research field(s) introduced in the B. Tech Programme.

### **Good Practice**

- i. Limiting students registering for the Masters while building capacity through staff qualification improvement and the inclusion of research skills in the learning Programme (especially at the B. Tech level) has been a wise strategy.

## **E: POLICY IMPLEMENTATION**

### **Findings**

- i. No files containing DUT POLICIES were displayed. Staff are unaware of most of the DUT policies. The SER mentions that DUT Policies are

adopted but no clear evidence suggest that it is done or what policies are implemented in the Programme.

- ii. There is a lack of evidence of any discussions pertaining to implementation of policies.

### **Recommendations**

- i. The DUT policies are to be more fully applied in the programme especially the policies pertaining to Quality Assurance, Experiential Learning, Research and Assessment.

## **3 CONCLUDING COMMENTS**

The panel concludes that mechanisms of accountability for the day to day running of the Programme within the Faculty are unclear to staff members in the Programme.

This undertone of lack of communication within the Faculty could undermine the integrity of the Programme. The panel perceives that staff are not motivated strongly enough to improve their qualifications, and are not encouraged to get to know and understand the requirements of the DoE in respect of the HEQF. Staff are also not made aware of the applicability of DUT policies within the programme.

This clearly deviates from the University, Faculty, department, and programme vision and mission, which provide explicit and incisive direction.

## **4 ACKNOWLEDGEMENTS**

The Centre for Quality Promotion and Assurance is commended for their outstanding preparations; their guidance was invaluable to the review process.

The panel recognises the efforts of the staff of the Photography Programme in making the necessary arrangements for this review process. It wishes to thank all members for their time and input, and interest shown in making the process run smoothly.

All review panel members' contributions; dedication, openness and fairness; and the willingness to sacrifice their time, are particularly acknowledged.

## Section 2

### Extracts from documents supporting staff and student concerns

<p>To All Photography Staff</p> <p>Abdul, in his capacity as Programme Co-ordinator, has brought to my attention a serious concern that staff studies are having a damaging effect on the quality of Teaching Provision and assistance in the Photography Programme. He is correct to inform me of such concerns.</p> <p>He has informed me of lecturers being absent for lectures or crits without permission, of lectures being shortened to pointlessness, of lecturers being unprepared for their classes or starting half an hour late. Any such behaviour is unacceptable, and evidence of it may constitute grounds for disciplinary action against the staff member concerned. All staff members must be aware that this is the case</p> <p>( From HoD 24/8/2009)</p>
<p>Dear Colleagues</p> <p>Please see attached updated Study Guide Template.</p> <p>Please forward it to all academic staff.</p> <p>(From CQPA 15/3/2010)</p>
<p>I think the students need to be exposed to other programs other than Photoshop. As I mentioned in my introduction that, as a photographer you also have to be a designer or at least have working knowledge of design. The Adobe Creative Suite includes Illustrator, InDesign, Flash, Dreamweaver, etc. These are some of the few design programs that every photographer should have a working knowledge of.</p> <p>The Department needs to bring back the multimedia elements, even as early as second year there need to be an audio-visual presentation but especially at third year level, using a media rich program like Flash. Every photographer needs a website, Dreamweaver is a great web design program even if you get a web designer to build a website site for you at least you'll have better understanding as to the inner workings and you can get what you want out of the designer. Illustrator and InDesign could be very useful in putting together the 3<sup>rd</sup> year and BTech reports and Photo books for portfolio.</p> <p>BTech student reflective report (2011)</p>
<p>Dear HoD's</p> <p>May I request you to submit the following info at your earliest convenience; Reports on: Processes undertaken to identify students at risk 2011 (two to three paragraphs)</p> <p>Structured tutorial programme/time table Staff/students meetings (minutes)</p> <p>Please treat this as urgent and submit this before Friday 11 November 2011, 13:00</p> <p>(From Executive Dean 9/11/2011)</p>
<p>In many ways APPLIED DIGITAL PHOTOGRAPHY lectures are interesting, and enjoyable for the most part. However, one very seldom leaves a digital lecture, and feels that they have learned ANYTHING that will help them with their digital images.</p> <p>... Besides the work set, forcing us to "change the way we see" we get through</p>

VERY little in the lines of digital photography. NO Photoshop, NO Lightroom, NO Bridge... but PLENTY of Gmail, and Google docs, and blogging...

...We learn very little that would benefit our photography or digital development skills. We strongly believe that we need a lecturer who has a vast knowledge of the subject at hand and someone who is prepared to share their knowledge and personal experiences with us in order for us to thrive and grow in the photographic field.

Student complaints 2013

We are more interested in learning about how to start up and open our own businesses, business cards, logo's, rights as a photographer, pretty much photography related stuff (things that will benefit us now and while we are still young photographers).

On more than one occasion Deadlines have been extended to allow people that have not done the work a chance to hand in work which is not fair on the rest of us who have done are work. likes to reward the people who have done the work an extra 10% and the people who handed in late will only get a -10%! This is not acceptable, they should be getting 0!

Students report that some staff are often absent and that they do not benefit from their guidance. The lack of support from staff often results in mediocre to poor performance from students. There is inadequate briefing or complete lack thereof for students from some staff for the assignments given

(see Programme Design Findings)

Delay with students' hand in of work results in lack of timeous feedback from staff. It is important that staff and students develop time management skills.

(see Programme Design Findings)

# APPENDIX E: PHOTOGRAPHY STAFF DEVELOPMENT WORKSHOP

## Section 1

### Memorandum

**From :** [REDACTED] CELT, DUT  
**To :** Abdul Bhorat, Head of Programme: Photography, Faculty of Arts and Design, DUT  
**Date :** 17 November, 2009  
**Topic :** Comments on Photography Programme Workshop

This workshop was held in the CELT training room in Mariam Bee Building on the ML Sultan Campus from 09.00-15.30 on each of

- Monday, 2 November,
- Tuesday, 3 November,
- Monday, 9 November,
- Monday 16 November,
- Tuesday, 17 November.

Our comments are presented under two headings...

1. What was achieved in this workshop;
2. What still needs to be done and what we can offer.

### What was achieved in this workshop

At the beginning of the workshop we articulated our learning outcomes. These are documented below with the extent to which we achieved these outcomes in *italics*.

1. Critically examined the resources needed for the design of assessment in the present higher education scenario, viz. SAQA ID's, CCFO's, Bloom's taxonomies, DUT Strategic Goals 2009-2018; *We explored these through the examination of the written records and data, so that we were all aware of the content and function and the implications for the photography programme.*
2. Briefly explored the role of multidisciplinary in higher education practice; *We looked at this from the perspective that in a UoT we wear two hats: that of the professional specialist, and that of the educator.*
3. Briefly explored the role of integration in higher education practice; *We looked at the role of integration from a number of relevant perspectives.*
4. Briefly explored a variety of modes of integration in higher education practice; *We looked a number of relevant options.*
5. Reflected critically on the application of integration in their higher education practice; *We reflected on the application of these operations and identified the advantages and disadvantages.*
6. Shared their best practice in groups drawing upon group resources to identify creative solutions to problems; *The group worked productively and proactively together displaying high levels of co-operation and team work.*
7. Communicated effectively using spoken, written and graphic expression; *Everyone joined in the work tasks that were decided upon.*
8. Collected organized, analysed and evaluated information for optimum usefulness. *The group resources were usefully explored and exploited.*
9. Been mindful of contextual and environmental factors; *Relevant and useful attention was paid to the world of work factors and the learners' context and background.*
10. Demonstrated respectful accommodation of cultural sensitivities. *There was a high level of sensitivity and appreciation of the various kinds of diversity evident in the group.*

11. explored commonalities and possibilities of co-operation and collaboration in the design of group Integrated Learning and Assessment projects (ILAP). *This process was addressed briefly but needs further interrogation.*
12. examined the key capacities which their learners need in the working world. *This aspect of the workshop was repeatedly and usefully explored.*
13. applied, interrogated, and reflected on the design principles of a model of group Integrated Learning and Assessment projects to their own practice. *This process was addressed briefly but needs further interrogation.*
14. designed an integrated assessment which includes the Learning Outcomes, Assessment Criteria, Assessment rubric and Instructions to Learners. *This process was addressed briefly but needs further interrogation.*
15. Completed an appropriate learner guide for learners for 2010. *This process was addressed briefly but needs further interrogation.*

#### *Additional Comments*

1. The workshop participants were reasonably representative of the programme, viz. most of the educators were present, and the good representation from the student body improved as the workshop over five days progressed. In addition, the Quality Promotion Officer, Odwa Mntonintshi, responsible for this programme attended all but the last day. He was a great asset to the process, and in addition his presence was most helpful and reassuring as it indicated to the group that what we were doing was in accordance with the CQPA. The participants engaged enthusiastically so that the discussion was frank, rich and productive, and contributed to a healthy sense of the group endeavour.
2. We established a 'wish list' for each of the participants.
3. We explored the world outside the workshop venue by referring to TEDTALKS.
4. We repeatedly established the responsibility of the programme to the institution, the workplace and the learners, in no particular order.
5. During the last two days, we partially developed assessment rubrics for the 'Visual Diary' as a form of solo integrated assessment in each of the four years that the programme is offered. The rubrics which emerged reflect a developmental path for the learners which
  - 5.1 grounds them each broadly and inclusively in the first year in the Photography Programme (PP) and orientates them for the World of Work (WOW).
  - 5.2 develops and establishes their photographic technique in the second year,
  - 5.3 explores knowledge through time and space to establish their areas of specialization and creativity in third year,
  - 5.4 and establishes their professional profile in fourth year.
2. **What still needs to be done and what we can offer** (*our offers of assistance are indicated in brackets and italics*).
  1. Visual Diary: [REDACTED] and I need to receive the completed Assessment Rubrics by 30 November, when we will critique them and return them to the Photography Programme. The Assessment Criteria then need to be developed, thereafter the Learning Outcomes, and the Assignment Instructions to learners, before these can be included in the Learner Guide.
  2. Integrated Learning Assessment Projects (ILAPs) :
    - 2.1 ILAPs have been referred to in passing, with particular reference to the 3<sup>rd</sup> and 4<sup>th</sup> year exhibitions, which could be used as demonstrations of professional curating capacity, and could be assessed as professional photographic assignments.
    - 2.2 We also suggest basing ILAPs in ROCS with Len Rosenberg to develop WOW capacity at every level of the programme.
    - 2.3 If these integrated assessments are fully developed, then the whole programme can work in a self organizing system of ILAPs driven increasingly by the learners as they prepare for the WOW. To make these initiatives operative, using the Checklist for the Design of ILAPs we need to:



- 2.3.1 identify a focus for each,
  - 2.3.2 develop Assessment Rubrics,
  - 2.3.3 develop Assessment Criteria,
  - 2.3.4 develop Learning Outcomes,
  - 2.3.5 and write Assignment Instructions for the learners.
3. Departmental Handbook workshops: we need to negotiate what these will include, and workshop an understanding of the operation of the programme with the students and staff together, immediately the students return in 2010. this initiative must include a 'Learning Contract' negotiated between the teachers and learners. This will take at least a full day, if not more.
  4. 'Speed of Trust' workshop : this workshop could be part of 3 above, or could be work-shopped with the staff and then extrapolated to the students. 3 hours
  5. 'Seven Habits of Highly Effective People' workshops : as above, but 6 hours
  6. 'Ethnostress' workshops : as above, but 3 hours.
  7. 'Anthropological Milestones Workshops' : staff and students together in groups of 40 MAX. 3 hours
  8. 'Origins of Knowledge' workshops: staff and students together in groups of 40 MAX. 3 hours
  9. 'Operation of ILAPs' workshops : These work best when they are connected to the running of ILAPs, and could also be operated online. Physical workshops of 1-3 hours each are good to start.
  10. Development of Learner Guides which prepare and lead the learners through their learning process
  11. Tutor Training and Management:
  12. Development of Photographic module to be included in ECP for 2010.
  13. Writing funding proposals for third stream income initiatives.
  14. SeStuTHE workshops for recording transformative education practice into theses for higher degrees.
  15. Develop contact with Trent University in Ontario Canada with a view to possible exchanges of staff and students.

### **Final comments**

We are mindful that the PP is being reviewed in early June, and so we suggest that a plan be adopted to introduce and operate those initiatives that the PP want in place for that review. Thank you for inviting us to facilitate this workshop. It has been a pleasure to work with such motivated, energised and creative people

**From:** [REDACTED]  
**Sent:** 11 October 2009 01:57 PM  
**To:** Abdool Haq Mahomed Borat  
**Cc:** NAMES BLOCKED TO RETAIN ANONOMITY  
**Subject:** RE: workshop:photography@dut...2010 and beyond

Dear Abdool

Thank you for a most productive meeting. Please can you let me have the names of the folk in the Photography programme, and the subjects that they teach, and the programme itself, its SAQA ID, and all existing Learner Guides. And any other docs that you think would be useful.

Thanks

[REDACTED]

**From:** Abdool Haq Mahomed Borat  
**Sent:** 09 October 2009 03:33 PM  
**To:** [REDACTED]  
[REDACTED]  
[REDACTED]  
**Cc:** [REDACTED]  
**Subject:** workshop: photography@dut...2010 and beyond

Hi

Following my email dated 4th October 2009, my first meeting with CELT took place this morning. [REDACTED] will be holding a three day workshop for the photography program on the 2,3 and 9 th November 2009 in Mariam Bee Building (unfortunately these are the only days that are available). It is imperative that all photography staff (administrative, academic, technical, tutor and part-time) as well as Miss Blacker attend the workshops which will continue into the new year. This means that all examination marking of scripts and or portfolios must be completed and marks captured timeously. Any application of leave already approved will unfortunately need to be postponed. [REDACTED] will keep us updated with requirements for the workshop. Light refreshments will be provided.

Thank You

Abdul

## Section 2

**From:** Abdool Haq Mahomed Borat  
**Sent:** 08 January 2010 09:17 AM  
**To:** Photography staff  
**Subject:** tutorials for 2010 onwards

Hi All

By now as you return to DUT you would have received my proposed syllabus for first to fourth years. You might have noticed that there are a variety of new categories at the various years especially regarding Applied Photography. In order to clear up any ambiguities about the briefings, I have Attached 144 pages of unedited tutorials as per the headings below. Firstly, please note page 1 **“A Notice to Photography Clubs and Teachers about Using Our Tutorials”**. It is clearly stated that the images must be acknowledged and cannot be used on any commercial sites. In this regard, I will obtain permission from the various authors/sites. I suggest, at this stage use the tutorial as a guide internally and when you give out the assignments retain a copy of the best photograph as a reference for future assignments. Please note every assignment / tutorial/techniques/visual diary, briefing, etc. must be assessed. Please do not waste yours or the students' time in failing to comply with what was emphasised in the CELT workshops regarding assessment taking place. Please do not print out the 144 pages. Use them as a guide, edit the notes, test the validity of the tutorial, mix it with additional information you may have already researched and present them as PowerPoint lectures. All staff spent a year by attending the GD Research Methodology course and should be PPoint proficient. Do not hesitate to ask me for assistance in the above.

Best  
Abdul

1. A Notice to Photography Clubs and Teachers about Using Our Tutorials  
page1
2. How to Create an Eye Catching Montage page 2
3. Mums Triptych page 6
4. 5 Techniques for Enhancing Contrast in Digital Photos page 7
5. Painting a Photo in Photoshop page 16
6. Understanding Histograms page 26
7. Sharpening in Lightroom page 30
8. Master Chief's Bad Day page 38
9. Digital Unmasking | Ripping one's face page 41  
Lightroom: What is it and When Should You Consider it? page 43
10. Split Toning in Photoshop page 49
11. Creating a Triptych in Lightroom page 55
12. How to Create an HDR page 59
13. Get Creative With Collage: Trends and Inspiration page 64

14. Seven Deadly Sins page 89
15. What the Mona Lisa Can Teach You About Taking Great Portraits page 98
16. 8 Tips for Mom-a-raz-zo Photographers page 104
17. Shooting with Available Light - Lifestyle Portraiture page 114
18. 35 Fantastic HDR Pictures page 118
19. White Background Colourful Kids—Ideas for High Key Studio Photography page 138
20. White Seamless – Studio How-To page 140
21. High Key Studio – What I Use and Why page 141
22. How to Achieve Perfect Butterfly Lighting page 144

## A Notice to Photography Clubs and Teachers about Using Our Tutorials

02 November 2009  
07:04 PM

[Digital Photography School](#)

### A Notice to Photography Clubs and Teachers about Using Our Tutorials

by [Darren Rowse](#)

One of the most common email requests that I get are from those heading up local photography clubs asking if they are able to use our tutorials in their newsletters or classes.

I get these emails on such a regular basis that I thought I'd write a post outlining how our content can be used by these groups.

While the written content on DPS is protected by copyright we do give permission to local photography clubs and schools to use our tutorials for educational purposes under some circumstances and conditions (outlined below).

1. **Content may not be reproduced online on another website** - ie you may use it in your club or school if you print it out for members/students or even to email it out - but not to publish on your site.
2. **Credit must be given to the author** - please include their name and bio line and a crediting link/url to their site if they have one in their bio.
3. **Credit must be given to Digital Photography School**. Please include a line to the effect of 'Source: [www.digital-photography-school.com](http://www.digital-photography-school.com)' or 'first published on [www.digital-photography-school.com](http://www.digital-photography-school.com)'
4. **Please don't reproduce pictures without checking copyright** - this one is trickier - at DPS we use a lot of Creative Commons licence images which you'd be able to use also if you credit the photographer. But if the images don't have a link to where you can check the copyright they may well be copyright protected and only for use on DPS (some photographers only allow us to use them). To be safe you'd be best not to use the images in our articles or supply your own.
5. **Our Tutorials may not be used for commercial purposes** - please don't sell them or use them as the basis for a paid course. If in doubt please contact us.
6. **Fair Use** - please don't reproduce large quantities of our tutorials. We're happy for you to reproduce a few for educational purposes but don't take it too far and do hundreds!

Our goal with this policy is to share the knowledge and make the learning happening on DPS go further - but also to give credit where credit is due and not have our site and it's contributors exploited. Again - if in doubt, feel free to email us via our [contact form](#).

Read more from our [DPS Site News](#) Category

Inserted from <<http://digital-photography-school.com/a-notice-to-photography-clubs-and-teachers-about-using-our-tutorials>>

# APPENDIX F: LETTER OF STAFF INFORMATION AND STAFF QUESTIONNAIRE

## DEPARTMENT OF LANGUAGE PRACTICE

### Letter of information

I am currently registered for a DTech programme in Hypermedia<sup>1</sup> Communication. The title of my dissertation is, "An online educational portal serving as a communication nexus facilitating access to multimedia<sup>2</sup> resources for academic staff and students at a University of Technology".

The general aim of my study is to obtain information from a variety of sources in the university that uses hypermedia communication and multimedia technology to facilitate teaching and learning. I would appreciate some information on your experiences. This information could contribute significantly towards the design and testing out with DUT staff and students a multimedia helpdesk.

I need to examine the potential of providing hypermedia and multimedia resources across the campuses through the helpdesk and to conduct research with established users to determine the best methods for doing so.

The specific objectives of the research project are to:

- complete a survey of the main existing multimedia resources both off-line and on-line at DUT;
- investigate the design of established multimedia educational portals at selected Higher Education Institutions (HEIs);
- design, set up and test out an online multimedia educational portal which will provide information about and access to the following:
  - a. offline resources (i.e. in support departments)
  - b. online resources;
- provide a model of the process of setting up an online multimedia educational portal;

I would appreciate if you could fill out the accompanying questionnaire and submit online. If you experience any difficulties, please contact me. I may need to follow up with an interview.

Yours faithfully  
AH Bhorat

e-mail: [abduh@dut.ac.za](mailto:abduh@dut.ac.za)

Prof D Pratt  
Supervisor  
email: [deep@dut.ac.za](mailto:deep@dut.ac.za)

<sup>1</sup> Hypermedia will be described as "a computer program intended to tie everything together and make it all available to everyone" (Nelson 1981).

<sup>2</sup> Multimedia will be interpreted as the collection of texts, graphics, photographs and videos.

# DURBAN UNIVERSITY of TECHNOLOGY

## Hypermedia and Multimedia Resources Survey - 2011

The aim of this study is to investigate current practice in all disciplines at the Durban University of Technology (DUT) that uses Hypermedia Communication and Multimedia Technology both in and out of the lecture rooms. I would appreciate some information on your experiences. This information could contribute significantly towards the design and testing of a multimedia helpdesk for DUT staff and students.

Please, take a few minutes to fill out the questionnaire (details will be kept confidential) (**tab down sections to fit contents**).

Date	Title
Name	Telephone
Dept	Email
Physical Address	

Copy and paste this symbol (tick)✓in the appropriate blocks.

