Abstract

Using Groupwork in the Designing and Playing of Board Games in Educational, Occupational Health and Safety

Keywords: Occupational Education, Groupwork, Learning, Occupational Health and Safety
Robertson, (2004) and Kaur, (2006) among others explored the importance of making games developed as a result of playing the game, studies by Bolton and Opt (2006); Good and
simulated tasks, knowledge is developed through the computer of the game, and skills are
reported to aid (2007) and that games provide a forum in which learning arises as a result of
an acceptable learning approach in an otherwise rather unimaginative curriculum world.
Regulations pertaining to health and hygiene because as Kamboor et al (2006) said, games are
develop students' knowledge, understanding and interpretation of the OHS Act and selected
educational information to address this problems, by using gamework to devise board games to
interpretation, and therefore implementation of the Act difficult. This paper documents an
in South Africa, the Occupational Health and Safety (OHS) Act (Act 85 of 1993) has been in

| that all sorts of work activities are carried out safely and with minimum risk.

2003, p.2)

Safely and health of workers is part and parcel of human security. Safe work is not only sound

Introduction
In order to achieve the above aim, the following objectives were addressed:

Objectives

Aim

Within multicultural and multilingual classrooms, second language students believe that we are familiar with the benefits that it provides, especially speaking English as a first language. Having used groupwork in different contexts in the English language, students speak many challenges for students who do not speak English as the medium of instruction, as a result of which the majority of our students are second language students. In their mother tongue, most students come from very diverse homes. In order to achieve deep learning groupwork was used as the authors are familiar with the benefits of working within a group context. Our students come from very diverse homes.

Leads to conceptual changes in the students’ minds, comprehends information differently after the learning process and where the learning experience fosters deep learning. Head (2008) explains that deep learning occurs when students internally to design a board game and then play the games designed by others in the class, in an attempt to design and strategize and they develop new ways of thinking (Kathir, 2006).

Taking all of the above into account, this educational intervention required groups of students rather than merely playing them. They found that the greatest benefit remains for the designers of
Diversity are not openly declared or discussed, and people are just expected to get along. It was

She adds that while people are always trying to be politically correct, issues of race, culture and

on their campuses, no real strategies or policies have been put into place to ensure integration.

said, although institutions of learning are partially aware of the racial, cultural and ethnic divides

their diversity often do associate with their peers who are different from them. As Singh (2010)

are deepened with groupwork. This was an important outcome for us as our students, by virtue of

these Singh (2007) and Chapron and Day (2007) also found that relationships between students

and ability held by all the students and acknowledge the mutual benefits that arise from sharing

Day’s, 2007, p. 62), namely, that learning in groups recognizes and validates the skills, knowledge

We concord with Taylor’s (1996) experience of the value of learning in groups (in Chapron and

GROUPWORK

data collection instruments used are discussed in the methodology section.

questionnaire was used for the achievement of the third and fourth objectives (the quantitative

A pre-test and post-test were respectively employed to achieve the first two objectives and a

name), the development of interpersonal skills and relationships amongst team members.

- to determine the effect of the desgining and playing of the board game on group dynamics;

- to determine educational interaction and

- to determine students’ perception of the effectiveness of the use of board games as an

- to determine the effect of designing and playing the board games;

- to get students’ knowledge of the OHS Act and Regulations before designing and playing

- to assess students’ knowledge of the OHS Act and Regulations before designing and playing

- to assess students’ knowledge of the OHS Act and

- to assess the efficiency of designing and playing the board game.

- to assess the efficiency of designing and playing the board game.
Learning environments are necessarily personal, each individual's constructions are mediated by their backgrounds (Sinclair, 2004).

Experiences and beliefs which have been shaped by their home, cultural, educational and social context of a textbook. By implication then, the world of the learner constitutes prior knowledge. Or better understanding rather than receiving it from a more authoritative source such as a teacher, students' prior knowledge, which means that each learner actively constructs and reconstructs his or her understanding. Learning is an interpretative process as new information is given meaning in terms of existing knowledge according to Lilly (2002), Roth (1994), Kilborn (2000) and Cohen, A.,M. and Morrison (2006, p. 108) among others.

