

## Post Graduate Certificate of Education Student Teachers' Views of Economics Games as an Interactive Classroom Technique

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**KEYWORDS** Student Learning. Economics Games. Experiential Teaching. Technique. Values

**ABSTRACT** Research studies have reported that playing games in the classroom does not solve all educational challenges but games and simulations are useful and effective tools to actively involve Post Graduate Certificate of Education student teachers in their learning. This study investigated the educational value of in-class simulated games on student learning in economics education through an experimental teaching strategy. A survey was conducted to obtain the data. Students considered the in-class simulated games as a valuable contribution to their learning which implied that students' achievements were enhanced by structured activities. The games enhanced their academic performances and linked to real-life experiences on how the markets operate. They acquired and improved their social skills and gained confidence in their ability to apply the skills effectively during the games in the classroom. Lastly, the games motivated students to take responsibility for their own learning.

### INTRODUCTION

In recent years, several attempts have been made to enhance student learning experiences by increasing their motivation, by attempting to focus their attention, and also by helping them to construct meaningful and permanent records of their learning in Economics education (Van Wyk 2007, 2013). *To encourage this development, learning activities become important. As an example of one approach, the present study investigated the advantages of using simulation games as an experiential teaching strategy as stimulus to encourage, creating interest, developing critical thinking and reflective skills in Economics education. In addition, simulations and games are a formidable combination for effective learning. Additionally, simulated micro-teaching and experimental teaching sessions are used to train student teachers in our faculty immediately spring to mind. With reference to Economics, experiments and games place students directly into real Economics situations where they are required to make choices based on specific incentives and challenges (Van Wyk 2013). The researchers viewed that these real-life experiments provide a powerful link between Economics theory and direct experience of life. For the sake of the quality of teaching and learning, but also for teachers' praxis - for which teach-*

ers relied heavily on the lecture format. This was an opportunity to venture into more effective and efficient strategies to develop students' cognitive, psychomotor and affective learning skills. Incidentally, these student teachers are now obliged to teach the underlying principles of the new curriculum for South African schools, National Curriculum and Assessment Statement (NCAPS). The specific simulated games for this study were carefully selected, modified and aligned to measure the learning outcomes for the Economics and Management Science module (Van Wyk 2007).

### Simulated Economics Games Theory

Educational games and simulations are experiential exercises that are potential to transport students to another world. They apply their knowledge, skills, and strategies in the execution of their assigned roles. Games are competitive exercises in which the prime objective is to win and players must apply subject matter or relevant knowledge in an effort to advance in the exercise and win. Simulations, in contrast, are open-ended situations with many interacting variables (Watts and Becker 2008; Gredler 1994; Welfield 2007). A simulation game is a kind of game that contains a mixture of skills, chance and strategy to stimulate an aspect of reality, such as a stock exchange. Several studies conducted with simulation games combine the features of a game (competition, cooperation, rules,

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participants and roles) with those of a simulation (incorporation of critical features of reality) which creates different learning outcomes (Ruohomaki 1995; Gredler 1996). Economics education needs more active and collaborative teaching and learning strategies. According to Faria (1998) games can be divided into three distinct sections such as general business games/simulations; games with educational features and games for specific educational purposes. During the last three decades, research studies conducted on simulated games marked remarkable results regarding increase of academic performances, enhancement of social skills, developing of self-esteem, change of social behavioral patterns of students, with the substantial increase of positive interdependence amongst diverse student populations and accommodating diverse student learning styles (Keys et al. 1990; Faria 1998; Klassen and Willoughby 2003; Van Wyk 2013). All these games had enormous positive effects on students' learning or development. More recently studies conducted by using simulated games especially in economics education revealed excellent outcomes pertaining to diverse student populations (Cabula and Toma 2002; Franklin et al. 2003; Glynn et al. 2005; Kumar et al. 2007; Akilli 2007; Van Wyk 2013). These research studies adopted and applied simulated games as an interactive classroom technique in teaching economics education with great success.

### Teaching with Economics Games

Seven simulated economics games were played during the contact sessions. The first game focused on the three Economics concepts of "*opportunity cost, decision making and scarcity problem*" principles. Students played a Nike-cap auction game for allocating a scarce resource to the highest bidder. In this game the researchers used a new Nike-cap as the scarce resource. A second concept, *productivity*, was demonstrated by using The Quality Book Factory game. After demonstrating the game to the students, they had to demonstrate how they would use it to demonstrate the supply chain and labour specialization of scarce resources to produce a quality product. Groups had to produce as many quality products (books) as possible within the stipulated time. The third demonstrated principle was the interaction between