1. State the specific services that you offer? (eg video, audio, resources from the web, online assignments/discussions, software etc) (Tab down for extra typing space).
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------

2. Briefly describe the hypermedia and multimedia resources, services, tools etc offered for teaching and learning through your department (Tab down for extra typing space).
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

3. Who is your target audience? Indicate with a tick.														
<table border="1"><tr><td>Probationary staff</td><td></td></tr><tr><td>Part time staff</td><td></td></tr><tr><td>Full time staff</td><td></td></tr><tr><td>Undergraduate students</td><td></td></tr><tr><td>Post graduate students</td><td></td></tr><tr><td>Research staff</td><td></td></tr><tr><td>Other( specify)</td><td></td></tr></table>	Probationary staff		Part time staff		Full time staff		Undergraduate students		Post graduate students		Research staff		Other( specify)	
Probationary staff														
Part time staff														
Full time staff														
Undergraduate students														
Post graduate students														
Research staff														
Other( specify)														

4. What is the most important service you offer? (Tab down for extra typing space)
------------------------------------------------------------------------------------

<b>5. How do you market the services within the university community? (Tab down for extra typing space)</b>										
<b>6. Where are your services mostly used? Indicate with a tick.</b> <div style="display: flex; justify-content: center; gap: 10px;"> <span>Online <input type="checkbox"/></span> <span>Offline <input type="checkbox"/></span> </div>										
<b>7. Where do your clients use hypermedia and multimedia? Indicate with a tick.</b>  <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">Traditional classroom instruction</td> <td style="width: 50px;"><input type="checkbox"/></td> </tr> <tr> <td style="padding: 2px 5px;">Multimedia instructional</td> <td><input type="checkbox"/></td> </tr> <tr> <td style="padding: 2px 5px;">Special research project</td> <td><input type="checkbox"/></td> </tr> <tr> <td style="padding: 2px 5px;">Web page</td> <td><input type="checkbox"/></td> </tr> <tr> <td style="padding: 2px 5px;">Other (specify) Tab down for more typing space</td> <td><input type="checkbox"/></td> </tr> </table>	Traditional classroom instruction	<input type="checkbox"/>	Multimedia instructional	<input type="checkbox"/>	Special research project	<input type="checkbox"/>	Web page	<input type="checkbox"/>	Other (specify) Tab down for more typing space	<input type="checkbox"/>
Traditional classroom instruction	<input type="checkbox"/>									
Multimedia instructional	<input type="checkbox"/>									
Special research project	<input type="checkbox"/>									
Web page	<input type="checkbox"/>									
Other (specify) Tab down for more typing space	<input type="checkbox"/>									
<b>8. How many staff are involved in your services?</b>										
<b>9. Do you use any specific equipment or software in the production of multimedia programs? (Specify). (Tab down for extra typing space)</b>										
<b>10. Other comments. (Tab down for extra typing space)</b>										

Please return this questionnaire to:

AH Bhorat [abduh@dut.ac.za](mailto:abduh@dut.ac.za)

Ayesha Bee, ML Sultan Campus

Tel: 031 373 5228

## APPENDIX G: ETHICS STATEMENT



**ETHICS STATEMENT:** Please complete and sign the attached Ethics Questionnaire.

All students who intend to complete research projects under the auspices of Durban University of Technology are required to complete this form. This is an abridged version of DUT's ethics questionnaire, adapted for students conducting research in the Faculty of Arts and Design.

Use the Durban University of Technology's Research Ethics Policy and Guidelines to ensure that ethical issues have been identified and addressed in the most appropriate manner, before finalizing and submitting your research proposal.

Please indicate [by an X as appropriate] which of the following ethical issues could impact on your research. Please type the motivations/further explanations where required in the cell headed COMMENTS. Copying and pasting the appropriate sections from your proposal may not suffice - please ensure that your justification/comments are addressed fully, as issues that inadequately answered will be returned to the student for further comment.

No	Question		
1.	<p><b>DECEPTION</b></p> <p>Is deception of any kind to be used? If so provide a motivation for acceptability.</p> <p>Comment:</p>	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input checked="" type="checkbox"/> X <input type="checkbox"/>
2.	<p><b>CONFIDENTIALITY</b></p> <p>Does the data collection process involve access to confidential personal/organizational data (including access to data for purposes other than this particular research project) without prior consent of the subjects?</p> <p>Comment:</p>	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> X <input type="checkbox"/>
3.	<p>Will the data be collected and disseminated in a manner that will ensure confidentiality of the data and the identity of the participants? If no, please explain.</p> <p>Comment:</p>	<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> N/a	<input type="checkbox"/> <input checked="" type="checkbox"/> X <input type="checkbox"/>



4.	<p>Will the data obtained be stored and ultimately disposed of in a manner that will ensure the confidentiality of the participants? If "No" please explain. If "yes" how long will the confidential data be retained after the study (and by whom) and how will it be disposed of at the end of the period?</p> <p>Comment: Data will be stored in a locked steel cupboard cabinet and destroyed after 2 years.</p>	<table border="1"> <tr><td>No</td><td></td></tr> <tr><td>Yes</td><td>X</td></tr> <tr><td>N/a</td><td></td></tr> </table>	No		Yes	X	N/a	
No								
Yes	X							
N/a								
5.	<p>Will the research involve access to data banks that are subject to privacy legislation? If yes, specify and explain.</p> <p>Comment:</p>	<table border="1"> <tr><td>No</td><td>X</td></tr> <tr><td>Yes</td><td></td></tr> </table>	No	X	Yes			
No	X							
Yes								
6.	<p><b>RECRUITMENT</b></p> <p>Does respondent recruitment involve any direct personal approach from the researchers to the potential subjects? Refer to the sampling plan in your proposal and copy the relevant sections here.</p> <p>Comment: Potential subjects: Primary data will be collected from online/telephonic interviews and/or visits to established users of online Educational portals in South African tertiary institutions, as well as visits to commercial media production houses. In addition the candidate will obtain primary data regarding needs for the academic ambit at DUT, as well as feedback on the proposed portal, through a survey, using interviews and questionnaires.</p> <p>The validity and success of existing portals and service sites (located at both South African and leading universities from abroad) will be analysed using formal questionnaires that will be directed to staff, students and researchers.</p> <p>All potential subjects will be approached through the relevant authorities and will be asked to sign a letter of consent should they agree to participate.</p>	<table border="1"> <tr><td>No</td><td></td></tr> <tr><td>Yes</td><td>X</td></tr> </table>	No		Yes	X		
No								
Yes	X							
7.	<p>Are participants linked to the researcher in a particular relationship i.e. employees, colleagues, family, students? If yes specify how.</p> <p>Comment: Colleagues and students will be amongst the participants, including those in the researcher's Programme.</p>	<table border="1"> <tr><td>No</td><td></td></tr> <tr><td>Yes</td><td>X</td></tr> </table>	No		Yes	X		
No								
Yes	X							
8.	<p>If yes to 7, is there any pressure from researchers or others that might influence the potential subjects to enrol? Elaborate.</p> <p>Comment: No, as the research surveys, questionnaires and discussions will be voluntary, i.e. participation is not compulsory.</p>	<table border="1"> <tr><td>No</td><td>X</td></tr> <tr><td>Yes</td><td></td></tr> </table>	No	X	Yes			
No	X							
Yes								
9.	<p>Does recruitment involve the circulation/publication of an advertisement, circular, letter etc? Specify.</p> <p>Comment: No, potential participants will be approached directly.</p>	<table border="1"> <tr><td>Yes</td><td></td></tr> <tr><td>No</td><td>X</td></tr> </table>	Yes		No	X		
Yes								
No	X							
10	<p>Will subjects receive any financial or other benefits as a result of participation? If yes, explain the nature of the reward, and safeguards.</p> <p>Comment: It is hoped that participants will benefit indirectly (i.e. from having access to multimedia resources) but there are no direct benefits involved.</p>	<table border="1"> <tr><td>Yes</td><td></td></tr> <tr><td>No</td><td>X</td></tr> </table>	Yes		No	X		
Yes								
No	X							

11	Is the research targeting any particular ethnic or community group? If yes, motivate why it is necessary/acceptable. If you have not consulted a representative of this group, give a reason. In addition explain any consultative processes, identifying participants. Should consultation not take place, give a motivation. Comment:	Yes No	 X
12	Does the research fulfil the criteria for informed consent? [See guidelines]. If yes, no further answer is needed. If no, please specify how and why. Comment:	Yes No	X 
13	Does consent need to be obtained from special and vulnerable groups (see guidelines). If yes, describe the nature of the group and the procedures used to obtain permission. Comment:	Yes No	 X
14	Will a Subject Information Letter be provided and written consent be obtained? If no, explain. If yes, attach copies to proposal. In the case of subjects who are not familiar with English (e.g. it is a second language), explain what arrangements will be made to ensure comprehension of the Subject Information Letter, Informed Consent Form and other questionnaires/documents. Comment: See attached.	Yes No	X 
15	Will results of the study be made available to those interested? If no, explain why. If yes, explain how. Comment: By publication of the thesis in the DUT library, and on the DUT Institutional Repository	Yes No	X 
16	<b>RISKS TO SUBJECTS</b> Will participants be asked to perform any acts or make statements, which might be expected to cause discomfort, compromise them, diminish self-esteem or cause them to experience embarrassment or regret? If yes, explain. Comment:	Yes No	 X
17	Might any aspect of your study reasonably be expected to place the participant at risk of criminal or civil liability? If yes, explain. Comment:	Yes No	 X
18	Might any aspect of your study reasonably be expected to place the participant at risk of damage to their financial standing or social standing or employability? If yes, explain. Comment:	Yes No	 X
19	Does the research involve any questions, stimuli, tasks, investigations or procedures which may be experienced by participants as stressful, anxiety producing, noxious, aversive or unpleasant during or after the research procedures? If yes, explain. Comment:	Yes No	 X
20	<b>BENEFITS</b> Is this research expected to benefit the subjects directly or indirectly? Explain any such benefits. Comment:	Yes No	 X

21	Does the researcher expect to obtain any direct or indirect financial or other benefits from conducting the research? If yes, explain.  Comment: Apart from qualifications improvement and improved chances of promotion, no direct or indirect benefit/s will result from this project.	Yes No	 X
22	<b>SPONSORS: INTERESTS AND INDEMNITY</b> Will this research be undertaken on the behalf of or at the request of a company, or other commercial entity or any other sponsor? If yes, identify the entity. Comment:	Yes No	 X
23	If yes to 22, will that entity undertake in writing to abide by Durban University of Technology's Research Committees Research Ethics Policy and Guidelines? If yes, do not explain further. If no, explain Comment: n/a	Yes No	 
24	If yes to 23, will that entity undertake in writing to indemnify the institution and the researchers? If yes, do not explain further. If no, explain. Comment: n/a	Yes No	 
25	Does the researcher have indemnity cover relating to research activities? If yes, specify. If no, explain why not. Comment: No, just the usual DUT staff/student provisions, as the research does not involve risk.	Yes No	 X
26	Does the researcher have any affiliation with, or financial involvement in, any organization or entity with direct or indirect interests in the subject matter or materials of this research? If yes, specify Comment:	Yes No	 X

The undersigned declares that the above questions have been answered truthfully and accurately.

STUDENT NAME: ..... Abdool-Haq Mahomed Bhorat .....

SIGNATURE: .....  .....

DATE: 1 April 2009

## APPENDIX H: RESOURCES FOR THE PROTOTYPE PORTAL

### Section 1: Multimedia resources used for the prototype portal

The multimedia resources used for the prototype, which are discussed in this section, are available on the curated internet portal. The digital material by no means represents a complete catalogue, and is continually being upgraded. Some of the videos are short snippets that can be saved on mobile phones, such as the *Basic portrait three lights* video from the free educational Media College website (2011). Many of the full electronic versions have been bought through the DUT library and are available from the BM Patel Library (short loans sections) on the MLS campus for both staff and students.

Monte Zucker (2007) (1929-2007) was a strong influence on present day wedding and portrait photography. Zucker's images were simple, yet emotional. The United Nations recognised him as portrait photographer of the year for his photographic experience in the year 2002. The Digital Photography School (2009) newsletter led the researcher to Zucker's collection of modern media, which is now available at the BM Patel Library.

Snippets of the hypertext media are available on the educational portal website by courtesy of YouTube. One of our BTech students referred to Zucker's work as an influence on her chosen speciality. Below are the student's comments about this professional photographer:

Monte's images are simple, direct and emotional. Each of them makes a simple statement. There is nothing in his photographs, except what should be there. All distractions are removed before he takes the photos. What you see, is what he wants you to see. Based on classical tradition, Monte's portraiture has never strayed far from his original intent – to capture a moment in people's lives.

Another free online resource by AoL TV (2011), which is based in New York, was a short video, *How to use window light in photography*. The video

illustrates the simple but popular use of window light portraiture techniques. This type of assignment is taught to all first-year photography students. A similar lighting principle was used by Annie Leibovitz. This is described in a documentary film about her life (Annie Leibovitz - life through a lens: 2008), depicting her evolution as, perhaps, one of the most inspirational photographers for many students.

Bockaert (2001) produced the interactive e-book, *The 123 of Digital Imaging (123di)*. Bockaert's interest in digital technology developed while he was studying for his Masters in Mechanical and Electrical Engineering. His subsequent passion for computers and software made him venture into digital photography, and, in 1997, he started publishing his developed digital imaging content on the Internet. In the year 2003, he produced his first version of the *123di* e-book. When marketing his e-book, he stated: "I developed algorithms to seamlessly transform digital images, published digital imaging content on the Internet, extensively researched image enhancement methods, alpha and beta tested several software packages and developed Graphical User Interfaces". A hyperlinked demonstration version of the e-book is available on the researcher's educational Internet portal.

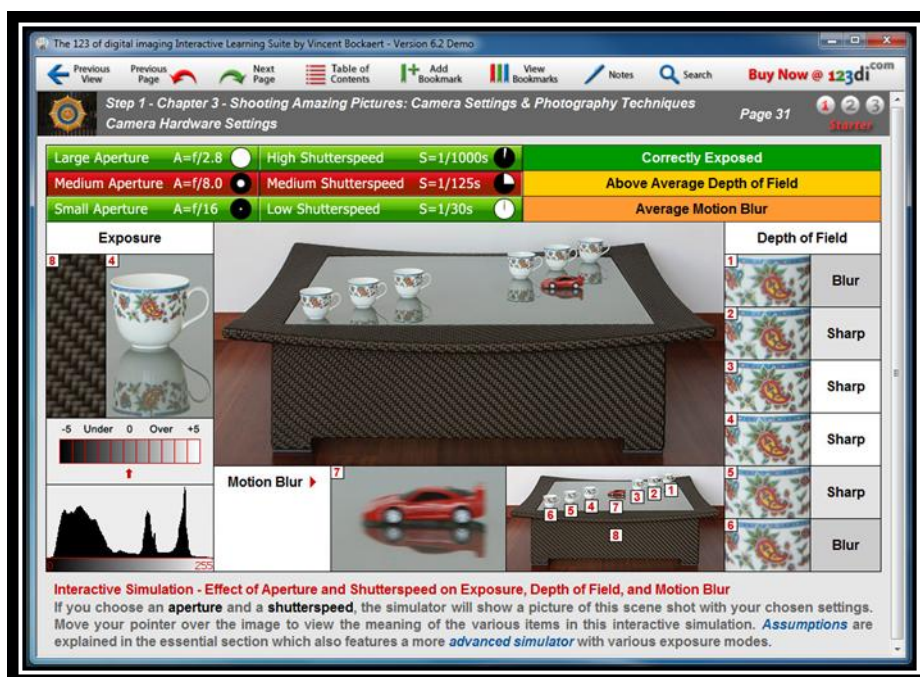


Figure H.1 Exposures and apertures (Bockaert 2001: 31)

The theory application, including analysing histograms and camera RAW principle of the interactive e-book, was tested for visual accuracy with subject leaders and undergraduate photography students for Theory of Photography I and II. Shown as Figure H.1 is a screen image of one of the multimedia lessons discussing the differences and predictable results with the changes in aperture, shutter speeds, depth of field and histograms. This is achieved by navigating the mouse over hypertext links that invoke an action. These are basic, compulsory lessons that all photography students are taught, with the photographic principles involved being applied throughout one's career.

Editing of sections of the e-book was necessary to ensure that the digital simulation could be used by both novice and experienced lecturers, and to ensure the avoidance of foreign terminology with second language students. Based on the principle of the semantic web, that some software can be played on both the receiver and transmitter's computers, standardisation of e-book data was necessary. The initial lecture included still images used in a PowerPoint lecture (which is also appropriate for hardcopy viewing). However, the animated procedure is ineffective.

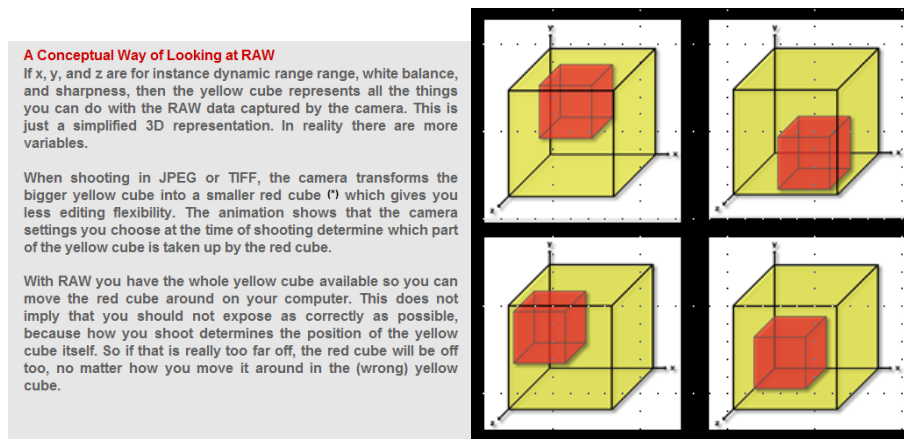


Figure H.2 Camera RAW principle (Bockaert 2001: 537)

Subsequently, with the use of a trial version of the Camtasia software, the researcher digitally edited the hypertext simulations into a MP4 video clip for both the *exposures and apertures* visual (Figure H.1) and camera RAW lectures

(Figure H.2), respectively. The types of multiple formats involved (PowerPoint, hardcopy and video files), effectively illustrate the versatility of the resources available for use across multiple applications. This versatility-for-use fits in with Shneiderman's (2002) guidelines for digital resources, and is a feature of Nayar's (2009) *Bigshot* digital camera project, which could be used to suit diverse pedagogical purposes.

The fourth resource used for this study is the interactive e-book by Evan Sharboneau (2010), *Trick photography and special effects*. An interesting feature of Sharboneau's e-book is that the images are hyperlinked to the original location and/or photographer's site on the Internet. The web links allow users to interact with online community of practitioners (bloggers). The web sites provide an opportunity to comment on the photography, ask clarifying questions and improve one's photography. An interesting feature of the e-book is the hyperlinked feature that allows one to jump to any page to read about the techniques behind the specific image (as prophesied in Bush's 1945 article on the *Memex* idea). However, each technique generally gets more difficult and complex as the e-book progresses.

Another useful feature is the hyperlinked video lessons from the YouTube social media website by the same author (Figures H.3 and H.4) which can be viewed and read as a follow up on the text tutorial, as shown in the two illustrations.

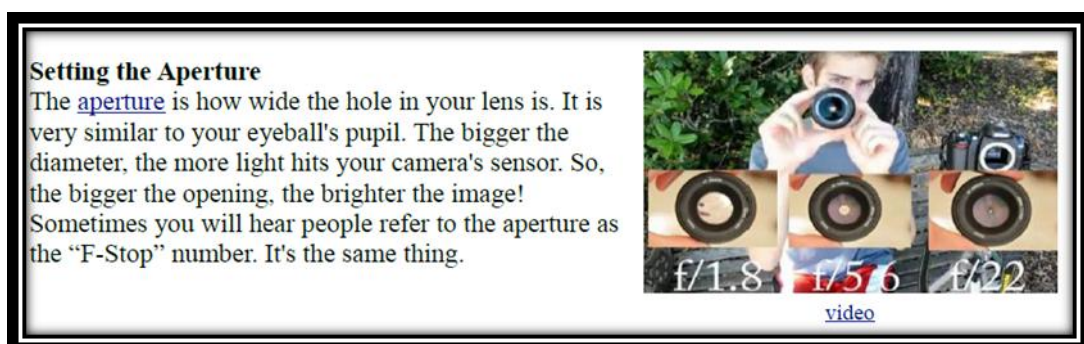


Figure H.3 Setting the aperture (Sharboneau 2011b:14)

The hyperlink to the YouTube video is located below the still image. Furthermore, note the surroundings in the text file and YouTube video screen image, which are identical. The YouTube video tutorials are very informal but explicitly detailed and can be easily understood by the millennial generation of photography students. The researcher believes that the hyperlinked principles of text and video bring to life Bush's 1945 vision of the *Memex* project.