THEORETICAL FRAMEWORK

The mark of a true game: computer based games readily incorporate the key feature of competition which he describes as work on and use the games outside the classroom as well. Also, Hines (1102) noted that games do not have personal computers at home, we decided to use board games so that students could learn in a fun environment. But 54% of adults consider online games to provide opportunities for personal growth. We acknowledge the perceived benefits of computer games for teaching and learning, but as a mean to teach our lessons to enjoy fully personalized learning experiences and opportunities.

Younge and Liptis (1999) and Dempsey et al. (2002) among others suggest that computer games offer unique learning opportunities for children.

BOARDGAMES VS COMPUTER GAMES

Simulating Learning.

Therefore hoped that groupwork would enable closer relationships between the students, while
Within a social constructivist framework then, this education intervention used an active learning approach within groupwork to develop students' knowledge and understanding of the process (Kearley, 2006: De Freitas and Critchits, 2008).

Within a social constructivist framework this education intervention used an active communication thus allowing students to construct new relationships with knowledge in the construction of making games in a group also provides green scope for social interaction and their own understanding and learn in a natural unobtrusive manner (Dominan and Diddle, 2006). Allowing players to construct through enjoyable physical activity (Wright and Forester, 2007) allowing players to construct games are enjoyable, engaging, they promote problem-solving and decision-making and encourage them to take responsibility for what they learn, seeks to encourage independent, critical thinking in learners, fosters a deep approach to learning, among others add their active learning through learning through a variety of open-ended activities, and meaningful, self-directed, and active. Kane (2004, p. 277), Becker and Glasscoff (2003), Levy and Paul and Roswell (2005) and Cohen et al. (2006) suggest that learning should be a search for 1981.

They can perform independently and competently tomorrow (see also Vygotsky, 1962, 1978, Vygotsky, 1993, and Luke-Kapler, 2000, p. 69). In explaining Vygotsky's zone of proximal development, Vygotsky and understanding their transcribed the capabilities of the individuals on their own (David's, Sumber's social constructivist this proposal that collectives of persons are capable of actions the actions of others in a social setting and characteristics of the culture in which learning is
By analyzing data and writing up the results, educational intervention (including designing and playing the games) was two months followed.

After designing the games, the next step was for the class to play the various games. This was done over one week to allow each student to play all the games. The total duration of the miss a turn, go back three squares, move forward three squares, etc.

- The rules and steps are very simple and easy to follow.
- Formulate the rules of the game, and indicate clearly the steps to be followed. Ensure that the rules and steps are very simple and easy to follow.
- Give the game a suitable and appropriate name.
- Use a starter, e.g., dice, spinner, etc.
- Decide on playing instruments, e.g., beads, tiny commodities, etc.
- The color of the card to the color on the board.
- Formulate at least 25 questions and place each question on a separate card. Corresponding pictures, photographs, etc. on the board.
- Having a theme of topic (e.g., food, agriculture, etc.) place appropriate clip art, digital images, etc.
- Design a playing board, that is a square, rectangular, hexagon, pentagon, etc.

Specific guidelines were laid out for the design of the games as follows:

criteria which was based on the guidelines was carefully explained to the class.
Card, boards and materials such as pain and glue were provided to the students. The assessment.
The students had one month to design a game which would teach them OHS Act and Regulations.
of the students. The second part of the questionnaire focused on the effectiveness of the use of
the questionnaire and the post-test, but they did not want to ethically compromise the anonymity
biographical details. Finally, the authors could have used a numbering or coding system to link
from the post-test with responses on the questionnaire, it was necessary to ask for some
theories on the questionnaire, and because the authors wanted to cross-tabulate information
The questionnaire was administered after the post-test. As students were not asked to identify

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The purpose of the detailed tests was also to reinforce knowledge of the Act.