*consumers and producers*. This game was called Dairy Farmers versus Food Retailers. The different groups demonstrated how the forces of supply and demand determine price and how changes in the price of a product and service affect the quantities demanded and supplied in the market. The fourth game, The Market Never Stands Still, explained how *demand* and *supply* shift in response to changes in factors affecting consumers and producers respectively. The Markets Interact game demonstrated how changes in supply or demand affect market prices and quantities exchanged. For this game, students were clustered (two per group) together through the "think-pair-share" small group technique for the different Economics quizzes. These were multiple choice questions on a particular learning unit of the module. In the last game, the Fiscal Policy: A Two-Act game, groups of six students demonstrated the effects of *expansionary* and *contractary* fiscal policy of government and how the President of the South African Reserve Bank can intervene in market operations, through role playing. Here they demonstrated collaborative and cooperative skills to solve specific scenarios. An example was the high unemployment rate of 47% in the 18 to 29 age group in South Africa, by brainstorming different scenarios and reporting recommended outcomes per scenario.

The purpose of the present study was to explore the educational gains of using in-class simulated games as an experiential teaching approach in economics education.

## METHODOLOGY

### Research Design

A quantitative method was used to determine the educational gains of using in-class simulated games as an experiential teaching approach in economics education (Costello and Osborne 2005).

### Sampling

Postgraduate Certificate of Education (PGCE)-student teachers participated in the study. Only 129 PGCE-students who were registered for Economics and Management Sciences module, were selected as the proportional stratified sample for the study. Eighty-one percent (81%) of the sample size was made up of female

students (N=99) and 19% were males (N=30). Both the groups were taught by the researcher mentioned period comprising of two contact sessions of 55 minutes per week for the first semester.

### The Setting and Procedure for Playing the Games

Seven simulated games were played in relatively large lecturer rooms at a faculty of education. The classrooms were large enough and provided suitable space to accommodate all the students who participated in the games. Dates for economics quizzes were diarized in the module. Students were randomly selected and divided into small groups to play the three quizzes. Other simulation games such as The Quality Book Factory on productivity and Markets Interact were explained and demonstrated by the lecturer in the classroom and then played by the students. Rules, criteria and outcomes of each simulated game were clearly communicated to students. Students were compelled to adhere to the rules and criteria of each game. They were penalized if they failed or performed below expectations. The times allocated for the respective games varied between fifty-five minutes (55 min) and three hours and fifteen minutes (3 hours and 15 min) per game. Specific continuous assessment marks (grades) were allocated to each game as part of the final mark for the module. The researcher acted as instructor (lecturer), observer, judge and quality controller during the contact sessions.

### Research Instrument and Analysis

A structured questionnaire-devised on the basis of an extensive study of the relevant literature - was completed by students (N=129). The questionnaire was based on a 4-point Likert scale (4=Strongly Agree, 3=Agree, 2=Strongly

Disagree, 1=Disagree) aimed at determining the responses relating to economics games as an experimental approach in the classroom. *To test the reliability of the research results, Cronbach's alpha coefficient was calculated for items in the questionnaire. A calculated test for reliability showed that question 1 ( $\alpha = 0.80$ ), question 2 ( $\alpha = 0.86$ ), and question 3 ( $\alpha = 0.91$ ) were reliable items in the questionnaire.* The data analysis procedure included two main phases: the descriptive statistical data analysis. Regarding the descriptive data, SPSS software was used for data storage, and for calculation of frequencies and percentages.

## RESULTS

### PGCE Students' Learning Gains from Economics Games

Respondents indicated that the seven games played in class were valuable contributions to their learning. The data presented in Table 1, students viewed the simulated games as valuable contribution to their learning.

The majority of the respondents indicated that they strongly agreed (65.4%) that economics games enhanced their problem solving skills (68.9%), to strongly agreed (42.6%) that all the games were a valuable contribution to their learning. Students indicated that they learned more from the games than from the traditional methods. They also indicated that the games enhanced and promoted their Economics conceptual ability. The application of knowledge in the games advanced their understanding of concepts relevant to their learning. Students also indicated that they enjoyed interacting with their classmates during the simulated games.

Students ranked the classroom games according to their opinion on 'what they got the most from in terms of learning and they motivated their responses.

**Table 1: Learning gains from simulated economic games (N=129)**

|                                                                 | Strongly agree |    | Agree |    | Dis-agree |    | Strongly disagree |   |
|-----------------------------------------------------------------|----------------|----|-------|----|-----------|----|-------------------|---|
|                                                                 | %              | f  | %     | f  | %         | f  | %                 | f |
| Students learned more from games economics concepts and content | 59.6%          | 77 | 34.8% | 45 | 5.4%      | 7  | 0                 |   |
| Economics games enhance my problem solving skills               | 68.9%          | 89 | 34.6% | 45 | 7.7%      | 5  | 0                 |   |
| Students interactions during the games                          | 45.7%          | 59 | 42.6% | 55 | 11.6%     | 15 | 0                 |   |

Based on the data in Table 2, students ranked (importance) the games in accordance with enhancing their knowledge, skills and valuable contribution to their learning. Students ranked the importance of the following simulated games: #1-Fiscal policy; A Two –Act play (98.6%); #2-Productivity: The Quality Book factory (83.1%); #3-Economics quizzes (77.0%); #4-Decision making and Scarcity: Cap auction (73.6%); #5-

Dairy Farmers versus Food Retailers (66.9%); #6-Markets Interacts (66.1%); and #7-The Market Never Stands Still (52.7). Students indicated the importance (ranked) and motivated (valued) that the simulated games enhanced their learning skills through these interactive, participative and experimental teaching strategies.