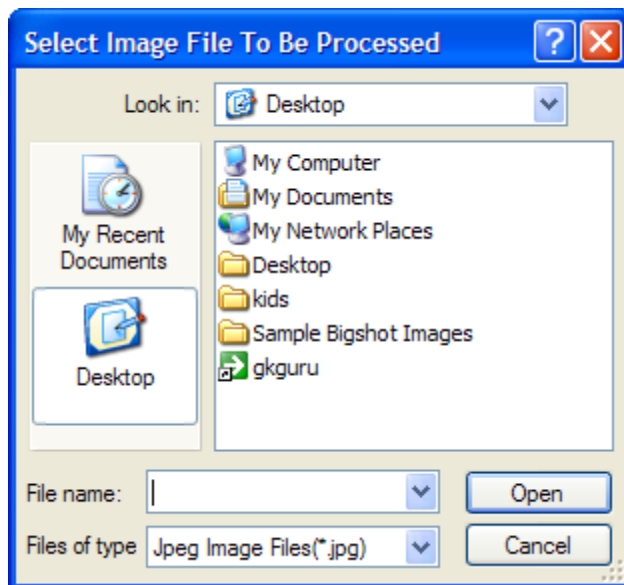
Figure H.4 DSLR Basics: Aperture, shutter speed and ISO (Sharboneau 2011a)

Finally, Shree Nayar (2009), developer of the *Big Shot* digital camera at Columbia University, as discussed in Appendix B, provides excellent “design as science” and “research rigour” guidelines for the artefact (Hevner *et al.* 2004: 83). Nayar explains the hypertext technology that is presented as a means of *Learning by building* and *Expressing by sharing* through mass digital communication. The *Bigshot* camera web page introduces the reader to the camera, provides details on its assembly, and teaches the science of the digital camera (e.g. power to the gearbox, capacitor and circuit board) through simulations and processing the digital image on a computer. All of the above steps are shown in very clear simulated interactive movements, illustrations and correlated text. Following the assembly and capturing of a photograph, the users are shown the procedures for uploading their images onto a computer as shown over in Figure H.5. Nayar's detailed videos provide good guidelines for producing tutorial videos.





- Start the Bigshot software.
- Click on the Process Photo button.



- You will be presented with the dialog box shown on the left.
- Browse and select the Bigshot photo that you want to process and press "Open."
- The software will automatically detect the type of photo (Normal, Panoramic or Stereo) and apply the appropriate warping and other image enhancements.

Figure H.5 Processing photo (Krishnan, Smith and Linh, 2009: [1])

### *Writing materials/resources*

The Bachelor of Technology (Baccalaureus Technologiae 2010:[2]) in Photography follows the guidelines of the South African Qualifications Authority (SAQA) Registration Qualification (SAQA ID 72153). The qualification includes a range of Theory lectures with a general emphasis on the ability to conduct in-depth research into a specific "problem area" and the submission of a thirty-page typed report directly related on the student's specialised subject that correlates with a body of practical work (introduced as an example in Case study two). The students are required to be able to investigate, analyse, manage, communicate and improve research skills for personal and professional development within the photographic ambit by using various

resources. Parts of the process include working with students from across faculties and develop a writing style.

The aesthetic as well as the technical aspects of their work are important. Therefore, the typed report is designed to correlate with the practical component. For this reason, a review report critique is included into the course. Writing coherent reports in conjunction with Applied Photography has challenged students from their first year of study in the Photography Programme. Accordingly, the photography students are taught essay-writing skills from their inception into the programme, as highlighted in Case study 2 (in Chapter 6), as part of the narrative exercise.

Furthermore, The Learning Centre-UNSW (2009:[1]) justified the importance of academic writing by providing the following advice:

Much of the work you produce at university will involve the important ideas, writings and discoveries of experts in your field of study. The work of other writers can provide you with information, evidence and ideas, but must be incorporated into your work carefully. Quoting, paraphrasing and summarising are all different ways of including the works of others in your assignments.

Your lecturers expect you to demonstrate an understanding of the major ideas/concepts in the discipline. Paraphrasing and summarising allows you to develop and demonstrate your understanding and interpretation of a text and to avoid plagiarism. They are important tools for reshaping information to suit the many writing tasks that will be required of you. They also require the analytical and writing skills which are crucial to success at university.

The above highlights the lecturers' expectations of students from across the various DUT Faculties, and is a standard requirement entrenched in programme study guides. Hence, most academics set essay-form assessments to evaluate the student's ability to analyse, synthesis, construct, discuss, reflect and express informed opinion. To better prepare students in their report writing skills, a "generic proposal guide", based on the Faculty of Arts and Design, master's research proposal, was prepared for students use from undergraduate level upwards in the Photography Programme.

## **Section 2: BTech proposal preparation guide and user experience**

Primary research into the University of Wisconsin-Madison's Writing Center (2009) revealed that they are staffed by six professional writing instructors, forty seven doctoral teaching assistants from literary studies, and fifty five undergraduate Writing Fellows. All tutors in the Writing Centre programmes are highly trained, expert readers and are qualified to offer help with writing in all disciplines and at all levels". Other resources used in the guide were obtained from Landsberger (1996), Levine (2008), Scholtz (2008), Starkey (2000), Monash University (2007), Learning Centre of New South Wales (2009), Pratt (2010) and Deakin University (2011).

Relevant writing material guidelines are available on the portal under the Teaching and Learning Resources, reference guide section. The guide includes tutorials on basic writing skills to templates containing various examples of the newly designed BTech specialist proposal form. Extracts of dissertations applicable to the Arts and Design Faculty are included. In preparing this guide, various authors' works (as indicated above) were sourced and include researched examples. They were reproduced in their entirety in compliance with copyright laws, as stated in the respective rules and conditions of usage by the different writers. These notes are available on the educational portal under the resources' section, but are unpacked in blended mode lessons during the Research Methods and Techniques Workshops (part of BTech: Photography).

Part of the pilot study involved "fine-tuning" the proposal guide and the online preparation of two BTech students' dissertations. The students were studying and working part-time, and, mid-way into the year, they liaised extensively via email to complete their dissertations. One student (DM), in particular, who originally wanted to de-register, subsequently changed her mind, worked consistently, and passed with a distinction. Shown below is part of the email discussions with the BTech student between the periods May to September

2011. The researcher believes that direct online discussions can benefit the disciplined student.

### Online discussions with student DM (May-September 2011)

<b>Student DM&gt;</b> Mon 23 May 2011 13:49:53.
I have a question...
Ok, with regards to my BTECH. I'm struggling big time to find the time to shoot images for Btech, as well as work full time, and still run my photography business which seems to take up most weekends. I've considered all my options and, as much as I really don't want to, I might need to go onto part-time studying and finish my degree over two years.
Having said that... is it possible for me to do the written assignments this year, and the practical assignments next year? I have spoken to my Travel coordinator, and he is very confident that my application for my Visa for the USA will go through fine even if I'm registered as a Part-time student. I'm not sure what your thoughts are? But any advice is welcome at this stage! I would love to give up my day job but then I wouldn't be able to afford to live. Unfortunately, this is life I guess ☺
<b>Researcher&gt;</b> Mon, 23 May 2011 14:44:18
<i>Ok, I can understand the juggling. In principle you can complete BTech over 2 years. However, if you are going overseas it can be difficult for practical submission. I will speak to [REDACTED] tomorrow. How long will you be away for or are you going one way?</i>
<b>Student DM&gt;</b> Mon, 23 May 2011 14:57:43
I will be leaving mid-November and returning in May 2012. After which I will then complete my degree. Thank you very much... And please let me know what [REDACTED] says.
<b>Researcher&gt;</b> 23 May 2011 03:14 PM
<i>Call me</i>
<b>Student DM&gt;</b> 14 August 2011 07:34 PM
Please read through this and tell me if I'm on the right path! I sometimes feel like I've missed the boat with this review. Definitely do not enjoy writing! :) And apologies for taking so long!
<b>Researcher&gt;</b> 15 August 2011 06:28 AM
<i>Please can you send me your Title, Aims and Objectives so I have a clear understanding of what you are specializing. I will then be able to offer suggestions.</i>
<b>Student DM&gt;</b> 15 August 2011 07:35 AM
I will be focussing on the desserts and sweets area of food photography. I am not sure if that should be in my title... "Patisserie Food Photography". The way I'm aiming to do this lit review is by starting off at Advertising photography and eventually ending off at Food photography.
<b>Researcher&gt;</b> 28 August 2011 07:42 AM
<i>Please refer to the edited version of your aims and literature review. In the proposal write in the future tense and try and use the second person. For example instead of 'I will take' say 'the candidate will do the following....'. Please note I have completed a quick edit based on what you have given me.</i>

<p><i>Also remember that part of the literature review will go into your final dissertation.</i></p> <p><i>Please also note if I am not happy with progress then I will ask you to submit next year. I am aware that working and study makes it difficult to complete in a single year. I will decide next week after you have shown me some practical desserts and sweet images either on the computer or email.</i></p>
<p><b>Student DM&gt;</b> Wed, 31 Aug 2011 08:46:35</p>
<p>Attached is the proposal... I'm just quickly researching an ancient recipe then will send the completed version.</p> <p>Am I on the right track so far?</p> <p>What about the shoot planning? I should edit that too?</p> <p>Thank you so much for this.</p> <p>Will send through the other info shortly. :)</p>
<p><b>Researcher&gt;</b>02 September 2011 07:55 AM</p>
<p><i>Attached please receive another copy of [REDACTED] BTech dissertation. Please follow the same layout and numbering procedure throughout your report. Arial Font 11, 1.5 line spacing, 3cm from left etc</i></p> <p><i>The Title, Aims and Objectives which you have redone should be transferred into the Btech report. You have done an extensive Literature Review in your proposal so the info can be transferred into various subsections such as Introduction and History of Patisserie Food Photography. Re-edit your paragraphs. 1 sentence does not make a paragraph. I would also like to see some of your food images not later than Monday. I will be in until 10.00 am on Monday.</i></p>
<p>Good luck</p> <p>Taking too long to upload the attachment. download or view from <a href="http://docaweb.dut.ac.za/moodle/file.php/75/Teaching_and_Learning_Resources/Dissertation_Samples/schoeman.pdf">http://docaweb.dut.ac.za/moodle/file.php/75/Teaching_and_Learning_Resources/Dissertation_Samples/schoeman.pdf</a></p>
<p><b>Student DM&gt;</b> Wed, 14 Sep 2011 10:34:22</p>
<p>Is it too late to phone you? I lost track of time. I'm busy working through this dissertation. Will send some work through this evening.</p> <p>Kind Regards</p>
<p><b>Researcher&gt;</b> Thu, 15 Sep 2011 03:18:51</p>
<p><i>Will get back to you later this morning.</i></p>
<p><b>Student DM&gt;</b> 15 September 2011 07:00 AM</p>
<p>Jeepers, I thought you were joking when you said you'll be awake at 2am to receive my work!:) )</p>
<p><b>Researcher&gt;</b>Sent: 15 September 2011 09:54 AM</p>
<p><i>Ok you are on the right track.</i></p> <p><i>NOT OKAY to use last year's photographers because YOU WILL SIGN A DECLARATION THAT NO WORK HAS BEEN PREVIOUSLY SUBMITTED for examination purposes. However you can use other information from the same photographers that was not submitted. Check out the site I sent you this morning and make reference to the Food expo which will impress the moderator. Read my comments in the edited version and keep your references style consistent.</i></p>

<b>Student DM&gt;</b> 19 September 2011 01:44 PM
<i>Researcher comments in Italics in original email</i>
Can I add some images that I have taken through my work experience to chapter 5? Yes. <i>It is evidence of your work.</i>
I found these forms in my reflective journal study guide that look like they need to be completed by a hosting photographer? Is this still relevant?
<i>Also very relevant as they will go as a separate portfolio of evidence. You can refer to it in your report and if you cannot hand in by this Wednesday then you can do so not later than this Friday.</i>
I have just about completed my dissertation, just tweaking it a little. Can I send it to you again for a once over? Yes do so. <i>You also need to give me a single document of your entire dissertation on a cd.:)</i>
<b>Researcher&gt;</b> 19 September 2011 09:40 AM
<i>My comments are in Italics.</i>
<i>Avoid slang, Change font to Arial.</i>
<i>Add New cover title page, Abstract, List of illustration, contents page etc as per [REDACTED] layout.</i>
<i>When ready, complete and print 2 copies, 1 for department and 1 for library.</i>
<i>Ring bind.</i>
<i>To be delivered to me this Wednesday 9.00am</i>
<b>Student DM&gt;:</b> 19 September 2011 07:34 PM
Here it is!!! I hope this is the last I will have to work on this dissertation. They in separate parts because of the page numbers. If something doesn't make sense, please let me know. I've been working on this the entire day and I only got 1,5 hrs sleep last night.
Thanks again for all your patience, encouragement and support!
<b>Researcher&gt;</b> 20 September 2011 05:58 AM
<i>You can sleep tomorrow. Today you have more cosmetic work to complete. You are almost there for a star. Don't lose it now.</i>
<i>Please go through it one more time and rectify my comments before printing.</i>
<b>Student DM&gt;</b> 20 September 2011 01:40 PM
Your silence is worrying me! :)
Are you still busy check my work or can I go ahead and print?
<b>Researcher&gt;</b> Tue, 20 Sep 2011 13:49:51 +0200
<i>Sent you feedback 1 minute ago</i>
<b>Student DM&gt;</b> 20 September 2011 01:52 PM
Hahhahahaha, I obviously sent you an e-mail as you were sending one to me. Thanks for the feedback.
Kind Regards

# BTECH PRE-PROPOSAL EXAMPLE



<b>Faculty</b>	Arts and Design			
<b>Department</b>	Visual Communication Design			
<b>Qualification</b>	BTech: Photography			
<b>Student Surname</b>	[Fill in personal details here and below.]		<b>Student No</b>	
<b>First Names</b>			<b>Title</b>	
<b>Address</b>				
<b>Tel (W)</b>	<b>Tel (H)</b>	<b>Cell</b>	<b>Fax</b>	<b>e-Mail</b>
<b>Title of Dissertation/Thesis</b>				

<b>Supervisor / Promoter</b>				<b>Title</b>	
<b>Tel (W)</b>	<b>Tel (H)</b>	<b>Cell</b>	<b>Fax</b>	<b>e-Mail</b>	
<b>Joint Supervisor/ Promoter</b>				<b>Title</b>	
<b>Tel (W)</b>	<b>Tel (H)</b>	<b>Cell</b>	<b>Fax</b>	<b>e-Mail</b>	

**Section B: To be typed in Arial 11-point font in 1.15 spacing (expand sections to fit contents, but keep within the specified maximum lengths.)**

## 1. Field of Research and Provisional Title

*Provide the field of 1 specialisation and the provisional title of the project, with a brief description, if the title is not self-explanatory.*

In the initial stages of proposal writing use this section to produce a working title.  
It will explain to the reader what you are doing and will describe the depth of your topic.  
You could include a brief summary and introduction to the specialist areas  
As you progress the title should become clear and in line with the research that will be undertaken.

## 2. Context of the Research (Reasons for choosing the topic)

*This section provides the general information regarding the study that will be undertaken and should make it clear why the areas of specialisation are worth addressing. It sketches the background and, if appropriate, should identify the theoretical framework within which the problem is to be addressed. (Maximum length: 50 words)*

This section can be used to indicate if the project is achievable.  
It also discusses whether the study is clearly provided in detail for the reader to understand the context and the purpose of the study.

### Example Documentary Photography

██████████, my area of focus, is an urban township, South of Durban, built by the apartheid government to

accommodate Coloured people during the era of forced separation and removal. It is against a backdrop of steel pipes, huge industrial silos and constantly flowing gas and smoke emissions that we find a community struggling with -cultural problems. “A substantial share of work in Wentworth is illegal and related to theft, sex-work, trafficking in women and children, and drugs.”

This study will illustrate how understanding the lived experience of a community facilitates the production of a photo-documentary especially of communities facing very specific problems (██████ 2010).

### 3. Aims and Objectives

*This section should either set out the specific areas of specialisation problems which are to be solved/investigated. It should indicate clearly what the study intends to achieve and how the portfolio exhibition will be presented for examination (Maximum length: 100 words)*

The **aim** of this study (██████ 2008) will be to investigate the social cultural context of ████████ and produce a photo-documentary. In trying to achieve this aim the following key questions will be asked

1. What defines ████████ (race, class, attitudes, religion, living conditions)?
2. What defines ████████ problems (crime, gang culture, social equality)?
3. What are the determinants of these problems (poverty, unemployment, education)?

#### Objective

To exhibit my photographs in a gallery or publish in a book

### 4. Literature Review

*Include a critical review of relevant master photographers including one South African and their influences on the students' specialist areas. Use a consistent style of referencing and refer to **recent author sources** as well as older seminal works. Demonstrate how the literature review /influences links to your topic and the aims and objectives. (Maximum 500 words.)*

Develop the literature review section according to a coherent and logical pattern.

Do not simply discuss each author, book or journal article one after the other. Instead decide on an appropriate format for discussing prior research in the light of your own research.

Prepare a reading list. Check through authentic data bases of previous studies (library).

Define your topic.

State theories or examples of prior studies (History). This could include holding an interview with people who may be involved in this type of study.

Include prior research (Influence of Master Photographers).

Include current research.

State the value of the research (why is your topic useful/how would you market yourself?)

The history of the topic identifies prior studies and a time line which indicates the arguments used in the discussion

Tie what you have researched with your personal study.

██████ (2010) reaffirms the importance of the Literature Review by stating “the student needs to understand that the literature review is a discussion of the literature (and not their own investigation). .....It is as if one is writing about an imaginary discussion that was held amongst all the authors and in relating this discussion to the reader, you may include snippets of your own opinions regarding what they have said.

### 5. Methodology

*You are advised to cover key aspects related to the study type, target population, research design, data collection methods, any limitations, sampling techniques, questionnaire design, equipment, facilities, modes of transport, handling of inclemental weather, models, props, permission schedule. (Maximum 100 words)*

#### Example 1

The writer will use a qualitative methodology and a historical approach. The candidate will collect and analyse secondary data currently available from the Internet, academic reports, periodicals, books and journals regarding Multimedia Centers nationally and abroad.

Primary data will be collected in the form of interviews, questionnaires and/or visits to some of the established Multimedia Centers at South African educational institutions and trade exhibitions. In addition the candidate will obtain primary data regarding .....



The research project will consist of a practical component consisting of multimedia based programs which will be carried out in the existing Photographic Unit, equipped with a limited range of digital equipment. For specific projects additional resources/expertise will be co-opted from across campus... Opportunities will be explored and attempts made to team academic requirements with student projects under the supervision of the candidate.

## Example 2

Existing scholarly texts will be referred to in the quest to highlight aspects regarding the history and theory of and the relationship between Symbolism, Expressionism and Surrealism. The author's work was compared with the work of Surrealist artists.

## 6. Plan of Research Activities

*Provide a summarised work plan (year planner) for each month of the project giving information for each activity per week, under the following headings:*

Activity

Timeframes (target dates for the duration of the project. Explain exactly what and how you will plan for your exhibition between February 2011 and October 2012

## 7. Structure of Dissertation / Thesis Chapters

*Briefly state the proposed content of each Chapter in one clear sentence per Chapter.*

## 8. Potential Outputs

*Provide details on envisaged measurable outputs (e.g. publications, exhibitions, webpage, blogs, etc.)*

## 9. Key References

*List a maximum of 5 key references which you may have cited in the above sections using a consistent referencing style (e.g. Harvard).*

Deidre Pratt (2011) Research Co Ordinator Faculty of Arts and Design.

Deakin University, 2011. *What is a Literature Review?* [Online].

[Cited References]; Afolabi (1992), Bourner (1996) Bruce (1994).

Available: [http://www-development.deakin.edu.au/wmt/delete\\_from\\_uat.phpAs](http://www-development.deakin.edu.au/wmt/delete_from_uat.phpAs)

Accessed 3 May 2011.

The Writing Center at the University of Wisconsin Madison (2011). *Review of Literature.*

Inserted from: <http://www.wisc.edu/writing/Handbook/ReviewofLiterature.html>

Accessed 20 August 2008.

**I HEREBY DECLARE THAT THE ABOVE FACTS ARE CORRECT.**

**Student Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

## 10. Declarations

### Student Declaration

**I, the undersigned, certify that:**

- I am familiar with the rules regulating qualifications at Durban University of Technology (DUT), and understand the seriousness with which DUT will deal with violations of ethical practice and plagiarism in my study.
- Where I have used the work of others this has been correctly referenced in the proposal and again referenced in the reference /bibliography section. Any research of a similar nature that has been used in the development of my researched project is also referenced.
- This project has not been submitted to any other educational institution for the purpose of a qualification.
- All subsidy-earning outputs (artefacts and publications) from current studies will be regarded as the property of the Durban University of Technology for subsidy purposes.
- Where patents are developed under the supervision of the Durban University of Technology involving institutional expenditure, such patents will be regarded as joint property entitling the Durban University of Technology to its share, subject to the Durban University of Technology's policy on the Management and Commercialisation of Intellectual Property.
- I understand that I may be expected to publish an article based on my research results or my work may be published by DUT for promotional purposes.
- I understand that plagiarism is wrong, and incurs severe penalties.