Two hours each were allocated to the tests, as they comprehensively tested knowledge of the
three sections pertinent to regulations on asbestos, lead, and hazardous chemicals substances.
With interpretation, application skills, and knowledge of the key sections of the Act. The last
questions on age and gender. The second section which was informed by the OHS Act, dealt
Both tests contained five sections. The first section focused on biographical details and contained
rest was used to determine the effectiveness of board games in teaching students the OHS Act.

and Safety Act (A5 5 of 1993) prior to them designing and playing the board games. The post-

The purpose of the pre-test was to determine students' knowledge of the Occupational Health
part of the evaluation.

research in the form of a questionnaire was used to gather student reflections on the process as
pre- and post-tests were conducted to assess the learning gained from the process. Qualitative

**Data Collection Instruments**

The design and effectiveness of the board games.

This educational intervention was an evaluation study as it was concerned with the assessment of

**Methodology**
They had studied the three sections of the Act and the three sets of regulations on asbestos, lead,
and safety. The reason for selecting this class was that they had studied the Occupational Health and
Safety Act (Act 85 of 1993) in depth as part of the course in Occupational Health and Safety.
In other words, they did not have any say regarding the composition of the
students. It must be noted that the authors did not select students to form a class; instead, a full
1993). The authors thus selected a full class and had 100% participation, that is, a total of 41
elements, and the purpose of the study (Babbie, 2004; Emory and Cooper, 1991;perhaps,
described in information (Ekern, 2003) and on the researchers' knowledge of the population, the
sample for this educational intervention was selected on the basis that they could provide the
knowledgeable participants who are able to provide the required data for the research. The
were selected. He adds that the advantage of purposeful sampling lies in the selection of
explain. Purposeful sampling is used when we have one or more specific predefined groups that
(1996)
The population was third year Environmental Health students at the Durban University of
The Sample

Package for Social Sciences (SPSS).

deeded usable. The responses were then coded, and analysed using version 18.0 of the Statistical
were ensured. A total of 41 questionnaires were returned. All the questionnaires were
complete and deposited in a specially marked box outside one of the author's offices. This was done
After the post-test, the questionnaire was administrated to each student which they had to
development of interpersonal skills and relationships with team members.
the board games as a teaching tool. The third section focused on group dynamics, namely, the
To ensure a mix of students in each group, as there were only 2 white and 11 Indian students in incorporated males and females, and students from different race or ethnic backgrounds. This was students were asked with choosing their own groups. With two conditions each group had to

The group of 41 was divided into seven groups of five students each, with one group of six.

Grouping the students

(The Economist, 2010).

According to SA’s 2012), many students choose to classify themselves this way to benefit classifys themselves differently. Given that transformation efforts in the country have not been

the statistics revealed that there were in fact colored students in the class but they choose to note that this sample was not only containing any colored students but closer examination of Indian people in South Africa. But the majority of its population is African. It is interesting to town in the province of KwaZulu-Natal. Geographically, Durban has the highest concentration of Indian and 57% were White. This educational intervention was conducted in Durban which is a which demands gender equality in OHS. African students made up 68% of the sample, 27% were of the OHS sector in industry by males, and because of the transformation agenda in the country students during registration at the beginning of the year in an attempt to address the dominance

made was not within the authors control. This was due to the department targeting female between 19 and 22 years of age. The fact that the sample was made up of 73% female and 27%

language proficiency, culture, home background, and race. All students in the sample were as was the case with all third year classes in the program, this class was diverse in terms of background or background knowledge required for this study.

and hazardous chemical substances. They were therefore deemed to have the necessary
deeper insights regarding gender roles, race relations, and power issues.