I HEREBY DECLARE THAT THE ABOVE FACTS ARE CORRECT.

**Signed:** \_\_\_\_\_

**Date:** \_\_\_\_\_

(Student )

**Supervisor/Promoter Declaration**

- (a) I approve the student's provisional title of research project.
- (b) I acknowledge that the topic is researchable and the student has the potential to complete the project in the suggested time frame allowed.
- (c) I am satisfied with and approve the research proposal;
- (d) \*I approve of the Joint Supervisor(s)/Joint Promoter(s) proposed by the HOD.
- (e) I have checked that the student has complied with all the instructions outlined in the Study Guides.
- (f) I accept responsibility to advise and guide the student.
- (g) I accept the appointment of Supervisor/Promoter/Co Examiner.

*\*delete and sign alongside if not applicable*

**Signed:** \_\_\_\_\_

**Date:** \_\_\_\_\_

(Supervisor/Promoter/Co Examiner)

### Head of Department Declaration

I, \_\_\_\_\_

(Full name of Head of Department)

- (a) Confirm that the candidate possesses the relevant academic abilities qualifications.
- (b) Have read the research proposal and I am satisfied that the topic is in line with the level of qualification.
- (c) Confirm that, as far as can be ascertained, the candidate will be able to complete the project in the stipulated time frame.
- (d) Approve of the topic/field of investigation.
- (e) Propose the Supervisor(s)/Promoter(s) and Joint Supervisor(s)/Joint Promoter(s) detailed above (delete which not applicable);
- (f) Recommend that the student's project be accepted.

**Signed:** \_\_\_\_\_

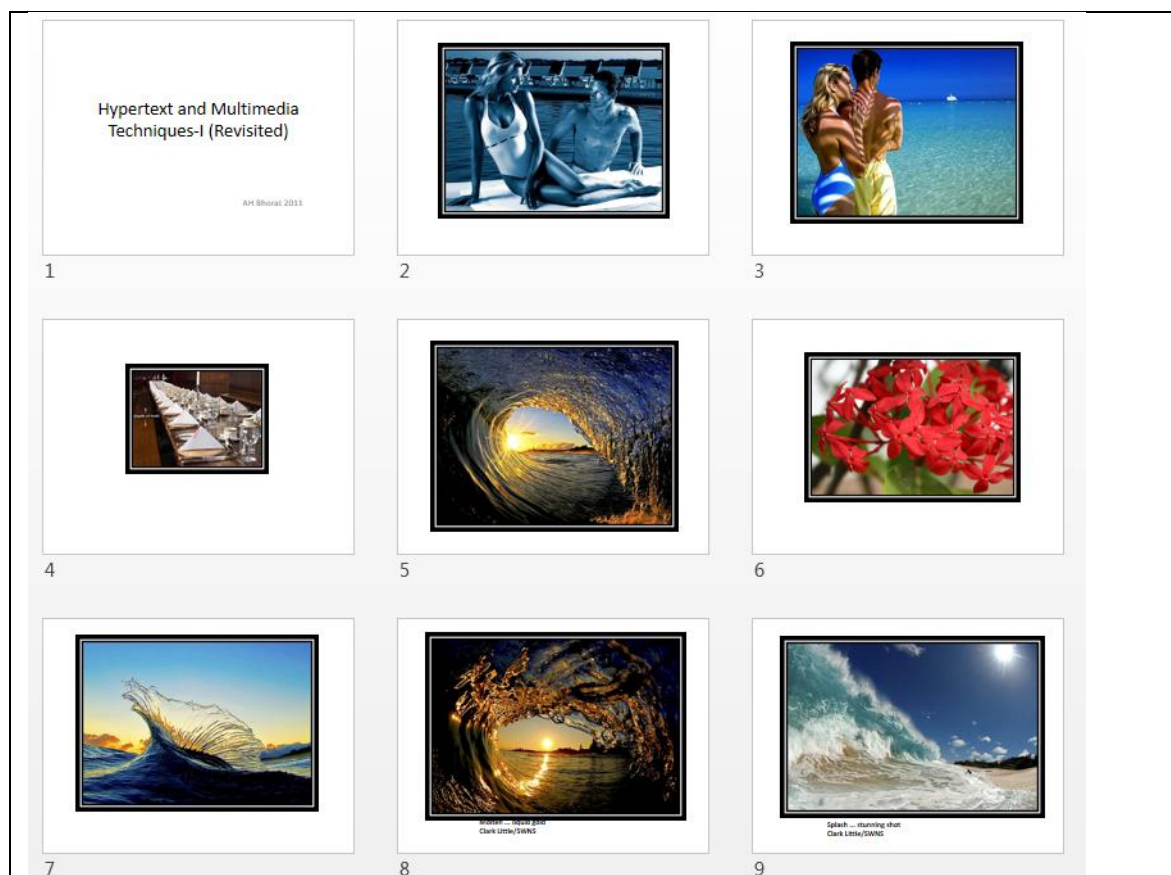
(HOD)

**Date:** \_\_\_\_\_

# APPENDIX I: FIRST-YEAR STUDENT SURVEY

This appendix contains the PowerPoint images and written responses to the questions on Internet use with the First-year students (Techniques 1 - 26 May 2011).

## Section 1: PowerPoint images





## Digital Camera Modes



- Auto mode tells your camera to use it's best judgement to select shutter speed, aperture, ISO, white balance, focus and flash.
- This mode will give you good results in many shooting condition
- It is a safe option
- The camera will guess what you want
- You do not have control over anything extra (Rowse: 2011).

## Portrait

- Select Portrait mode when you want to photograph a person – usually showing their face.
- The best portrait results are achieved when the subject is well focused, but the background is out of focus.

The camera increases the aperture in this mode to get a small depth of field. This places only the subject in focus (see page 102).

When you switch to portrait mode your camera will automatically select a large aperture (small number  $f/5.6$ ) when you take your background out of focus (i.e. sets a narrow depth of field – ensuring your subject is the only thing in focus and is therefore the centre of attention in the shot).

## Macro

- Close up shots of flowers, insects etc require the camera to focus on an object that's close to the lens.
- Macro mode provides just that using by using the macro lens of the camera (Peterson 2013).
- Macro mode lets you move closer into your subject to take a close up picture (7.20).
- Good for shooting flowers, insects or other small objects.



















































































[illegible]

**Bockeart (Simulation)**

**Test Environment**

The basic loop operates and challenges digital exposure depth of field (DOF) and motion blur. We created a controlled test environment, a coffee shop laid out designed to fit with a 1.6 frame DOLBY Vision v1. There are 10 cameras on a tripod. On the other side is a simple control panel that receives hand signals via a TV. In front and behind the grill of the top row, two operators usually appeared out. Although this is not a common situation, the advantage of the controlled setup allows us to see the above mentioned relationship clearly as we can keep certain parameters constant (such as the lighting, position of the objects, etc).

**DoF Simulation** THALES AIRBUS

A combination of 6DOF and 7DOF simulation requires the system experience that is unique within the world. This unique model can be used for a wide range of applications, from the design of new aircraft to the development of new flight simulators. The system is designed to be used for a wide range of applications, from the design of new aircraft to the development of new flight simulators. The system is designed to be used for a wide range of applications, from the design of new aircraft to the development of new flight simulators.

21

[illegible]



28



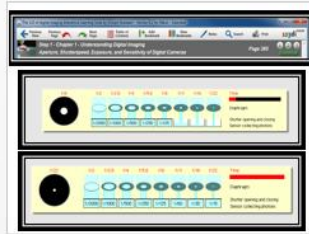
29



30



31



32



33



34



35



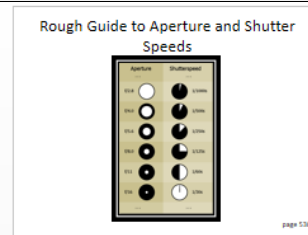
36



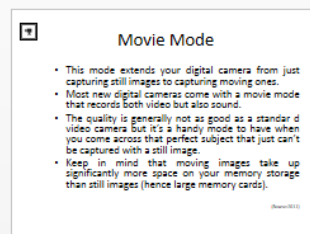
37



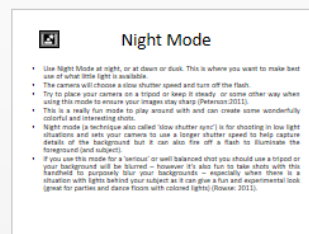
38



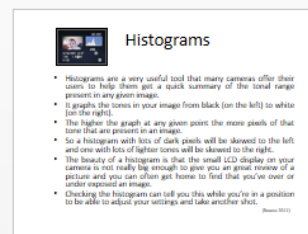
39



40



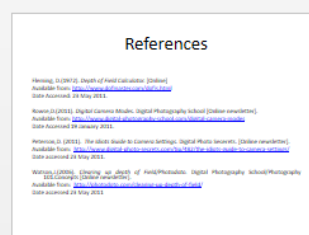
41



42



43



44



## Section 2: Techniques 1- Unedited student written responses

Boldface highlights comments intended for further discussion-addressed at the debriefing session held on 18 November 2011.

Questions	Comments
<p><i>Indicate the option that best describes your agreement with the statement provided. Give brief reasons to substantiate your answers.</i></p> <p><i>Choose: Strongly agree, Agree, Disagree, Strongly Disagree</i></p> <p>6. The Internet is more beneficial than it is harmful?</p>	<p>1. Agree it is beneficial if you looking for something positive at some point it is harmful because that you don't or did not ask for sometime just pop up on your screen. Like games, competitions and pornographic advertisement.</p> <p>S2. Strongly agree. I use the Internet to do research for educational purposes. Keep in touch with friends and for entertainment. So it is not harmful. If you use it for good purposes.</p> <p>S3. I agree it a grate source for finding information about whatever you want to research about. Most of us tend to use it for the reasons of downloading songs and networking. But it can be realy educational.</p> <p>S4. Agree; because it is a useful tool to get information, entertainment and keeping in touch with family and friends.</p>
	<p><b>S5. Agree: I say so because it is where we get too relevant information to what we are looking for. It is also beneficial because everything you need which is not on the books it is highly possible to find it.</b></p> <p><b>S6. Yes the Internet is more beneficial than harmful because you get to learn things and it is more interesting and very easy to excess.</b></p> <p>S7. Agree-because most of lecture what you find in Internet is for people to get help in different ways than those harmful sha77.</p> <p><b>S8. Strongly agree because most of the assignment we are given needs us to use the Internet in order to have informal and it to a student on how we use it whether it will benefit them or not.</b></p> <p>S9. Agree. The Internet can be used, as and educational tool for teaching and learning process.</p> <p>S10. Agree, because it helps so many people everyday and we rarely hear about the bad stough!</p> <p>S11. I agree with the above statement because I can learn about almost anything with the use of the Internet. I can contact almost anyone at any time, if they are linked with the Internet.</p> <p>S12. Agree, we are able to connect with the world like never before. It has made gathering information more accessible and social networking has allowed us to keep in touch easier.</p> <p>S13. Agree, because some of the stuff from the Internet can put you in jail but most of it is beneficial, since we learn new things daily on it.</p> <p>S14. Agree via Internet you get exposed to things you didn't know, whenever you come across with something you didn't know and you want to learn more Internet is always the first thing to think of. Yes some other people misuse the Internet.</p> <p>S15. I agree because the time I spend doing nothing, I just go to the Internet and search for things, that I need information on. So it beneficial for me.</p> <p>S16. Strongly agree. You can get everything from the Internet from around the whole world.</p>

Questions	Comments
	<p>S17. Agree, it allows people to connect with family and friends. It is very informative.</p> <p>S18. Agree-Internet is a form of learning even though it has its harm. I think it has more good than bad.</p> <p>S19. Agree. Ever since the invention of the Internet, it has befitted and helped us in our everyday lives with regards to entertainment, pollication, keeping in touch with friends, payments, downloads but at the same time is has caused many problems/issues such as fraud, money being stolen, viruses, plagiarism etc.</p> <p>S20. It is both good and bad, in a sense that, the information can be misleading and it can be useful when researching on certain assignments/topics.</p> <p>S21. Strongly agree-There is so much information available,</p> <p>S22. Strongly agree</p> <p>S23 Agree. It provides instant access to information. I still prefer using books as a reference for assignments</p>
7. Is the Internet a good forum on which to learn?	<p>S1. Yes because you can find everything you looking for within a blink of an eye</p> <p>S2. Yes it is a good forum to learn, because you need Internet to interact with people.</p> <p><b>S3. Although you find there is not accurate it is very good in learning. You always have to have a second opinion though to support your research that you got.</b></p> <p><b>S4. Strongly agree, It has vast amounts of information and its updated daily. It is easily accessible.</b></p> <p>S5. Yes because we are able even to download PDF and book that help us to understand and succeed in our academic year of study.</p> <p><b>S6. Yes it's a good forum to learn because almost everything you want to know is on the Internet and it is easily accessible.</b></p> <p><b>S7. Agree-with Internet you can learn more important things that you need to know and you always get want when you using Internet.</b></p> <p><b>S8. Sometimes if the work is valid and from sources that are related to what you will be looking for.</b></p> <p>S9. Yes because there are many sites which offer vast quantities of information at our fingertips.</p> <p><b>S10. Yes! because it is easy to access and if you find the right website the information is reliable and factuouse.</b></p> <p>S11. Yes the Internet is a good forum to learn.</p> <p><b>S12. Yes gathering information is faster and more accurate and referencing is easier. It allows us to get in touch with many different sources.</b></p> <p>S13. Agree, it makes things to be simple and it kep people entertained while they learn.</p> <p>S14. It is a good forum to learn. Its always there any time you need it. 24 hours a day.</p> <p><b>S15. Yes, because it where you explore everything but what is wrong with me is I sometimes do cut and paste without understanding the sentence or the statement that will cleer me still with no knowledge. But to be a good forum it is as I'm not that talkative in class so I'm not shy to ask the computer.</b></p> <p>S16. Strongly Agree</p> <p>S17. Yes</p> <p>S18. Yes</p> <p>S19. Yes it is because it has so much relevant information that helps with assignments or info needed.</p>



Questions	Comments
	<p>S20. Agree, the Internet assist when the books required for research on assignment are at a minimum.</p> <p>S21. Strongly agree- there are many sores to get info.</p> <p>S22. Agree S 23. Agree, provides access to Photoshop tuts and photography podcasts, etc</p>
8. In your opinion state what characteristics make a website useful?	<p>S1. The user can make it useful and at the same time the user can make it useless.</p> <p>S2. Information about education and entertainment.</p> <p><b>S3. The direct shortcuts of information. Have not long information that is not accurate to us straight. Just plain accurate and to the point.</b></p> <p><b>S4. I has to be user friendly, provide links, eye catching and fun.</b></p> <p>S5. downloads, keeping in touch with people, Advertise your talent</p> <p>S6. Good lesson. It was very informing.</p> <p>S7. Information you find on the website.</p> <p>Job opportunities</p> <p>Communication with others.</p> <p>S8. colour of the website</p> <p>Important information</p> <p>easy access</p> <p>S9. Easy to understand, well written and condensed.</p> <p>S10. Easy access to information or data and reliable sources</p> <p><b>S11. The content that is on the website.</b></p> <p><b>The images and information that is found on the website.</b></p> <p>S12. The information it displays and the intended nature of the website.</p> <p>S13. Agree, most of the websites are useful, they keep people connected, share new things and life experiences.</p> <p>S14. Google, communication, fun learning</p> <p>S15. It is to have a bibliography.</p> <p>S16. Blank</p> <p>S17. Blank</p> <p>S18. If it has entertainment and an educational things in it than it can be useful.</p> <p><b>S19. Lots of relevant information, links.</b></p> <p>S 20. Blank</p> <p>S21. Content information Prity Pics</p> <p>S22. user- friendly</p> <p>informative</p> <p>attention keeping</p> <p>S23. Easy navigation, significant content (valid content)</p>
9. Other comments (if any)	<p>S1. Blank</p> <p>S2. Blank</p> <p>S3. Blank</p> <p>S4. Blank</p> <p>S5. We must be log out when we are on YouTube at the digital lab because some of us use it wisely not for fun.</p> <p>S6. Good lesson. It was very informing.</p> <p>S7. Blank</p> <p>S8. Blank</p> <p>S9. Blank</p> <p>S10. Blank</p> <p>S11. Blank</p> <p>S12. Blank</p> <p>S13. Blank</p> <p>S14. No comments</p>






Questions	Comments
	<p>S15. Blank  S16. Blank  S17. Blank  S18. Blank  S19. Blank  S20. Blank  S21. Blank  S22. Line across  <b>S23. As discussed during feedback /debriefing class comments.</b>  <b>-students use the Internet for purposes other than tech work which affects students who want to work.</b>  <b>-prefer lectures, not solely online lectures</b></p>
<p>10. In a few lines clearly state your opinion of using hypertext and multimedia as teaching tools?</p>	<p>S1.Hypertext and Multimedia are good tools especially if we were talking about something in class and like half of the students in class don't know that thing, <b>the lecture can quickly google it and show it to the class.</b>  <b>Multimedia is also good for projecting videos of pictures to the whole class. Notes can be projected rather than writing them on the board.</b>  S2. It is a good tool. It is helpful to any photographer whether an amateur or professional, because it teaches you to take a photograph in a very good way.  <b>S3.To the multimedia side of photography, the lecture was very influential in terms of under and overexposing technics that you need to know as a photographer.</b>  S4. Think they are very beneficial to a learner, makes learning more interesting, allows interactions and its free flowing, one doesn't struggle with papers and books.  This was very helpful.  <b>S5. My opinion is that todays lecture has helped me a lot because it summarises everything we have learned in a short time. It also helps us to refresh our minds about what we have read before in our lectures.</b>  <b>S6. It did helped and it was fast. The lesson did not take long and it was very easy for us as student to get to understand as everything was explained as we are looking.</b>  S7. Hypertext and multimedia I don't think we can use them as teaching tool because most of 2re sha7f find here is useful.  <b>DELETED WITH NEW ANSWER.</b> Yes we can treat hypertext and multimedia as a teaching tools because you also learn when you use them and you also get information, you need to know.  S8. Shows the information more clearly  Makes you understand  Improves the seeing skills.  <b>S9. Yes, as they both add to the lecture in terms of visual presentation.</b>  S10. It can help to make you understand more about whatever you are wanting to understand.  <b>S11. It makes the understanding better</b>  <b>-It helped me , I felt I have gotten a better understanding of the lecture</b>  <b>-makes the lesson a bit more exciting</b>  <b>-I was able to view what was been said.</b>  <b>S12. When things are shown and described visually, you get a better understanding of the information your receiving. When you have a better understanding visually it is embedded into your mind, thus making it easier to remember.</b></p>

Questions	Comments
	<p><b>S13. Agree, some of the stuff is easily understandable, when it going with picture. It become easy. I learn more today in the presentation, and I wish all classes will be the same as it more understandable.</b></p> <p><b>S14. It helped me because everything is in front of me, the examples, its easy to remember something you have seen before than what you have been taught.</b></p> <p><b>S15. Using multimedia is good it helps me a lot. I'm a person who forget easily if I didn't see an image but what I can say is the use hypertext teaching tools is so useful. It gives a clear understanding you can always closeup and show and read all the information that appear on the screen.</b></p> <p><b>S16. Oh well it is a teaching tool, because even now I know things that I usually see in my camera and don't understand but know I know them very well. In terms of apertures and shutter speed I understand how to set them in any project or assignment.</b></p> <p><b>S17. It is very convenient and it saves a lot of time. It makes the lesson more interesting and less complicated. Time is saved because everything is digital.</b></p> <p><b>S18. It is a good teaching tool as a student get to see and understand what is being lectured. Seeing is the best tool for learning and remembering. You get to see what being taught.</b></p> <p>S19. Using hypertext and multimedia as teaching tools is a good way of teaching as it is more useful and helpful and helps understand more. S20. Blank</p> <p>S21. Yes it is a very good teaching tool because you do not need to be with the teacher to learn and they can convey the info over the Internet.</p> <p>S22. This is a good way to expand on knowledge in a body of writing.</p> <p>S23. It is a useful tool but is easy to get sidetracked if not careful.</p>

# APPENDIX J: SECOND-YEAR STUDENT SURVEY

This appendix contains the PowerPoint images and written responses to the questions on Internet use and the use of Hypertext and Hypermedia as teaching tools with the Second-year students (Techniques 2 – 13 July 2011).

## Section 1: PowerPoint images

<p>Hypertext and Multimedia Techniques-II (Revisited) Colour Balance/Histograms</p> <p>AH Bhuvai 2011</p>	<p>WHY Colour Balance ?</p>  <ul style="list-style-type: none"> <li>• simplest reason we adjust white balance is to get the colors in your images as accurate as possible.</li> <li>• why? after capturing the images they may have an orange, blue, yellow etc look to them.</li> <li>• describe the fact that to the naked eye the scene looked quite normal.</li> <li>• images with different sources of light have a different 'colour' (or temperature) to them.</li> <li>• fluorescent lighting with a bluish? ??? cast to photos whereas tungsten (incandescent) yellow lights add a yellowish tinge to photos.</li> </ul> <p>Source: <a href="http://www.digitallife.com/white-balance.html">http://www.digitallife.com/white-balance.html</a></p>	 <ul style="list-style-type: none"> <li>• different temperatures range from the very cool light of blue sky through to the very warm light of a candle.</li> <li>• generally don't notice this difference in temperature because our eyes adjust automatically for it.</li> <li>• So unless the temperature of the light is very extreme a white sheet of paper will generally look white to us.</li> <li>• digital camera doesn't have the ability to make these adjustments automatically and sometimes the photographer will need to treat different light to produce a neutral photograph.</li> <li>• for cooler (blue or green) light you'll tell the camera to warm things up and in warm light you'll tell it to cool down.</li> </ul>
<p>Adjusting White balance</p> <ul style="list-style-type: none"> <li>• different digital cameras have different ways of adjusting white balance</li> <li>• you'll need to use your camera's manual to work out the specifics of how to make changes;</li> <li>• or you can use the automatic and semi-automatic modes to help you make the adjustments;</li> </ul>	<p>Preset White Balance Basic Settings</p>  <ul style="list-style-type: none"> <li>• Auto: This option lets camera adjust white balance automatically.</li> <li>• Daylight: This option is used when shooting in daylight.</li> <li>• Cloudy: This option is used when shooting in cloudy conditions.</li> <li>• Tungsten: This option is used when shooting under tungsten (incandescent) light.</li> <li>• Fluorescent: This option is used when shooting under fluorescent light.</li> <li>• Custom: This option allows you to set a custom white balance.</li> </ul>	<p>Manual White Balance Adjustments</p> <ul style="list-style-type: none"> <li>• In most cases you can get a pretty accurate result using the above preset white balance modes – but some digital cameras (Pro DSLRs and higher end point and shoot) allow for manual white balance adjustments also.</li> <li>• The way this is used varies a little between models but in essence what you do is to tell your camera what white looks like in a shot so that it has something as a reference point for deciding how other colours should look.</li> <li>• You can do this by buying a white (or grey) card which is specifically designed for this task – or you can find some other appropriately coloured object around you to do the job.</li> <li>• I've done this with the following two shots.</li> <li>• The first shot is one of some books on my wife's bookshelf taken in Auto White Balance mode. The light in my room is from three standard light bulbs, and as a result the image is quite warm or yellow.</li> </ul> <p>Source: <a href="http://www.digitallife.com/white-balance.html">http://www.digitallife.com/white-balance.html</a></p>
 <p>What colour is this? Basic</p> <p>The first shot is one of some books taken in Auto White Balance mode. The light in my room is from three standard light bulbs, and as a result the image is quite warm or yellow. Source: <a href="http://www.digitallife.com/white-balance.html">http://www.digitallife.com/white-balance.html</a></p>	<p>Manual White Balance</p>  <p>After adjusting the white balance, the image appears more neutral. Source: <a href="http://www.digitallife.com/white-balance.html">http://www.digitallife.com/white-balance.html</a></p>	<p>Colour Temperature</p> <ul style="list-style-type: none"> <li>• What is 'colour temperature'? What is a value</li> <li>• colour temperature is a measurement of visible light that has important applications in lighting for photography.</li> <li>• The colour temperature of light sources is denoted by the following table (approximate):</li> <li>• The temperature (expressed in kelvins or K) at which the heated black body radiates the colour of the light source is that source's colour temperature. For a black body source, the directly related Planck's law and Wien's displacement law.</li> <li>• Ideal of color space: Available only to light that is visible to the human eye.</li> <li>• 2700 K - Match flame</li> <li>• 3000 K - Candle flame</li> <li>• 2700-3200 K - Incandescent light bulbs (tungsten)</li> <li>• 3300 K - Studio "CP" light</li> <li>• 3500 K - Studio lamp, photoflood, etc.</li> <li>• 4000 K - Moonlight, some arc lamp</li> <li>• 5000 K - Noon daylight</li> <li>• 5500-6500 K - Typical daylight, Speed light lamp</li> <li>• 6000 K - Daylight, overcast</li> <li>• 9000 K - Typical CRT computer screen</li> </ul> <p>Source: <a href="http://www.digitallife.com/white-balance.html">http://www.digitallife.com/white-balance.html</a></p>

10

Table with 2 columns: Color Temperature (K) and Color Name. Rows include: 2800K (Incandescent), 3000K (Incandescent), 3200K (Incandescent), 3500K (Incandescent), 4000K (Incandescent), 4500K (Incandescent), 5000K (Incandescent), 5500K (Incandescent), 6000K (Incandescent), 6500K (Incandescent), 7000K (Incandescent), 7500K (Incandescent), 8000K (Incandescent), 8500K (Incandescent), 9000K (Incandescent), 9500K (Incandescent), 10000K (Incandescent).

11

### Commercial

The White Balance tool is the go-to tool for the commercial photographer. It's the tool that lets you adjust the white balance of your camera to match the color of the light source you're using. This is important because if you don't, your photos will look off-color and unprofessional.

12

### Colour Temperature Chart

Color Temperature Chart showing a gradient from blue (low temperature) to red (high temperature). The chart includes a color bar and a corresponding temperature scale in Kelvin.

13

Table with 2 columns: Color Temperature (K) and Color Name. Rows include: 2800K (Incandescent), 3000K (Incandescent), 3200K (Incandescent), 3500K (Incandescent), 4000K (Incandescent), 4500K (Incandescent), 5000K (Incandescent), 5500K (Incandescent), 6000K (Incandescent), 6500K (Incandescent), 7000K (Incandescent), 7500K (Incandescent), 8000K (Incandescent), 8500K (Incandescent), 9000K (Incandescent), 9500K (Incandescent), 10000K (Incandescent).

14

Table with 2 columns: Color Temperature (K) and Color Name. Rows include: 2800K (Incandescent), 3000K (Incandescent), 3200K (Incandescent), 3500K (Incandescent), 4000K (Incandescent), 4500K (Incandescent), 5000K (Incandescent), 5500K (Incandescent), 6000K (Incandescent), 6500K (Incandescent), 7000K (Incandescent), 7500K (Incandescent), 8000K (Incandescent), 8500K (Incandescent), 9000K (Incandescent), 9500K (Incandescent), 10000K (Incandescent).

15

Table with 2 columns: Color Temperature (K) and Color Name. Rows include: 2800K (Incandescent), 3000K (Incandescent), 3200K (Incandescent), 3500K (Incandescent), 4000K (Incandescent), 4500K (Incandescent), 5000K (Incandescent), 5500K (Incandescent), 6000K (Incandescent), 6500K (Incandescent), 7000K (Incandescent), 7500K (Incandescent), 8000K (Incandescent), 8500K (Incandescent), 9000K (Incandescent), 9500K (Incandescent), 10000K (Incandescent).

16

Table with 2 columns: Color Temperature (K) and Color Name. Rows include: 2800K (Incandescent), 3000K (Incandescent), 3200K (Incandescent), 3500K (Incandescent), 4000K (Incandescent), 4500K (Incandescent), 5000K (Incandescent), 5500K (Incandescent), 6000K (Incandescent), 6500K (Incandescent), 7000K (Incandescent), 7500K (Incandescent), 8000K (Incandescent), 8500K (Incandescent), 9000K (Incandescent), 9500K (Incandescent), 10000K (Incandescent).

17

### How To Colour Balance Your Flash With Gels

What's the difference between the light from your flash, the sun, those crazy, twisted light bulbs and the rest of us crazy twisted light bulbs? Easy answer: degrees. Kelvin, or the colour of the light you see.

- All that light is equal!
- Even the sun light coming to the Earth's atmosphere changes temperature as measured in degrees Kelvin as the Earth rotates.
- This becomes glaringly apparent when colour film comes on the scene. **Special!** Film was made to match the colour range of natural light.
- That same digital and to ability to magically switch between light colour temperatures on the fly.
- As handy as the digital evolution has been for colour balancing, it still can't make much of an impact when a flash is used in conjunction another temperature of light, like incandescent indoor lights.
- We've all seen the photo with a light blue-white colour cast on a face and the scene behind it a solid yellow glow.
- Or the green light glow off for fluorescent lights. So what now we do to make our camera happy with the colour balance?

18

### Advanced

Color Temperature Chart showing a gradient from blue (low temperature) to red (high temperature). The chart includes a color bar and a corresponding temperature scale in Kelvin.

19

### Custom White Balance

Image showing a still life scene with various objects, including a yellow duck and a brown pig, used for custom white balance.

20

### Flash

Image showing a still life scene with various objects, including a yellow duck and a brown pig, used for flash photography.

21

### Reduce Shutter Speed

Image showing a still life scene with various objects, including a yellow duck and a brown pig, used for reducing shutter speed.

22

### Increase Shutter Speed

Image showing a still life scene with various objects, including a yellow duck and a brown pig, used for increasing shutter speed.

23

### Recap

While this demonstration is a bit simplistic, it helps you understand how flash gels can be used to balance out ambient light.

- While there are other adjustments that can be made (such as increasing the flash output when more gels are applied, it serves to show how just the colour can be balanced).
- The other coloured gels work the same for outdoor light and fluorescent light.
- Just note that you can't use multiple colours at one time to balance out multiple light temperatures.

24

### Different Author

Every type of light source has a different light temperature. Incandescent lights have a warmer, more yellowish light. Fluorescent lights have a cooler, more bluish light. Daylight has a very high temperature, around 5500K to 6500K.

25

### Image with an orange tinge, from Aik & Photo Pro.

Image showing a still life scene with various objects, including a yellow duck and a brown pig, with an orange tinge.

26

### Supporting Views

White Balance Mode: When you're in White Balance mode, the camera will automatically adjust the white balance of your photos to match the color of the light source you're using.

27

### Indoor Fluorescent Lights

Some indoor lights actually flicker so fast that you can't see the light changing colour. This usually happens in gyms, schools, and other places with fluorescent lights. If you're shooting with a very fast shutter speed (like 1/2000s or faster), your camera is taking the picture so fast that it can't capture the full spectrum of the light. It's getting a slightly different coloured burst of light every time.

## 28

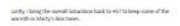
- 31



## 29



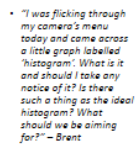
## 30



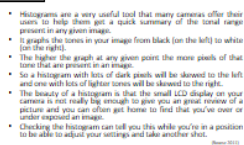
## 38

Answered by Digital Photo Secret  
On May 2011  
08:34 PM

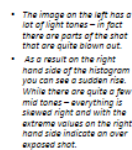
## 39



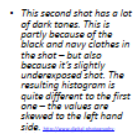
## 40



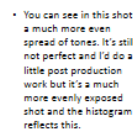
## 41



## 42



## 43




## 45

- 
- The diagram shows a 2x4 grid of colored squares. The top row consists of four yellow squares. The bottom row consists of two blue squares, two red squares, and two grey squares. Below the grid is a bar chart with four bars of different heights and colors: blue, red, yellow, and grey. The yellow bar is the tallest, followed by the blue bar, then the red bar, and the grey bar is the shortest.




### 46



- A digital image is basically a mosaic of square tiles or "pixels" of uniform color which are as tiny as 1 square uniform area element.
- Instead of seeing them by color, we could see them as a stack of 256 grayscale tones (levels of brightness) from black (value 0) to white (value 255) with 254 gray levels in between.
- An imaging software automatically sorts the pixels of the image top to bottom into 256 groups (levels of brightness) and counts them up accordingly.
- The height of each "stack" or vertical bar tells you how many pixels there are for that particular brightness.
- "0" and "255" are the darkest and brightest values, corresponding to black and white respectively.

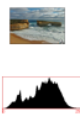
### 47



- On this histogram each "stack" or "bar" is one pixel wide.
- Unlike the normal histogram, the 256 bars are stacked side by side without any gaps between them, which is why for educational purposes, the vertical bars are shown in alternating shades of gray, allowing you to distinguish the individual bars.
- There are no blank spaces between bars to avoid confusion with blank spaces caused by missing tones in the image.
- Normally all bars will be black as indicated in the histogram as shown on the right.

### 48


#### Correctly exposed image



- This is an example of a correctly exposed image with a "good" histogram.
- The smooth curve downwards ending in 255 shows that the subtle highlight detail in the clouds and waves is preserved.
- Likewise, the shadow area starts at 0 and builds up gradually.

### 49


#### Underexposed



- The histogram indicates there are a lot of pixels with value 0 or close to 0, which is an indication of "clipped shadows".
- Some shadow detail is lost forever.
- Unless there is a lot of pure black in the image, there should not be that many pure black pixels.
- There are also very few pixels in the highlight area.

### 50


#### Overexposed



- The histogram indicates there are a lot of pixels with value 255 or close to 255, which is an indication of "clipped highlights".
- Subtle highlight detail in the clouds and waves is lost.
- There are also very few pixels in the shadow area.

### 51


#### Image with Too Much Contrast



- This image has both clipped shadows and highlights.
- The **dynamic range** (p271/advanced) of the scene is larger than the dynamic range of the camera.

### 52


#### Image with too little contrast



- This image only contains midtones and lacks contrast, resulting in a hazy image.

### 53


#### Image with modified contrast



- When "stretching" this histogram via a Levels or Curves adjustment, the contrast of the image improves, but since the tones are redistributed over a wider tonal range, some tones are missing, as indicated in this "combed" histogram.
- Too much combing can lead to **posterization**.

### 54

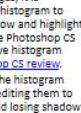
#### Keeping an Eye on the Histograms when Taking Pictures



- All professional cameras allow you to view the histogram on the camera's LCD so you can adjust the exposure and take the shot again if necessary.
- Some cameras come with an overexposure warning, whereby the overexposed areas blink, as indicated in this animation.
- Usually the blinking areas indicate that at least one of the **channels** is clipped.

### 55


#### Keeping an Eye on the Histograms when Editing



- When Editing: When editing images, it is important to keep an eye on the histogram to avoid the above mentioned shadow and highlight clipping and posterization. Adobe Photoshop CS and later versions come with a live histogram palette, as stated in my [Photoshop CS review](#).
- It is essential to keep an eye on the histogram when taking pictures and when editing them to ensure proper exposure and avoid losing shadow and highlight detail.

### 56


#### RAW



Unlike **JPEG** and **TIFF**, RAW is not an abbreviation but literally means "raw" as in "unprocessed". A RAW file contains the original image information as it comes off the sensor before in-camera processing so you can do that processing afterwards on your PC with special software.

### 57


#### The RAW Storage and Information Advantages



- In the **Color Filter Array** topic, we explained that each pixel in a conventional sensor only captures one color. This data is typically 10 or 12 bits per pixel, with 12 bits per pixel currently being most common. This data can be stored as a RAW file. Alternatively, the camera's internal image processing engine can interpolate the raw data to determine the three color channels to output as a 24-bit JPEG or TIFF image.

### 58


#### The RAW Storage and Information Advantages...cont..basic



- Even though the TIFF file only retains 8 bits/channel of information, it will take up twice the storage space because it has three 8-bit color channels versus one 12-bit RAW channel.
- JPEG addresses this issue by **subsampling** at the cost of image quality.
- So RAW offers the best of both worlds: it preserves the original color bit depth and image quality and saves storage space compared to TIFF. Some cameras offer **raw+small compressed JPEG**.

### 59


#### The Flexibility of RAW



- In addition, many of the camera settings which were applied to the raw data can be undone when using the RAW processing software. For instance, sharpening, white balance, levels and color adjustments can be undone and recalculated based on the raw data. Also, because RAW has 12 bits of available data, you are able to extract shadow and highlight detail which would have been lost in the 8-bit/channel JPEG or TIFF format. RAW:
- The only drawback is that RAW format files between cameras are not compatible. Software like Adobe's Camera Raw, Adobe's Bridge, and Adobe's Photoshop can process RAW files from a wide range of cameras. However, if you have a camera that is not supported by these programs, you will need to use a different software to process the RAW files.

### 60

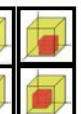
#### Page 206 Essential



The RAW image and information advantages. From the previous section, we already know that a digital camera sensor only captures one color. This data is typically 10 or 12 bits per pixel, with 12 bits per pixel currently being most common. This data can be stored as a RAW file. Alternatively, the camera's internal image processing engine can interpolate the raw data to determine the three color channels to output as a 24-bit JPEG or TIFF image.

### 61

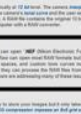
#### Page 209 Advanced



Advanced RAW image advantages. From the previous section, we already know that a digital camera sensor only captures one color. This data is typically 10 or 12 bits per pixel, with 12 bits per pixel currently being most common. This data can be stored as a RAW file. Alternatively, the camera's internal image processing engine can interpolate the raw data to determine the three color channels to output as a 24-bit JPEG or TIFF image.

### 62


#### p210



Advanced RAW image advantages. From the previous section, we already know that a digital camera sensor only captures one color. This data is typically 10 or 12 bits per pixel, with 12 bits per pixel currently being most common. This data can be stored as a RAW file. Alternatively, the camera's internal image processing engine can interpolate the raw data to determine the three color channels to output as a 24-bit JPEG or TIFF image.

### 63

#### p211



Advanced RAW image advantages. From the previous section, we already know that a digital camera sensor only captures one color. This data is typically 10 or 12 bits per pixel, with 12 bits per pixel currently being most common. This data can be stored as a RAW file. Alternatively, the camera's internal image processing engine can interpolate the raw data to determine the three color channels to output as a 24-bit JPEG or TIFF image.

### Disadvantages of RAW

- The only drawback is that RAW formats differ between camera manufacturers, and even between cameras, so dedicated software provided by the manufacturer has to be used
- However, opening and processing RAW files is much slower than JPEG or TIFF files. To address this issue, some cameras allow the option to shoot in RAW and JPEG at the same time.
- Another issue is that RAW files are large. If memory cards are cheap, this option has no longer performance or storage issues.
- It allows you to organize and edit your images in a faster way with regular software like Adobe Photoshop. It also allows the option to crop in RAW those critical images or images with problems (e.g. white balance or lost shades and highlight details).
- Another reason is that third party image editing and viewing software packages are not able to open and edit most popular camera brands and models. For example Adobe Photoshop CS.
- However, as stated in my [Photography CS review](#), the new Photoshop program does RAW files and it is possible to use the camera manufacturer's software if you don't want all settings may be recognized.

64

### Bockeart (Simulation)



**Test Environment**  
To learn how aperture and shutter-speed affect exposure, depth of field (DOF), and motion blur, we created a controlled test environment: a coffee table shot at daylight (11:20) with a full-frame DSLR fitted with a 70mm f/2.8 lens mounted on a tripod. One of the coffee table is a remote control car that moves from right-to-left, in front and behind the path of the car are three coffee cups arranged equally spaced apart. Although this is not a common situation, the advantage of this controlled setup allows us to see the above-mentioned relationship clearly as we can keep certain parameters constant (such as the lighting, position of the objects, etc.).