Among the students, discussions and debates regarding the above cases led to

"others in the group" because "I have a computer at home," "I speak English well," "I live near

"dominant" the project. Others felt "overwhelmed" as they were forced to do extra work. By

were more "capable," more articulate" or could speak English better" and wanted to

problematic. Some students raised issues such as bullying in the group, other students felt they

Cases presented included the following. The composition of some of the groups provided

communication skills.

students to all their references to the whole class, but this was done to another each

summary of what they had done in attempting to resolve the conflict. Commonly it was hard to ask

issue that could be easily resolved among themselves. As such, they had to provide a detailed

permission from the authorities who were wary of students taking up the class' time to discuss

discussion of progress. If they chose to present their conflict in the class, they first had to seek

they could present their case to the class at the weekly two hour session which was set aside for

Students were also told that they should resolve conflicts within their groups before

would be on a functional basis or not.

the group. They could decide on whether they wanted a group leader, or not, and whether this

prescribed to them. Rather they were allowed to make their own decisions based on needs within

Students had to assign task-related roles to each member of the group. Roes were therefore not

(as capable as possible), and then in terms of ability.

the class, students were informed that they had to compose their groups first in terms of race.
respectively after exposure to the game. This cannot be possible, as cumulative knowledge
subsequently improved by 2% and 5% in the second year.

Improvement in knowledge not application in the specific area of hazardous chemical
decrease in application proficiency. The findings indicated there was no significant
improvement in knowledge or application in the specific area of hazardous chemical.

In knowledge levels and insignificant increase and in fact in the case of one specific area, a
decrease in the cumulative effect of various measures, the learners indicated no significant
effectiveness of the teaching methodology. After the game, which should only have added
The purpose of the board game was to increase the skills, knowledge and proficiency

- Proficiency improved by a significant 10%.

- Respondents' knowledge in the specific area of OHS all improved significantly by 14%.

- Proficiency improved by 69% only.

- Respondents' knowledge in the specific area of OHS all improved significantly by 1%. Application

Evaluating findings and intervention outcomes

Firstly, the findings from the pre-and-post-tests were disappointing. After playing the OHS

Findings

- Attending classes regularly

- Participating without being part of a bigger group. Without the consequence, they started

- Would result in them being dismissed from the group and that they would not be able to

- On examination of the evidence, the two students were cautioned that non-attendance

One group sought the authors' intervention as two of their members were not attending classes

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(see also Kilian, 1998, 2001).

comes alive for learners when it comes through experiences they find meaningful and valuable.

active participation and was personally stimulating (29%); Kilian (2000, p. 19) learning
learning environment (26%); enhanced their understanding of the OHS Act (19%); encouraged
confidence in applying the OHS Act (8%); was learning through fun (21%); created a relaxed
situation for the games exercise was an effective learning experience in that it improved their

Student Reflections on the Process: Questionnaire Analyses

A more realistic view of their cumulative knowledge and skills during the post-test.

themselves. One explanation of the unexpected findings could therefore be that students acquired

in also afforded students an opportunity to reflect on their own learning and to critically assess

just not learn them. The post-test was designed to test as well as reinforce their knowledge, but

different sections, they needed to understand, interpret and apply the sections of the legislation

and knowledge of the fifty sections of the Act made them realize that although they knew the

and Regulations. The fact that the post-test assessed students' interpretation, application skills

intervention made them realize their shortcomings regarding their understanding of the OHS Act

During and after performing the post-tests, students gave the impression that the educational

Knowledge.

with the results of the post-test therefore, it appeared as if there was a decrease or decline in their

students had overestimated their knowledge of the OHS Act and Regulations. When corrected,

It was found that the pre-test had a negative effect on the outcome of the post-test results as

could have had an effect on the results of the pre-tests.

should not decrease. The results of the pre-tests were thus examined to determine if they
Given social norms, separate past responses to the question: how did the games exercise

motivate their work.

Competitive nature of the games motivated them to learn with understanding instead of just

The students develop an approach to learning determined by what is expected of them. The
better, and to "learn to understand so you can do better than the others," Creek (2001) explains
over again, which reinforced learning; the games thus motivated them to "learn harder and do
sections of the act in order to play the game," then they "had to learn the same thing over and
that they had to have good knowledge of the act in order to develop the game," learn all the
exercises, respondents were unanimous that learning was the most significant benefit. They said

In response to the question: overall, what did you find most beneficial from the games

problems and solutions (see also Lave, 1988, p. 69; Boug, 2007).