65

### DoF Simulation

[illegible]

66



67



68



69



70



71



72



73



74



75



76



77



78

## Continued



- [illegible]

79

## Continued



- [illegible]

81



## Section 2: Techniques 2 - Unedited student written responses

Boldface highlights comments intended for further discussion-addressed at the debriefing session, held on 22 August 2011)

Questions	Comments
<p><i>Indicate the option that best describes your agreement with the statement provided. Give brief reasons to substantiate your answers. Choose:</i></p> <p><i>Strongly agree, Agree, Disagree, Strongly Disagree</i></p> <p>Q6. The Internet is more beneficial than it is harmful?</p>	<p>S1. Agree-it is more beneficial as it gives people the opportunity to study without having to travel to tech.</p> <p>S2. Strongly agree. The amount of useful data and instructional videos is endless you can learn almost anything from the Internet if you know how to access it properly.</p> <p>S3. Agree because it mainly make for maby sources than being harmful. The information which you cant find Internet it one of best choice to search in, it advance now because you can social network as well.</p> <p>S4. Yes it is in its own way because most students use the Internet as a source of research to do their assignments and they also use it to communicate with each other.</p> <p>S5. Agree, very beneficial but at the same time contains some parental context.</p> <p>S6. Agree. You can advertise your business. You can do research on things you never knew of before and you can keep in touch with friends and all the latest news and stories.</p> <p>S7. Agree. You can advertise your business. You can do research on things you never knew of before and you can keep in touch with friends and all the latest news and stories.</p> <p>S8. Agree. You can advertise your business. You can do research on things you never knew of before and you can keep in touch with friends and all the latest news and stories.</p> <p>S9. Agree. You can advertise your business. You can do research on things you never knew of before and you can keep in touch with friends and all the latest news and stories.</p> <p>S10. Strongly agree: when you start using the E-net, you as a person know what you want from it so the Internet will give you what you searched for. A person must know if they are going to harmful or beneficial resources.</p> <p>S11. I agree as if you are unable to find a book or get to a library but on Internet cafe, your phone or at home the Internet will probably be able to help find what is needed and may even be better than a book as you can look for more than one thing and find it.</p> <p>S12. Strongly agree-Most people take advantages of eth Internet are most likely to destroy the purpose of using the Internet.</p> <p>S13. Agree; It is very beneficial to people that want to keep up with world events and news. also keeping in touch with friends and family. But there are some sites that are not meant to be viewed by underage people and that really the only problem Internet is also v-good for information.</p> <p>S14. It is all of the above because you benefit a lot and learn useful things every day but just like any other thing it also has its downfalls because anyone can do anything irregardless it's wrong or right.</p> <p>S15. I agree the Internet is more beneficial, with the Internet everything is done fast and easy to use it than any other sources. It also helps us with our digital assignments too.</p>

Questions	Comments
7. Is the Internet a good forum to learn?	<p>S1.Strongly agree - ther is a huge fountain of knowledge that can be accessed for free</p> <p>S2.Yes you have no limit to the information you can find on eth Internet and it is kept up to date.</p> <p>S3.Strongly agree- According to assignment given in varsity, Internet it a strong source to give approved information in detail.</p> <p>S4.Infromation, language, design, adverts, images graphics and a lot of other</p> <p>S5. Agree lots of educational pages.</p> <p>S6. Agree. If you know what to look for and you know it's the correct source/information.</p> <p>S7.Yes, The Internet allows for users to browse broadly and to show a lot to have more understanding of your access on the Internet. Most people find that studying or using a computer is more effective and useful because it has a lot to use and easier to work with.</p> <p>S8. strongly agree yes it us as a student to expand our knowledge by doing research</p> <p>S9. Agree, because it is the easy accessible source of getting information.</p> <p>S10. Agree and Disagree:if you use useful sites yes like google scholar Disagree if a person will use non educational sites.</p> <p>S11. Yes, as it may have more information than a book.</p> <p>S12. Strongly agree- There are so many ways of learning but I think the Internet is the most sufficient and well expanded way.</p> <p>S13. Agree: online classes and information are an easy access and also the viewing of tutorials helps people learn about things.</p> <p>S14. I agree. It has no limit you can go as far as you want and learn as much as you can.</p> <p>S15. Yes and no,Yes it easy to get access of the information through the Internet.</p> <p><b>No. it can not be good because an the Internet there are websites that you cannot rely on ie Wikipedia</b></p>
8. In your opinion what characteristics make a website useful?	<p><b>S1. A website must be user friendly, and it should not have too many links to other websites.</b></p> <p><b>S2.Info and topics clearly marked and easy to find and search options.</b></p> <p><b>S3.It is useful by send detail and information which is accurate to those who are concerned to know</b></p> <p><b>S4.nfromation, language, design, adverts, imgeas, graphics and a lot of other.</b></p> <p><b>S5. Colour, text</b></p> <p>S6.All the options and tools you can use to make Internet user friendly and faster.</p> <p>S7.The gadgets that fall into place when accessing a website. The different elements found on it and all the information be saved or shared.</p> <p><b>S8. to give brief information about what you want</b></p> <p>S9.Education and network and also for job applications.</p> <p><b>S10.Agree and Disagree: if you use useful sites yes like google scholar Disagree if a person will use non educational sites.</b></p> <p><b>S11. For personal information, communication, for Other information, ideas, networking, comparisons.</b></p> <p>S12.The way they give you so many options and substitute for what you are looking for.</p> <p>S13.All the gadgets and effects used on a website. The ability to save and download files.</p> <p>Ability to view files.</p> <p>S14.-the information it has, and How you can get hold of it</p> <p>S15.The things that interest People and the colours used</p>

Questions	Comments
23. In a few lines clearly state your opinion of using hypertext and multimedia as teaching tools?	<p><b>S1. I believe it was very beneficial, because the slides were well structured and all the information was to the point. I enjoyed the hypertext because it was to plain and simple. The images were very helpful because one could see what was being talked.</b></p> <p>S2. Blank</p> <p><b>S3. It's beneficial to use hypertext and multimedia because everything that a student should know goes hand in hand from the lecture because it discuss indeed.</b></p> <p><b>S4. It does make learning much easier for everyone. and since things are now digital it also helps us a lot in understanding things. So these types of teaching tools are mostly used in tertiary institutions which is really advanced.</b></p> <p>S5. I think it's a great o excellent medium at teaching These text and multimedia be put accness in a very teaching platform and it was done correctly and understandable.</p> <p>S6. Blank</p> <p>S7. It is a well and interesting way of learning and it shows more graphphical images and notes to students. <b>The imagery helps understand the notes better. Hypertext makes learning much more easy and faster to go through all note or lessons.</b></p> <p>Multimedia plays an important role because it gives people a better visual understanding of the aspects that are being discussed. I enjoyed the lecture as it gave me a broader knowledge on all the notes and lessons.</p> <p>S8. it is useful because it make it easly to understand lecture and make it easily for The Lecture man to teach students. Also make it easily to uplift techeing techniques. -I think it helpful it give a chance to all of us to use computer and other teaching</p> <p>S9. I strongly think it is useful tool to use, because it's stimulate our thinking abilities. <b>I also enables the student to gain more researching skills</b> which plays a very major role in the indivisual learning process.</p> <p><b>S10. Hypertext explaining the hypertext and multimedia was very fast and confusing.</b> Using hypertext is good knowing the difference was good because we need to know the difference so we can use it in l@appropriate places. Techniques To Be Revisited: motion Blurr underexposure overexposure-sur of pictures. Florescent with blue lights&gt;(confusing)</p> <p><b>S11. yes that was beneficial, most hypertext and multimedia teaching tools are very good as teaching techniques I prefer this way of teaching as I get to hear and see what is being told /taught and then easier to understand!</b></p> <p>S12. Blank</p> <p><b>S13. 23.hypermedia and multimedia can be very useful more so that we study photographs, But not only Photography.</b></p> <p>Multimedia is one of the greatest ways during teaching here you allow students to view pictures,video and sound. Yousing hypertext is also very useful in preparing multimedia (powerpoints) alire you can save links and go to the web pages as your presentation is gone on and show students different things.</p> <p>S14. It is a very good and beneficial because you get to see what the lecturer or whoeva is doing a presentation is talking about. <b>Although it some times get very boring because the only thing you do is listen and look. I feel that it might be very nice to interact with the lecturer.</b></p>

Questions	Comments
	<b>S15.it beneficial but it took so long and teh slides were many as a result i lost concentration. But there were times you went/talked to fast.</b>
24. Other comments (if any)	<p>S1. Blank</p> <p>S2. Blank</p> <p>S3.Technical the lecture was useful because it became the food of knowledge most of the things we didn't know we turn to have known</p> <p>S4. It was a good lecture which is really important and beneficial to us as students I think it will help us understand digital much more easier in future. I hope that many lectures like this one are going to take place in this department</p> <p>S5.Blank</p> <p>S6.Blank</p> <p>S7.Blank</p> <p>S8.Blank.</p> <p>S9.About the lecture today it was very useful <b>but somewhere down the line it was distructive and we Isot our concentration and focus on the lecture.</b></p> <p>S10.I think the over explanation of the things we discussed can be very confusing. Getting to the point and doing explaining</p> <p>S11.Blank.</p> <p>S12.Blank</p> <p>S13.Powerpoint was done well and lecturer Done very well.</p> <p>S14.Blank</p> <p>S15.Slides must not be many or long.</p> <p>Student missing pages. Q23.It is beneficial in expanding our knowledge on digital aspects and how we could use it when taking images or working on assignments.</p> <p><b>the subjects discussed might be more interesting to expand on, in our theory lecturs and in our digital lectures. The presentation was well used, but contained a bit of information that was slightly confusing</b></p>

## REFERENCES

Aamoth, D. 2011. *Japan captures tsunami, quake footage with camera phones* [online]. Available: <http://techland.time.com/2011/03/11/japan-captures-tsunami-quake-footage-with-camera-phones/> (Accessed 6 February 2012).

Allen, T. 2009. *Looking around corners using Femto-Photography* [online]. Available: <http://web.media.mit.edu/~raskar/femto/> (Accessed 27 June 2011).

Alvesson, M. and Sköldbberg, K. 2009. (Post-) positivism, social constructionism, critical realism: three reference points in the philosophy of science. In: Alvesson, M. and Sköldbberg, K. eds. *Reflexive methodology: new vistas for qualitative research*. London: Sage Publications.

Ancori, B., Bureth, A. and Cohendet, P. 2000. The economics of knowledge: the debate about codification and tacit knowledge. *Corporate and Industrial Change*, 9 (2): 255-287.

*Annie Leibovitz - life through a lens* (documentary film). 2008. Directed by Barbara Leibovitz. New York: Ranoah Productions.

AoL TV. 2011. *How to use window light in photography*. YouTube video. Available: <http://www.5min.com/Video/How-to-Use-Window-Light-in-Photography-325658564> (Accessed 5 June 2011).

Archer, M. 1982. *Morphogenesis versus structuration: on combining structure and action*. London: Blackwell Publishing.

Archer, M. 1995. *Realist social theory: the morphogenetic approach*. Cambridge: Cambridge University Press.

Archer, M. 1998a. Introduction: realism in the social sciences. In: Archer, M., Bhaskar, R., Collier, A., Lawson, T. and Norrie, A. eds. *Critical realism. Essential readings* London: Routledge, 189-205.

Archer, M. 1998b. Realism and morphogenesis. In: Archer, M., Bhaskar, R., Collier, A., Lawson, T. and Norrie, A. eds. *Critical realism. Essential readings* London: Routledge, 356-381.

Archer, M. 2010. *Being human: the problem of agency*. Cambridge: Cambridge University Press.

Archer, M., Sharp, R., Stones, R. and Woodiwiss, T. 1998. Critical realism and research methodology. Opening remarks at the Second Plenary at the CCR Conference. Paper presented at the *CCR Conference*. Essex, 2004. Alethia, Available: [http://www.journalofcriticalrealism.org/archive/ALETHIAv2n1\\_archer12.pdf](http://www.journalofcriticalrealism.org/archive/ALETHIAv2n1_archer12.pdf) (Accessed 30 July 2004).

Armendariz, D. 2010. *Exposing digital photography: open courseware* [online]. Available: <http://tv.cse7.org/2010/fall/> (Accessed 3 December 2011 ).

Armitage, S. and O'Leary, R. 2003. *A guide for Learning Technologists* [online]. Available: [www.ltsn.ac.uk/genericcentre](http://www.ltsn.ac.uk/genericcentre) (Accessed 12 July 2008 ).

Aunger, R. 2010. Types of technology. *Technological forecasting and social change*, 77 (5): 762-782.

Baccalaureus Technologiae. 2010. *Photography Qualification code 72153* [online]. Available: <http://allqs.saqa.org.za/showQualification.php?id=72153> (Accessed 5 April 2010).

Baëhr, P. 1990. Review article: critical realism, cautionary realism. *Sociological Review*, 38 (4): 765-778.

Baggaley, J. 2013. MOOC rampant. *Distance Education*, 34 (3): 368-378.

Ball, A. 2010. Review of the state of the art of the digital curation of research data (version 1.2). ERIM Project Document erim1rep091103ab12. University of Bath, Bath.

Barbeau, N. 2012. More black surfers online. *Daily News*. 30 November 2012: 8.

Bárcena, E., Read, T., Martín-Monje, E. and Castrillo, M.D. 2014. Analysing student participation in foreign language MOOCs: a case study. In: Cress, U. and Kloos, C.D. eds. *Proceedings of European MOOC Stakeholder Summit 2014 (EMOOCs 2014)*. Lausanne, Switzerland, 10 - 12 February. 11-17.

Barone, C. 2005. The New Academy. In: Oblinger, D.G. and Oblinger, J.L. eds. *Educating the Net Generation*. Washington: Educause, 14.11-14.16.

Barrett, B.F.D., Grover, V.I., Janowski, T., van Lavieren, H., Ojo, A. and Schmidt, P. 2009. Challenges in the adoption and use of OpenCourseWare: experience of the United Nations University. *Open Learning*, 24 (1): 31-38.

Bates, S.R. 2006. Making time for change: on temporal conceptualizations within (critical realist) approaches to the relationship between structure and agency. *Sociology*, 40 (1): 43-161.

Bates, T. 2000. Teaching, learning and the impact of multimedia technologies. *Educause Review*, 35 (5): 38-43.

Bawa, A.C. 2011. Bathed in bandwidth - living in the cloud. Paper presented at the *eLearning Festival*. Durban, 24 November 2011.

Bax, S. 2003. CALL - past, present and future. *System: an International Journal of Educational Technology and Applied Linguistics*, 31 (1): 13-28.

Bax, S. 2007. The Bluegem Portal. In: Tatnall, A. ed. *Encyclopedia of portal technologies and applications*. Hershey, PA: Information Science Reference, 98-101.

Beagrie, N. 2006. Digital curation for science, digital libraries, and individuals. *International Journal of Digital Curation*, 1 (1): 3-16.

Berners-Lee, T. 1989. *Information management: a proposal*. CERN. Available: <http://faculty.georgetown.edu/irvinem/theory/Berners-Lee-HTTP-proposal.pdf> (Accessed 21 December 2011).

Berners-Lee, T. 2000. *Weaving the web: the original design and ultimate destiny of the World Wide Web*. New York: Harper Collins.

Berners-Lee, T., Hendler, J. and Lassila, O. 2001. The semantic web. *Scientific American*, 284 (5): 34-43.

Bhargava, R. 2012. How curation could save the Internet (and your brand). *Communication World*, 29 (1): 20-23.

Bhaskar, R. 1978. *A realist theory of science*. 2nd edn. Hassocks: Harvester.

Bhaskar, R. 1986. *Scientific realism and human emancipation*. London: Verso.

Bhaskar, R. 1989. *Reclaiming reality: a critical introduction to contemporary philosophy*. London: Verso.

Bhaskar, R. 1994. *Plato etc.: the problems of philosophy and their resolution*. London: Verso.

Bhaskar, R. 1998a. General introduction. In: Archer, M., Bhaskar, R., Collier, A., Lawson, T. and Norrie, A. eds. *Critical realism. Essential readings*. London: Routledge, ix-xxiv.

Bhaskar, R. 1998b. *The possibility of naturalism: a philosophical critique of the contemporary human sciences*. 3rd edn. New York: Routledge.

Bhaskar, R. 1998c. Societies. In: Archer, M., Bhaskar, R., Collier, A., Lawson, T. and Norrie, A. eds. *Critical realism. Essential readings*. London: Routledge, 206-257.

Bhaskar, R. 2010. Contexts of interdisciplinarity and climate change - transforming knowledge and practice for our global future. In: Bhaskar, R., Frank, C., Høyer, K.G., Næss, P. and Parker, J. eds. *Interdisciplinarity and climate change*. New York: Routledge, 1-24.

Bhojaraju, G. and Buck, S. 2007. Ontologies in portal design. In: Tatnall, A. ed. *Encyclopedia of portal technologies and applications*. Hershey, PA: Information Science Reference, 653-657.

Bhorat, A.H.M. 2006. The development of an appropriate model for a multimedia centre at the Durban Institute of Technology. MTech (Photography), Durban Institute of Technology.

Bhorat, A.H.M. 2011. *Photo and Film Expo, Epsom printers* (13-15 October 2011-Gauteng).

Blackler, F. 1995. Knowledge, knowledge work and organizations: an overview and interpretation. *Organization studies*, 16 (6): 1021-1046.

Blake, A., Pickford, K., Greenaway, S., Thomas, S., Pickard, A., Williamson, C.M., Adams, N.C., Walling, A., Beck, T., Fray, M., Peters, J., Weaver, T., Brown, S.D.M., Hancock, J.M. and Mallon, A.M. 2009. MouseBook: an integrated portal of mouse resources. *Nucleic Acids Research*, 38: 593-599.



Blichfeldt, B.S. and Andersen, J.R. 2006. Creating a wider audience for action research: learning from case-study research. *Journal of Research Practice*, 2 (1): 1-12.

Bockaert, V. 2001. *The 123 of digital imaging*. Interactive learning suite software, version 6.2. Available: [http://www.123di.com/about\\_auth.php](http://www.123di.com/about_auth.php) (Accessed 27 April 2011).

*Born into brothels* (documentary film). 2004. Directed by Zama Briski and Ross Kauffmann. Taiwan: Red Light Films.

Brenner, A.L. and Mihalega, A.M. 2006. Storytelling in an automated environment: using metadata analysis to develop curated guides to a digital image collection. *OCLC Systems & Services*, 22 (2): 122-131.

Briski, Z. 2004. *Kids with cameras*. Hope House: Kids with Cameras.

Briski, Z. 2007. Introduction: from the filmmaker. In: Garvie, C., Khemchandani, S. and Robinson, M. eds. *Born into brothels: companion curriculum*. London: Amnesty International, 4.

Brown, C. 2011. *The giving lens: giving back through Photo education* [online]. Available: <http://www.thegivinglens.com/about/about-tgl/> (Accessed 6 April 2012).

Brown, E.B., Gordon, Z., Quinn, K., Staking, K., Stewart, N. and Zabriskie, C.H. n.d. *The visual literacy toolbox: learning to read image* [online]. Available: <http://www.humanities.umd.edu/vislit/bookmark.php> (Accessed 21 July 2012).

Brown, J.S. 2000. Growing up digital: how the web changes work, education, and the ways people learn. *USDLA*, Vol 16.(2): 15-27.

Brown, M. 2005. Learning spaces. In: Oblinger, D.G. and Oblinger, J.L. eds. *Educating the Net Generation*. Washington: Educause, 12.11-12.22.

Buch-Hansen, H. 2005. Critical realism in the social sciences. *Distinktion: Scandinavian Journal of Social Theory*, 6 (2): 59-69.

Burstein, F. and Gregor, S. 1999. The systems development or engineering approach to research in information systems: an action research perspective. In: Hope, B. and Yoong, P. eds. *Proceedings of 10th Australasian Conference*

on *Information Systems*. Victoria University of Wellington, New Zealand, 122-134.

Bush, V. 1945a. As we may think. *The Atlantic*. no. 176, 101-108.

Bush, V. 1945b. As we may think: a top U.S. scientist foresees a possible future world in which man-made machines will start to think. *Life*. vol. 19, no. 11, 112-124.

Campbell-Kelly, M. and Garcia-Swartz, D. 2013. The history of the Internet: the missing narratives. *Journal of Information Technology*, 28 (18): 33.

Carbonera, D. 2009. *Digital unmasking: ripping one's face* [online]. Available: <http://digital-photography-school.com/forum/how-i-took/66157-digital-unmasking-ripping-ones-face.html> (Accessed 12 September 2009).

Card, S.K., Mackinlay, J. and Shneiderman, B. 1999. *Readings in information visualization: using vision to think*. San Francisco: Morgan Kaufmann.

Carlsson, S.A. 2003a. Advancing information systems evaluation (research): a critical realist approach. *Electronic Journal of Information Systems Evaluation*, 6 (2): 11-20.

Carlsson, S.A. 2003b. Critical realism: a way forward in IS research. In: *Proceedings of 11th European Conference on Information Systems, ECIS 2003*. Naples, Italy, 16-21 June 2003.

Carlsson, S.A. 2005a. Critical realist information systems research. In: *Encyclopedia of Information Science and Technology*. 2nd edn. Hershey, PA: Information Science Reference, 811-817.

Carlsson, S.A. 2005b. A critical realist perspective on IS evaluation research. In: *Proceedings of European Conference on Information Systems, ECIS 2005*. Regensburg, Germany, May 26-28, 2005.

Carter, R.L. 2007. Advancement of digital photography and related technologies timetable. In: Peres, M.R. ed. *Focal encyclopedia of photography: digital imaging, theory and applications, history, and science*. 4th edn. Oxford: Elsevier Focal Press, 15-22.

Cayley, S. n.d. *The picture post historical archive* [online]. Available: <https://www.brainshark.com/cengage/vu?pi=zG9zpTEZVz33NHZ0&intk=783317682> (Accessed 10 March 2013).

Cerejo, L. 2010. *Design better and faster with rapid prototyping* [online]. Available: <http://www.smashingmagazine.com/2010/06/16/design-better-faster-with-rapid-prototyping/> (Accessed 26 June 2011).

Cheng, E. 2011. *Lytro light field camera* [online]. Available: [http://www.nytimes.com/2011/06/22/technology/22camera.html?\\_r=2](http://www.nytimes.com/2011/06/22/technology/22camera.html?_r=2) (Accessed 27 June 2011).

Clark, R., C and Mayer, R.E. 2008. *e-Learning and the science of instruction*. 2nd edn. USA: Pfeiffer.

Clonan, A. 2013. *Personalised learning sets Sheffield MOOCs in a league of their own* [online]. Available: <http://www.sheffield.ac.uk/news/nr/moocs-succes-in-scharr-1.305224> (Accessed 28 January 2014).