interest, they not only learn to gain pleasure from inquiry, they also gain ownership over
the group interactions. Rohl (1994, p. 216) noted that as learners pursue questions of their own
games exercise entailed a lot of hard work, but it enabled them to learn from their peers and
self-improvement (17%), and the ability to keep to deadlines (25%). 14% each indicated that the
for others (41%), greater self-awareness (26%), ability to participate or work in a team (92%),
construct teaching material together. They reported that they derived benefit in terms of respect
with each other on such a profound basis in a setting where they can discuss, design and
with the conventional teaching this is not promoted, as they do not get opportunities to interact
promoted relationships with peers they otherwise do not communicate with. They added that
the designing and construction phase of the games helped to develop interpersonal skills and
The students enjoyed the social aspects of the groupwork exercise (98%). They indicated that
representative sample in terms of race and gender would have further emboldened generalization. That the make up of the class was beyond the authors' control, the inclusion of a more for generalization, a further impediment to generalization lay in the sample. Beginning in mind educational intervention falls into the category of a single case evaluation study with limitations compared with those of the intervention class, the authors accept that as it stands, this using the same making and playing approach. Results of the pre- and post-tests could then be have served as a comparison group as they would have focused on the same content with full. The absence of a control group meant that results were not comparable. This control group could acknowledge the limitations of this study with which, if addressed, could have yielded richer data. While the students benefited the educational intervention as being of "great benefit", the authors

LIMITATIONS OF THE STUDY

different kinds of people", "and the value of being a team player", compromise", "to be a good listener", "to deal with different personalities", "to work with games helped them to "work together", "to see things from each other's perspective", "to communicate only with the people they know, but this exercise "forced" them to interact with other people in their class. They also said that working in groups on the construction of the communication only with the people they know, but this exercise "forced" them to interact with each other. We worked together to keep deadlines and as such we had to depend on each other", "better", "we communicated with each other", "we developed respect and trust for each other", more tolerant of each other", "we discovered each other's skills", "we got to know each other"
achieved not only about the OHS Act and Regulations, but also about each other, them to see each other as equals, something they ordinarily did not do. Deep learning was each involved in the design of a game, the competition that playing the game fostered, forced language difference melted away as they worked together to design their games, as they were playing the games meant learning in a fun way while interacting with each other. The issue of conflicts to the class reinforced skills in conflict resolution and communication.

conflicts among themselves; students learned effective skills in conflict resolution. The presentation of conflicts among members but also that they would have to first sort out problems learned to share resources and work as members of a team. Clearly, there were problems and conflicts emerged, encouraged students to interact with, depend on, and learn from each other. They interpersonal skills and in resolving relationships among peers, essential in the workplace.

learning experience, not only in terms of the OHS Act and Regulations, but also in terms of games; playing the games; and their interactions with each other. It was definitely an effective creating a favourable learning environment as the students learned from the competition of the classroom. From the results of the questionnaires, it may be concluded that the games exercise aided in

CONCLUSION

or adopted in the future.

The authors therefore suggest that the above be borne in mind if this study is to be performed...

questions such as, "now that I think about it, I would rate my competence in this area as..." have been included in the post-test to address any overestimation in the pre-test. For example:

Regarding the explanation for the pre- and post-test results, neuroscientific measures could have
References

serve to promote communication and collaboration, and (as demonstrated in this study) even on a small scale (groupwork could well

Global work requires flexibility to interact and work with people from different cultures and

when they participate in meetings, or indeed are known together with a number of strangers. Our

He adds that groupwork is not something mysterious, but is something that might be experienced

and work experiences, the more people will be able to bring in support of groups and groupwork.

required on the job. As Deal (2007, p. 5) said: the more we connect groupwork to everyday lives

skills, collaboration, interpersonal communication and conflict resolution are actual skills

the need for such intervention of collaboration in the workplace post-graduation, as interpersonal

The success reported in this study is consistent with the literature on groupwork and highlight

evaluation of the games exercise proved to be very positive.

The students learned with understanding instead of just memorizing their work. Overall,

students’ interest in learning and understanding the OHS AC and Regulations and ensured that

The games exercise was also found to be an effective teaching methodology as it increased
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