Cohendet, P. and Meyer-Krahmer, F. 2001. The theoretical and policy implications of knowledge codification. *Research Policy*, 30 (9): 1563-1591.

Collinsworth, J. 1980. 1880-1980: a 100-year start on tomorrow. *Studio Light Centennial Issue*, 2: 5-43.

Council on Higher Education. 2014. *HEQF Category B alignment questions*. Higher Education Quality Committee.

CQPA. 2010. *Photography Programme review and evaluation report*. Durban: Durban University of Technology.

Cruickshank, I. and Mason, R. 2003. Using photography in art education research: a reflexive inquiry. *International Journal of Art & Design Education*, 22 (1)

D'Antoni, S. 2009. Open Educational Resources: reviewing initiatives and issues, open learning. *The Journal of Open, Distance and e-Learning*, 24 (1): 3-10.

Danermark, B. 2001. Interdisciplinary research and critical realism – the example of disability research. Paper presented at the *5th Annual IACR Conference*. Roskilde University, Denmark. 17–19 August 2001.

Daniel, J. and Uvalić-Trumbić, S. 2013. Do MOOCs announce a new paradigm for higher education? Paper presented at the *Open and Flexible Higher Education Conference 2013*. Paris, 23-25 October, 2013. EADTU, 21-24.

Deasington, R. 1985. *X.25 Explained: protocols for packet switching networks*. Chichester: Ellis Horwood.

Dede, C. 2005. Planning for neomillennial learning styles: implications for investments in technology and faculty. In: Oblinger, D.G. and Oblinger, J.L. eds. *Educating the Net Generation*. Washington: Educause, 15.11-15.22.

Di Paola, L. and Teall, E. 2007. Web portals designed for educational purposes. In: Tatnall, A. ed. *Encyclopedia of portal technologies and applications*. Hershey, PA: Information Science Reference, 1161-1165.

Digital Photography Tips. 2011. *The history of digital photography: the early days* [online]. Available: <http://www.digital-photography-tips.net/history-of-digital-photography-early-days.html> (Accessed 28 June 2011).

Dobson, P.J. 2001. The philosophy of critical realism: an opportunity for Information Systems research. *Information Systems Frontiers*, 3 (2): 199-210.

Dobson, P.J. 2002. Critical realism and information systems research: why bother with philosophy? *Information Research*, 7 (2): 63-81.

Dobson, P.J. 2005. Critical realism as an underlying philosophy for IS research. In: Khosrow-Pour, M. ed. *Encyclopedia of Information Science and Technology*. Hershey, PA: Idea Group Reference (an imprint of IGI Global), 606-610.

Dobson, P.J. 2012. Critical realism and IS research: some methodological implications. In: Mora, M., Gelman, O., Steenkamp, A.L. and Raisinghani, M. eds. *Research methodologies, innovations and philosophies in software systems engineering and information systems*. Hershey, PA: IGI Global, 63-68.

Dolphin, I., Miller, P. and Sherratt, R. 2002. Portals, portals, portals everywhere. *Ariadne*, no. 33. Available: <http://www.ariadne.ac.uk/issue33/portals/#30> (Accessed 15 March 2012).

Downes, S. 2007a. Models for sustainable open educational resources. *Journal of Knowledge and Learning Objects*, 3: 29-44.

Downes, S. 2007b. *Places to Go: OpenCourseWare Consortium* [online]. Available: <http://www.innovateonline.info/index.php?view=article&id=445> (Accessed 24 February 2014).

Drake, D., Lovejoy, A.O., Pratt, J.B., Rogers, A.K., Santayana, G., Sellars, R. and Strong, C.A. 1920. *Essays in critical realism: a co-operative study of the problem of knowledge*. New York: Macmillan.

Du Pré, R. 2006. The philosophy of a University of Technology in South Africa: an introduction. *Thuto: Acadmic Journal of Vaal University of Technology*, 1: 9-34.

Eastman Kodak. 1994. *Pictures: adding excitement to your presentations: why use pictures in your presentation?* [online]. Available: <http://www.com/US/en/digital/dlc/book1/chapter7/why.shtml> (Accessed 1 June 1996).

Eboueya, M. and Uden, L. 2007. Benefits and limitations of portals. In: Tatnall, A. ed. *Encyclopedia of portal technologies and applications*. Hershey, PA: Information Science Reference, 75-81.

Efros, A., Collet, A. and Trutoiu, L. 2010. *Computational Photography*. Internet slide show from Course 15-463 (15-862), Department of Computer Science: Carnegie Mellon University. Available: [http://graphics.cs.cmu.edu/courses/15-463/2010\\_spring/](http://graphics.cs.cmu.edu/courses/15-463/2010_spring/) (Accessed 28 June 2011).

Eisenberg, A. 2010. *Computational photography may help us see around corners* [online]. Available: <http://www.nytimes.com/2010/12/19/business/19novel.html> (Accessed 27 June 2011).

Ennew, C.T. and Fernandez-Young, A. 2006. Weapons of mass instruction? The rhetoric and reality of online learning. *Marketing Intelligence & Planning*, 24 (2): 148-157.

Fallows, J. 1982. Living with a computer. *The Atlantic*. July 1998: 84-91.

Farese, N. 2011. *Photography driven by social change: social change driven by photography* [online]. Available: <http://photophilanthropy.org/about/letter-from-nancy/> (Accessed 6 April 2012).

Fleetwood, S. 2005. Ontology in organization and management studies: a critical realist perspective. *Organization*, 12 (1): 197-222.

Friedman, D. 2007. *Idea: the histogram as the image* [online]. Available: [http://www.ironicsans.com/2007/09/idea\\_the\\_histogram\\_as\\_the\\_imag.html](http://www.ironicsans.com/2007/09/idea_the_histogram_as_the_imag.html) (Accessed 3 December 2011).

Friedman, D. 2010. Photoshop's 20th birthday. *David Friedman photography blog* (Blog). Available: <http://www.davidfriedmanphoto.com/blog/2010/02/blog-update-and-photoshops-20th-birtghday.html> (Accessed 20 July 2012).

Fairchild, M. 2011. *Ironic Sans* [online]. Available: <http://www.sundaymagazine.org/wp-content/uploads/19110402-1-new.pdf> (Accessed 20 July 2012).

Fuchs, C. 2008. *Internet and society-social theory in the information age*. New York: Routledge.

Garner, G. 2007. Photography and society in the 20th Century. In: Peres, M.R. ed. *Focal encyclopedia of photography: digital imaging, theory and applications, history, and science*. 4th edn. Oxford: Elsevier Focal Press, 187-198.

Garrison, D.R. and Anderson, T. 2003. *E-Learning in the 21st century: a framework for research and practice*. London: Routledge-Falmer.

Garvie, C., Khemchandani, S. and Robinson, M. eds. 2007. *Born into brothels: companion curriculum*. London: Amnesty International.

Giaretta, D. 2007. Preservation concepts and the role of this conference series (Keynote speech). In: *Proceedings of PV 2007 Conference*. DLR Oberpfaffenhofen, 9-11 October 2007. 1-7.

Goodyear, P. and Ellis, R. 2007. Students' interpretations of learning tasks: implications for educational design. In: *Proceedings of ASCILITE 2007*. Singapore, 2-5 December 2007. 339-346.

Goodyear, P. and Ellis, R. 2010. Expanding conceptions of study, context and educational design. In: Sharpe, R., Beetham, H. and De Freitas, S. eds. *Rethinking learning for a digital age*. New York: Routledge, 100-113.

Green, D. 2006. *Using digital images in teaching and learning: perspectives from Liberal Arts institutions* [online]. Available: <http://www.academiccommons.org/imagereport> (Accessed 12 January 2007).

Greenfieldboyce, N. 2009. *Houston, we erased the Apollo 11 tapes* [online]. Available: <http://www.npr.org/templates/story/story.php?storyId=106637066> (Accessed 30 June 2011).

Greyling, F. 2007. The why and how of technology-assisted learning: authentic professional development for higher education practitioners. D.Ed., University of Johannesburg.

Gribbin, J. and Gribbin, M. 1997. *Faraday in 90 minutes*. Hyderabad: Universities Press.

Gropius, W. 2012. *Bauhaus: concepts and styles*: [online]. Available: <http://www.theartstory.org/movement-bauhaus.htm> (Accessed 21 July 2012).

Guan, S. and Zhang, X. 2004. Design and implementation of a web based personal digital library. *Journal of the Institution of Engineers, Singapore*, 44 (3): 59-77.

Guba, E. ed. 1990. *The paradigm dialog*. California: SAGE Publications.

Gutteridge, R.G. 2006. The myth of panacea: a critical realist exploration of blended course delivery. In: *Proceedings of NADEOSA 10th Anniversary Conference*. Pretoria, 23-24 August 2006.

Gutteridge, R.G. 2009. The impact of socio-cultural factors on blended learning in the development of academic literacy in a tertiary vocational context. MTech (Education), Durban University of Technology.

Harré, R. 1979. *Social being*. Oxford: Oxford University Press.

Harré, R. 1986. *The philosophies of science*. Oxford: Oxford University Press.

Hart, D.C. 2007. African Americans as photographers and photographic subjects. In: Peres, M.R. ed. *Focal encyclopedia of photography: digital imaging, theory and applications, history, and science*. 4th edn. Oxford: Elsevier Focal Press, 234-238.

Hartman, J., Moskal, P. and Dziuban, C. 2005. Preparing the academy of today for the learner of tomorrow. In: Oblinger, D.G. and Oblinger, J.L. eds. *Educating the Net Generation*. Washington: Educause, 6.1-6.15.

Hawke, S. 2010. *Introduction to linked data with Sandro Hawke on vimeo*. Available: <http://www.w3.org/2010/Talks/0608-linked-data> (Accessed 2 July 2012).

Hennessy, S., Ruthven, K. and Brindley, S. 2005. Teacher perspectives on integrating ICT into subject teaching: commitment, constraints, caution, and change. *Journal of Curriculum Studies*, 37 (2): 155-192.

Hevner, A.R., March, S.T., Park, J. and Ram, S. 2004. Design science in Information Systems research. *MIS Quarterly*, 28 (1): 75-105.

Heyman, T.T. 1996. *On the edge of America: California modernist art, 1900-1950*. Oxford: University of California Press.

Hill, G. 2009. A framework for valuing the quality of customer information. Ph.D., University of Melbourne.

Hodgkinson-Williams, C. 2010. Benefits and challenges of OER for Higher Education Institutions. Paper presented at the *Open Educational Resources (OER) Workshop for Heads of Commonwealth Universities*. Cape Town, South Africa, Creative Commons Attribution Share Alike, 23.

Hodgkinson-Williams, C., Paskevicius, M., Cox, G., Shaikh, S., Czerniewicz, L. and Lee-Pan, S. 2013. 365 Days of openness: the emergence of OER at the University of Cape Town. In: McGreal, R., Kinuthia, W. and Marshall, S. eds. *Open educational resources: innovation, research and practice*. Vancouver: Commonwealth of Learning and Athabasca University, 33-45.

Hoel, C. 2010. Morphogenetic approaches to religion: understanding religion from the perspective of Margaret Archer. Master's degree (Education), University of Agder.

Hofstee, E. 2006. *Constructing a good dissertation: a practical guide to finishing a master's, MBA or PhD on schedule*. Johannesburg: EPE.

Holzer, S.W. 2010. Design and implementation of user level socket application programming interface with socket splitting and mediation. M.Sc. (Computer Science), California Polytechnic State University.

Horrocks, I. 2006. *Exploring information systems development in English local government: a morphogenetic approach*. Milton Keynes: Open University.



Horrocks, I. 2009. Applying the morphogenetic approach: outcomes and issues from a case study of information systems development and organisational change in British local government *Journal of critical realism*, 8 (1): 35-62.

Hurworth, R. 2004. The use of the visual medium for program evaluation. In: Pole, C.J. ed. *Seeing is believing? Approaches to visual research*. Amsterdam: Elsevier, 163-180.

Hylén, J. 2006. Open Educational Resources: opportunities and challenges. *Open Education*: 49-63.

Hylén, J. and Schuller, T. 2007. Giving knowledge for free. *OECD Observer*: 21-22.

Hylén, J., Van Damme, D., Mulder, F. and D'Antoni, S. 2012. Open Educational Resources: analysis of responses to the OECD country questionnaire. *OECD Education Working Papers*, 76: 1-30.

Interaction Blog. 2011. *History of the Internet timeline* (Blog). Available: <http://a.parsons.edu/~laia263/alleson/?p=55> (Accessed 23 June 2012).

Irwin, L. 1997. *Differentiation and stratification* [online]. Available: [http://www.criticalrealism.com/index.php?sitesig=WSCR&page=WSCR\\_060\\_WSCR\\_Glossary&subpage=WSCR\\_090\\_Differentiation\\_and\\_Stratification](http://www.criticalrealism.com/index.php?sitesig=WSCR&page=WSCR_060_WSCR_Glossary&subpage=WSCR_090_Differentiation_and_Stratification) (Accessed 9 December 2012).

Jefferies, B. 2011. Critical realism: an empirical realist critique: working paper. Manchester Metropolitan University, Manchester. Available: <http://www.ribm.mmu.ac.uk/wps/papers/11-03.pdf> (Accessed 1 December 2012).

Johansen, J. and Wiley, D. 2011. A sustainable model for OpenCourseWare development. *Education Tech Research Development*, 59: 369–382.

Johnstone, S.M. 2005. Open educational resources service the world. *Educause Quarterly*, (3): 14-18.

Kaboub, F. 2001. *Roy Bhaskar's critical realism: a brief overview and a critical evaluation* [online]. Available: <http://f.students.umkc.edu/fkfc8/BhaskarCR.htm> (Accessed 30 December 2003).

Kahn, T. 2008. The road to the Information Age. Available: <http://www.theatlantic.com/magazine/archive/2008/07/the-road-to-the-information-age/306922/>

Kapechki, J.A. 2007. Color photography. In: Peres, M.R. ed. *Focal encyclopedia of photography: digital imaging, theory and applications, history, and science*. 4th edn. Oxford: Elsevier Focal Press, 693-700.

Keats, D.W. 2012. *An ecological approach to free and open source software for governments and organizations* [online]. Available: <http://www.slideshare.net/dkeats/an-ecological-approach-to-free-and-open-source-software-for-governments-and-organizations> (Accessed 10 August 2012).

Kemmis, S. and McTaggart, R. 2005. Participatory action research: communicative action and the Public Sphere. In: Denzin, N.K. and Lincoln, Y.S. eds. *Handbook of qualitative research*. 2nd edn. Thousand Oaks, CA: Sage, 559-603.

Khondker, H.H. 2011. Role of the new media in the Arab Spring. *Globalizations*, 8 (5): 675-679.

Kids with cameras. n.d. *Born into brothels press kit* [online]. Available: <http://www.kids-with-cameras.org/bornintobrothels/presskit.php> (Accessed 3 July 2011).

Kim, J. 2012. The institutionalization of YouTube: from user-generated content to professionally generated content. *Media, Culture & Society*, 34 (1): 53-67.

Kirsch, R. 1957. *Scanner and newborn Image*, (Kirsch, 1957). Available: <http://www.engadget.com/2010/06/30/russell-kirsch-helped-create-them-now-he-wants-to-kill-square-p/> (Accessed 3 July 2012).

Kjeldskov, J. 2013. Mobile computing. In: Soegaard, M. and Dam, R.F. eds. *The encyclopedia of human-computer interaction*. 2nd edn. Aarhus, Denmark: The Interaction Design Foundation.

Kodak. n.d. *History of Kodak: George Eastman* [online]. Available: [http://www.kodak.com/ek/US/en/Our\\_Company/History\\_of\\_Kodak/George\\_Eastman.htm](http://www.kodak.com/ek/US/en/Our_Company/History_of_Kodak/George_Eastman.htm) (Accessed 29 July 2012).

Koper, R. 2005. Increasing learner retention in a simulated learning network using indirect social interaction. *Journal of Artificial Societies and Social Simulation*, 8 (8): 1-25.

Kroemer, K.H.E. 2001. Keyboards and keying: an annotated bibliography of the literature from 1878 to 1999. *UAIS*, 1: 99–160.

Kvavik. 2005. Convenience, communications, and control: how students use technology. In: Oblinger, D.G. and Oblinger, J.L. eds. *Educating the Net Generation*. Washington: Educause, 7.1-7.20.

LaFraniere, S. 2005. Cellphones catapult rural Africa to 21st century. *The New York Times*. 4.

Lam, Y. 2000. Technophilia vs. technophobia: a preliminary look at why second-language teachers do or do not use technology in their classrooms. *Canadian Modern Language Review*, 56 (3): 389-420.

Lasser, M. 1972. *Audiovisual notes from Kodak: photography and learning at Harley (T.91.2.1)*. Rochester: Kodak.

Laughton, P.A. 2011. Open Archival Information System (OAIS) as a data curation standard in the World Data Centre. D. Litt. et Phil. (Information Management), University of Johannesburg.

Lawson, C. 2008. An ontology of technology: artefacts, relations and functions. *Techné: Research in Philosophy and Technology*, 12 (1): 1-14.

Leibovitz, A. 2014. *Disney dream portraits by Annie Leibovitz: behind the scenes with Jessica Chastain as Merida*. YouTube video. Available: [http://www.youtube.com/watch?v=C0ISW\\_I tqhw](http://www.youtube.com/watch?v=C0ISW_I tqhw) (Accessed 1 March 2014).

Leiner, B.M., Cerf, V.G., Clark, D.D., Kahn, R.E., Kleinrock, L., Lynch, D.C., Postel, J., Roberts, L.G. and Wolff, S.S. 1997. The past and future history of the internet. *Communications of the ACM* 29, 40 (2): 102-108.

Lewin, T. 2013. After setbacks, online courses are rethought. *New York Times*. Available: <http://www.nytimes.com/2013/12/11/us/after-setbacks-online-courses-are-rethought.html> (Accessed 17 December 2013).

Lin, C.S., Wu, S. and Tsai, R.L. 2005. Integrating perceived playfulness into expectation: confirmation model for web portal context. *Information and Management*, 42 (5): 683-693.

Lohr, S. 2011. *Lytro's camera lets you shoot first and focus later* [online]. Available: [http://www.nytimes.com/2011/06/22/technology/22camera.html?\\_r=2](http://www.nytimes.com/2011/06/22/technology/22camera.html?_r=2) (Accessed 27 June 2011).

Long, P.D. 2001. *OpenCourseWare: simple idea, profound implications* [online]. Available: <http://campustechnology.com/articles/2001/12/opencourseware-simple-idea-profound-implications.aspx> (Accessed 16 February 2014).

Lord, P. and Macdonald, A. 2003. *e-Science curation report for e-Science in the UK: an audit to establish requirements for future curation and provision*. Digital Archiving Consultancy Limited.

Luckett, K. 2007. Methodology matters: possible methods to improve quality *Perspectives in Education*, 25 (3): 1-11.

Luckett, K. 2012. Working with 'necessary contradictions': a social realist meta-analysis of an academic development programme review. *Higher Education Research & Development*, 31 (3): 339-352.

Mahdizadeh, H., Biemans, H. and Mulder, M. 2008. Determining factors of the use of e-learning environments by university teachers. *Computers & Education*, 51 (1): 142-154.

Makhubu, R.L. 2011. Development of an interpreting service model at the Durban University of Technology. DTech (Language Practice), Durban University of Technology.

Manduca, C.A., Fox, S. and Iverson, E.R. 2006. Digital library as network and community center: a successful model for contribution and use. *D-Lib Magazine*, 12 (12).

Manicas, P. 1998. A realist social science. In: Archer, M., Bhaskar, R., Collier, A., Lawson, T. and Norrie, A. eds. *Critical realism. Essential readings*. London: Routledge, 313-338.

Mason, R. 2005. On-line learning and supporting students: new possibilities. In: Tait, A. and Mills, R. eds. *Rethinking learner support in distance education*. London: Routledge, 90-101.

McCluskey, F.B. and Winter, M. 2013. MOOCs, ethics and the economics of higher education. *e-mentor*, 4 (51): 91-94.

McNeely, B. 2005. Using technology as a learning tool, not just the cool new thing. In: Oblinger, D.G. and Oblinger, J.L. eds. *Educating the Net Generation*. Washington: Educause, 4.1-4.10.

McNiff, J. 2002. *Action research for professional development* [online]. Available: <http://www.jeanmcniff.com/booklet1.html> (Accessed 28 August 2006).

McNiff, J. and Whitehead, J. 2000. *Action research in organisations*. London and New York: Routledge.

Media College. 2011. *Three point lighting technique* [online]. Available: <http://www.mediacollege.com/> (Accessed 4 March 2012).

Meeker, M. 2010. *Internet trends*. Internet slide show. Available: <http://www.slideshare.net/guest1222bdb/mary-meeker-april-2010-internet-trends> (Accessed 23 June 2012).

Menezes, P. 2011. *Techniques 1 - Pinhole photograph*. Durban: DUT.

Millard, J. 2007. Retro-Histo: making an image fit your histogram. *Joshmillard.com* (Blog). Available: <http://www.joshmillard.com/2007/10/04/retro-histo-making-an-image-fit-your-histogram/> (Accessed 31 March 2012).

Mingers, J. 2000. The contribution of critical realism as an underpinning philosophy for OR/MS and systems. *Journal of the Operational Research Society*, 51 (11): 1256-1270.

Mingers, J. 2004. Re-establishing the real: critical realism and information systems. In: Mingers, J. and Willcocks, L. eds. *Social theory and philosophy for information systems*. Chichester, UK: Wiley.

Moore, J. *BigShot: snap-together camera introduces kids to tech, and to their world*. 2010. Available: <http://www.csmonitor.com/Innovation/Tech/2010/0106/BigShot-Snap-together-camera-introduces-kids-to-tech-and-to-their-world> (Accessed 7 February 2012).

Moore, J.L., Dickson-Deane, C. and Galyen, K. 2011. e-Learning, online learning, and distance learning environments: are they the same? *The Internet and Higher Education*, 14 (2): 129-135.

Mora, M. 2007. Open educational resources. *Technology Innovation Management Review*: Available: <http://timreview.ca/article/77> (Accessed 10 October 2011).

Morrison, V. 2012. Notes for photography educators. Paper presented at the *Photography Education Symposium*. Photokina, Cologne, Germany, 22-23 September 2012.

Munro, S.W. n.d. *Milstein Hall of ocean life: John Ernest Williamson* [online]. Available: [http://www.amnh.org/exhibitions/permanent/ocean/04\\_history/d\\_williamson.php](http://www.amnh.org/exhibitions/permanent/ocean/04_history/d_williamson.php) (Accessed 20 July 2012).

Mutch, A. 2010. Technology, organization, and structure: a morphogenetic approach. *Organisation Science*, 21 (2): 507-520.

Nawaz, M., Hussain, F. and Zaka, B. 2013. Review of E-Learning methodologies in Pakistan. *World Applied Sciences Journal*, 28 (4): 425-439.

Nayar, S. 2009a. *Bigshot: a camera for Education* [online]. Available: <http://www.bigshotcamera.org/> (Accessed 27 June 2011).

Nayar, S. 2009b. *The camera for education*. YouTube video. Available: <http://www.bigshotcamera.com/> (Accessed 27 June 2011).

Nelson, T.H. 1974. *Dream machines: new freedoms through computer screens - a minority report*. Chicago: Nelson.

New York Times. 1911. New method of teaching morality to the young: visual instruction in right and wrong and niceties of conduct, the keynote of novel educational movement begun by Milton Fairchild. 2 April 1911: 56.

Newman, L. and Gifford, G. 2010. Student protests erupt at university. *IOL news (online)*. 1. Available: <http://www.iol.co.za/news/south-africa/student-protests-erupt-at-university-1.475285> (Accessed 4 March 2010).

Ng, R. 2006. Digital light field photography. Ph.D. (Computer Science), Stanford University.

Ng, R., Levoy, M., Brédif, M., Duval, G., Horowitz, M. and Hanrahan, P. 2005. *Light field photography with a hand-held plenoptic camera*. Stanford Tech Report CTSR 2005-02: Stanford University.

Njihia, J.M. 2008. ICT for development reconsidered: a critical realist approach to the strategic context in Kenya's transition to E-Governance. Ph.D. (Information Business Systems), University of Warwick.

Norris, C. 1999. Roy Bhaskar interviewed. *The Philosophers' Magazine*, (8): Available: [http://www.criticalrealism.com/archive/rbhaskar\\_rbi.html](http://www.criticalrealism.com/archive/rbhaskar_rbi.html)

Oblinger, D.G. and Oblinger, J.L. eds. 2005a. *Educating the Net Generation*. Washington: Educause.

Oblinger, D.G. and Oblinger, J.L. 2005b. Is it age or IT: first steps toward understanding the Net Generation. In: Oblinger, D.G. and Oblinger, J.L. eds. *Educating the Net Generation*. Washington: Educause, 2.1-2.19.

OECD. 2007. *Giving knowledge for free: the emergence of open educational resources*. Paris: CERL.

Olsen, W.K. 2004. Triangulation in social science research: quantitative and qualitative methods can really be mixed. In: Holborn, M. and Haralambos eds. *Developments in Sociology*. Ormskirk: Causeway Press, 103-188.

Orlikowski, W.J. 1992. The duality of technology: rethinking the concept of technology in organizations. *Organization Science*, 3 (3): 398–427.

Osterman, M. 2007. Introduction to photographic equipment, processes, and definitions of the 19th century. In: Peres, M.R. ed. *Focal encyclopedia of photography: digital imaging, theory and applications, history, and science*. 4th edn. Oxford: Elsevier Focal Press, 36-123.

Payet, C. 2013. Portal is a class act. *Sunday Magazine, Sunday Tribune*. 27 October 2013: 1-16.

Peres, M.R. 2007a. Advances in photographic technology. In: Peres, M.R. ed. *Focal encyclopedia of photography: digital imaging, theory and applications, history, and science*. 4th edn. Oxford: Elsevier Focal Press, 3-22.

Peres, M.R. 2007b. Profiles of selected photographic and digital companies. In: Peres, M.R. ed. *Focal encyclopedia of photography: digital imaging, theory and*

*applications, history, and science*. 4th edn. Oxford: Elsevier Focal Press, 301-320.

Peté, M., Fregona, C., Allinson, T. and Cronje, J. 2002. Developing a community of online learning practitioners at the Durban Institute of Technology. Paper presented at the *Conference on Communication and Information Technology in Tertiary Education (CITTE)*. University of Natal, Durban, 25–27 September, 2002.

Phillips, J. 2009a. *Bigshot's polyoptic wheel* [online]. Available: <http://www.bigshotcamera.org/sections/learn/wheel/index.html> (Accessed 27 June 2011).

Phillips, J. 2009b. *Bigshot camera* [online]. Available: <http://www.bigshotcamera.org/sections/build/parts.html> (Accessed 27 June 2011).

Photography Art Cafe. 2012. *Famous fashion photographers* [online]. Available: <http://www.photography-art-cafe.com/famous-fashion-photographers.html> (Accessed 7 August 2012).

Piedra, N., Tovar, E., Colomo-Palacios, R., Lopez-Vargas, J. and Chicaiza, J.A. 2012. Consuming and producing linked open data: the case of OpenCourseWare. *Program: Electronic Library and Information Systems*, 48 (1): 16-40.

Pole, C.J. ed. 2004. *Seeing is believing? Approaches to visual research*. Amsterdam: Elsevier.

Porpora, D.V. 1998. Four concepts of social structure In: Archer, M., Bhaskar, R., Collier, A., Lawson, T. and Norrie, A. eds. *Critical realism. Essential readings*. London: Routledge, 339-355.

Pratt, D.D. 2004. The Comm. Skills Online project: a tentative exploration of the interrelationship between traditional page-bound literacy, computer literacy and the development of academic literacy. *International Journal of Learning*, 11: 1739-1746.

Pratt, D.D. 2005. Mixed-mode Communication courses at a multicultural technikon: a pilot study combining web-based learning and an Internet search project with face-to-face classroom instruction In: Schaffer, S.P. and Price, M.L. eds. *Interactive convergence: critical issues in multimedia*. Oxford, UK: Inter-Disciplinary Press, 143-170.



Pratt, D.D. 2010. Bridging the continental divide: a reflective account of online distance supervision at the Durban University of Technology. In: Proceedings of *NADEOSA 2010 Conference*. Potchefstroom, 6-8 September 2010. 1-25.

Pratt, D.D. 2011. *Modelling written communication: a new systems approach to modelling in the social sciences*. Dordrecht: Springer.

Pratt, D.D. 2013. Transforming social structure with ICT in research capacity building at a multicultural university of technology. In: Proceedings of *EdMedia 2013*. Victoria, British Columbia, 24-28 June 2013. 856-861.

Pratt, D.D. 2014. The Internet as social system: applying Margaret Archer's theory of morphogenesis to hypermedia communication. *Journal of Systemics, Cybernetics and Informatics*, 12 (1): 5-9.

Pratt, D.D. and Gutteridge, R.G. 2006. The role of the social mechanism in social transformation: a critical realist approach to blended learning. In: Proceedings of *8th Annual Conference on World Wide Web Applications*. Bloemfontein, 6-8 September 2006.

Pynoo, B., Tondeur, J., van Braak, J., Duyck, W., Sijnave, B. and Duyck, P. 2011. Teachers' acceptance and use of an educational portal. *Computers & Education*, 58 (2012): 1308–1317.

Qualman, E. 2009. *Socialnomics: how social media transforms the way we live and do business*. Hoboken, NJ: John Wiley.

Quinn, L. 2006. A social realist account of the emergence of a formal academic staff development programme at a South African university. Ph.D., Rhodes University.

Raeburn, J. 2008. Documenting the face of America: Roy Stryker and the FSA/OWI. *The Journal of American History*, 95 (3): 944-946.

Raggl, A. and Schratz, M. 2004. Using visuals to release pupils' voices: emotional pathways into enhancing thinking and reflecting on learning. In: Pole, C.J. ed. *Seeing is believing? Approaches to visual research*. Amsterdam: Emerald Group, 147-162.

Ramaley, J. and Zia, L. 2005. The real versus the possible: closing the gaps in engagement and learning. In: Oblinger, D.G. and Oblinger, J.L. eds. *Educating the Net Generation*. Washington: Educause, 8.1-8.21.

Raskar, R., Kirmani, A., Hutchison, T. and Davis, J. 2009. *Looking around the corner using Transient Imaging* [online]. Available: <http://web.media.mit.edu/~raskar/femto/>. (Accessed 29 June 2011).

Ratty, B. 1998. *Photo seminars* [online]. Available: <http://www.photo-seminars.com/union.htm> (Accessed 9 May 2003).

Reddy, P. 2014. A learning object repository for computer assisted language learning in order to provide resources for language learners in schools in Kwazulu-Natal. MTech (Language Practice), Durban University of Technology.

Renaud, J.P. 2007. Gain a new perspective. *Choice*, 44 (12): 2077-2078.

Richter, T. and McPherson, M. 2012. Open educational resources: education for the world? *Distance Education*, 33 (2): 201-219.

Roberts, G. 2005. Technology and learning: expectations of the Net Generation. In: Oblinger, D.G. and Oblinger, J.L. eds. *Educating the Net Generation*. Washington: Educause, 3.1-3.7.

Rosenblum, N. 1997. *A world history of photography*. New York: Abbeville.

Rowse, D. 2009. *A notice to Photography Clubs and teachers about using our tutorials* [online]. Available: <http://digital-photography-school.com/a-notice-to-photography-clubs-and-teachers-about-using-our-tutorials> (Accessed 2 November 2009).

Rowse, D. 2011. *Photography tips and tutorials - Introduction to white balance* [online]. Available: <http://www.digital-photography-school.com/introduction-to-white-balance> (Accessed 20 January 2012).

Russell, C.A. 2000. *Michael Faraday: physics and faith*. Oxford: Oxford University Press.

Sabra, A.I. 2003. *Brief life of an Arab mathematician* [online]. Available: <http://harvardmagazine.com/2003/09/ibn-al-haytham-htm> (Accessed 18 February 2012).

Sampson, D. 2007. Evaluation of web portals. In: Tatnall, A. ed. *Enclopedia of portal technologies and applications*. Hershey, PA: Information Science Reference, 376-383.

Sandeen, C. 2013. Assessment's place in the new MOOC world. *Research & Practice in Assessment*, 8 (8).

Sandore, B. and Dunkelberger, R. 1996. *Final report: The University of Illinois/Kodak digital imaging project: a report on the use of the digital imaging workstation and related imaging projects* [online]. Available: <http://images.grainger.uiuc.edu/kodakappC.htm> (Accessed 1 May 1999).

Sanpath, A. and Comins, L. 2012. Freak storm as Durban hit by 'six inches' of hail. *Independent on Saturday* 9 June 2012: 1.

Sharboneau, E. 2010. *Trick photography and special effects: core photography fundamentals*. Available: <http://trickphotographybook.com/?hop=roybarker>.

Sharboneau, E. 2011. *DSLR Basics: Aperture, shutter speed, and ISO*. YouTube video. Available: [http://www.youtube.com/watch?v=pzgALhGF8\\_o](http://www.youtube.com/watch?v=pzgALhGF8_o) (Accessed 4 July 2011).

Sharp, L. 2010. The generations, defined Baby Boomer, Gen X, Gen Y: who are they? *Suite101 Community* (Blog). Available: <http://kelly-sharp.suite101.com/the-generations-defined-a188634> (Accessed 18 May 2012).

Shaughnessy, M.P. 1977. *Errors and expectations*. New York: Oxford University Press.

Shaw, M. 2000. *Defining a viable multimedia courseware engineering approach* [online]. Available: [http://www.shawmultimedia.com/course\\_eng.pdf](http://www.shawmultimedia.com/course_eng.pdf) (Accessed 10 July 2012).

Shirley, C. 2004. Untitled. In: Pole, C.J. ed. *Seeing is believing? Approaches to visual research*. Amsterdam: Elsevier.

Shneiderman, B. 1987. User interface design for the Hyperties electronic encyclopedia. Paper presented at the *Hypertext '87 Workshop*. Raleigh, NC, November 13-15. 199-204.

Shneiderman, B. 2002. *Leonardo's laptop. Human needs and the new computing technologies*. Cambridge: Massachusetts Institute of Technology.

Shneiderman, B. and Kearsley, G. 1989. *Hypertext hands-on! An introduction to a new way of organizing and accessing information*. New York: Addison Wesley.

Shneiderman, B. and Plaisant, C. 2005. *Designing the user interface: strategies for effective human-computer interaction*. 4th edn. Boston: Pearson.

Siemens, G. 2013. Massive open online courses: innovation in education? In: McGreal, R., Kinuthia, W. and Marshall, S. eds. *Open educational resources: innovation, research and practice*. Vancouver: Commonwealth of Learning and Athabasca University, 268.

Smith, M. and Donnelly, S. 2004. Power, inequality, change and uncertainty: viewing the world through the development prism. In: Poles, C.J. ed. *Seeing is Believing?: approaches to visual research-studies in qualitative methodology*. Emerald Group, 123-145.

Smith, N. 2010. *Wedding photography: 101 tips, tricks and secrets* [online]. Available: <http://trickphotographybook.com/?hop=wsecrets> (Accessed 10 May 2011).

Sokufudumala, A. 2012. Research Information Management System. *TIP talks*. June 2012: 12-13. Available: <http://dutmoodle.dut.ac.za/moodle/mod/resource/view.php?id=4128> (Accessed 2 February 2013).

Springer, M., Dulabahn, B., Michel, P., Natanson, B., Reser, D., Woodward, D. and Zinkham, H. 2008. *For the common good: the Library of Congress Flickr pilot project*. Available: [http://www.loc.gov/rr/print/flickr\\_report\\_final.pdf](http://www.loc.gov/rr/print/flickr_report_final.pdf) (Accessed 28 September 2013).

Stein, K. 2013. Penn GSE study shows MOOCs have relatively few active users, with only a few persisting to course end *GSE press room*. Available: <http://www.gse.upenn.edu/pressroom/press-releases/2013/12/penn-gse-study-shows-moocs-have-relatively-few-active-users-only-few-persisti> (Accessed 20 January 2014).

Stuart, N.M. 2007. Photographic higher education in the United States. In: Peres, M.R. ed. *Focal encyclopedia of photography: digital imaging, theory and applications, history, and science*. 4th edn. Oxford: Elsevier Focal Press, 210-222.

Student, G. 2011. Commercial fashion photography- reflective journal report-work experience. *Baccalaureus Technologiae: Photography*, Durban University of Technology, Durban.

Student Survey. 2011. *Photography student feedback*. Durban University of Technology.

TakingITGlobal. 2007. *Kids with cameras: curriculum guide* [online]. Available: <http://www.tiged.org> (Accessed 3 July 2011).

Taves, B. and Munro, S.W. n.d. *Milstein Hall of ocean life: John Ernest Williamson* [online]. Available: [http://www.amnh.org/exhibitions/permanent/ocean/04\\_history/d\\_williamson.php](http://www.amnh.org/exhibitions/permanent/ocean/04_history/d_williamson.php) (Accessed 20 July 2012).

Taylor, J.C. 1997. Flexible learning systems: opportunities and strategies for staff development in industry. Paper presented at the *11th AAOU Conference*. Kuala Lumpur, Malaysia, 1997.

Toles, J.L. 2009. The virtual classroom: an enhancement or replacement to traditional education. Undergraduate Research Awards. Paper 3. Available: [http://digitalarchive.gsu.edu/univ\\_lib\\_ura/3](http://digitalarchive.gsu.edu/univ_lib_ura/3) (Accessed 12 October 2011).

Travis, D. 2012. *Writing and content quality usability guidelines* [online]. Available: <http://www.userfocus.co.uk/resources/contentchecklist.html> (Accessed 14 May 2012).

Tricker, R.A.R. 1966. *The contributions of Faraday and Maxwell to electrical science*. Oxford: Pergamon Press.

Vallely, P. 2006. *How Islamic inventors changed the world* [online]. Available: <http://www.independent.co.uk/news/science/how-islamic-inventors-changed-the-world-469452.html> (Accessed 18 February 2012).

Vandenberghe, F. 2003. The Archers: a tale of folk (final episode?) (Review of the book *Structure, agency and the internal conversation*). *European Journal of Social Theory*, 8 (2): 227-237.

Veith, R.H. 2006. Memex at 60: Internet or iPod? *Journal of the American society for information science and technology*, 57: (9).

Verstegen, I. 2000. *Bhaskar and American critical realism* [online]. Available: [http://www.criticalrealism.com/archive/iverstegen\\_baacr.html](http://www.criticalrealism.com/archive/iverstegen_baacr.html) (Accessed 12 June 2012).

Wang, M.Y. and Hwang, M.J. 2004. The e-learning library: only a warehouse of learning resources? *The Electronic Library*, 22 (5): 408-415.

Welsh, E.T., Wanberg, C.R., Brown, K.G. and Simmering, M.J. 2003. E-learning: emerging uses, empirical results and future directions. *International Journal of Training and Development*, 7 (4): 245-258.

Williams, C. 2011. BlackBerry services collapse again. Available: <http://www.telegraph.co.uk/technology/blackberry/8820075/BlackBerry-services-collapse-again.html>

Wilson, T. 2008. New ways of mediating learning: investigating the implications of adopting open educational resources for tertiary education at an institution in the United Kingdom as compared to one in South Africa. *The International Review of Research in Open and Distance Learning*, 9 (1): 1-19.

Windham, C. 2005. The student's perspective. In: Oblinger, D.G. and Oblinger, J.L. eds. *Educating the Net Generation*. Washington: Educause, 5.1-5.16.

Wingfield, N. 2013. Microsoft Gets Nokia Units, and Leader. *The New York Times*.

Witthaus, G. 2011. Open to sharing in higher education: from Leicester to Durban (Keynote address). Paper presented at the *DUT eLearning Festival 2011*. DUT Hospitality and Conference Centre, 23-25 November 2011.

Wong, C.K. 2005. A critical realist approach to organizational innovation research. In: Proceedings of *4th International Critical Management Studies Conference*. Cambridge University, 4th - 6th July 2005.

Woodward, R.B. 2013. Snapshot of a curator *The Wall Street Journal*. 1-3.

World Health Organisation. 2011. *mHealth-New Horizons for Health through Mobile Technologies* [online]. Available: [http://www.who.int/goe/publications/goe\\_mhealth\\_web.pdf](http://www.who.int/goe/publications/goe_mhealth_web.pdf) (Accessed 9 July 2011).

World Photography Organisation. 2012. Notes for Photography Educators. *Photography Education Symposium*: 22-23 September 2012.

World Wide Web Consortium. 2011. *What is the Semantic Web?* [online]. Available: <http://www.w3.org/2001/sw/> (Accessed 2 June 2012).

Woukeu, A., Wills, G., Conole, G., Carr, C., Kampa, S. and Hall, W. 2003. Ontological hypermedia in education: a framework for building web-based educational portals. In: Proceedings of *EDMEDIA 2003 - World Conference on Educational Multimedia, Hypermedia, and Telecommunications*. Honolulu, Hawaii, USA. 349-357.

Yakel, E. 2007. Digital curation. *OCLC Systems & Services*, 23 (4): 335-340.

Yuan, L. and Powell, S. 2013. *A white paper on MOOCs and open education: implications for higher education*. University of Bolton: CETIS.

Yuan, L., Powell, S. and Olivier, B. 2014. *Beyond MOOCs: sustainable online learning in institutions*. University of Bolton: CETIS.

Zuber-Skerritt, O. and Ryan, Y. 1994. *Quality in postgraduate education*. London: Kogan Page.

Zucker, M. 2007. *Autobiography* [online]. Available: <http://www.montezucker.com/content.html?page=1> (Accessed 14 March 2012).