Data as contained in Table 3, mean scores and standard deviations for each item in the sec-

**Table 2: Ranking of economics simulated games that enhance student learning (n=129)**

| <i>Seven simulated games played</i>                        | <i>Ranking</i> | <i># of responses per game</i> | <i>% of #per game</i> | <i>Motivation on learning</i>                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------|----------------|--------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Decision making and scarcity: Cap Auction                  | 4              | 99                             | 76.7                  | Individual accountability for own actions in bidding process. Scare resources is money to participate in real world                                                                                                                                                                                                                                     |
| Productivity: The Quality Book Factory                     | 2              | 113                            | 87.5                  | Hard working, labour specialization, proud in producing a product, team work, sharing ideas in making your quality book for the market                                                                                                                                                                                                                  |
| Dairy Farmers versus Food Retailers (milk / cheese prices) | 5              | 87                             | 67.4                  | Business ethics, dealing honesty in the markets. Look out for market information, interaction with other role players                                                                                                                                                                                                                                   |
| The Market Never Stands Still                              | 7              | 68                             | 52.7                  | Consumers, business, government and foreign trade influence decision making. Understand the factors influencing supply of demand curves in the market                                                                                                                                                                                                   |
| Markets Interact                                           | 6              | 79                             | 61.2                  | How aggregate demand and supply in all business operates, market price determined by supply and demand                                                                                                                                                                                                                                                  |
| Economics quizzes                                          | 3              | 104                            | 80.6                  | Think-pair and share information to obtain grades. Knowledge, skills to interpret or apply Economics concepts and content.                                                                                                                                                                                                                              |
| Fiscal policy; A Two –Act play                             | 1              | 126                            | 97.6                  | Active participation, Interaction between role players in the economy. Role play activity, motivate to cooperate with group members pertaining to different roles. Trust and honesty to deal with real Economics issues. Government interference in market operations. South African Reserve Bank influences the market with monetary or fiscal policy. |

**Table 3: The effects of simulated games on student learning in economics education (N=129)**

| <i>Question 1. To what degree do you agree with the following statements regarding the games:</i>        | <i>Min</i> | <i>Max</i> | <i>Mean scores</i> | <i>SD</i> | <i>Alpha</i> |
|----------------------------------------------------------------------------------------------------------|------------|------------|--------------------|-----------|--------------|
| Q1.1. Promoting my learning and academic achievement                                                     | 2.0        | 5.8        | 3.46               | 0.5       | 0.97         |
| Q1.2. Improving my retention and accommodate my own learning process                                     | 2.2        | 5.1        | 2.93               | 0.4       | 0.86         |
| Q1.3. Enhancing my satisfaction with my learning experience                                              | 2.3        | 4.8        | 2.52               | 0.5       | 0.85         |
| Q1.4. Helping me to develop business ethics and skills in effective verbal communication-code of conduct | 2.0        | 4.1        | 2.19               | 0.4       | 0.70         |
| Q1.5. Developing my social skills and interdependence                                                    | 2.3        | 4.8        | 3.09               | 0.4       | 0.81         |
| Q1.6. Promoting my self-esteem and confidence levels                                                     | 1.8        | 3.7        | 1.73               | 0.3       | 0.79         |
| Q1.7. Helping me to promote positive race relations amongst us                                           | 2.3        | 4.7        | 2.43               | 0.4       | 0.80         |

tion of the seven simulated games indicate that their learning was enhanced. As can be seen in the table, the average scores per items varied between 1.7 and 3.4 (Scales 1-4). Standard deviation (SD) varying between 0.3 and 0.5. The coefficient alpha was computed for each item and for the total instrument to determine the internal consistency of each item. The results in Table 3 indicated that the internal consistency per item (reliability test = 0.7): Question 1.6. Promoting my self-esteem and confidence levels (0.79) and Question 1.1. Promoting my learning and academic achievement (0.97) was high, except for Question 1.4. Helping me to develop business ethics and skills in effective verbal communication (0.70). The Cronbach's alpha coefficient average (0.81) for the seven items for this section of the questionnaire was significantly reliable.

### DISCUSSION

The results of the present study have been encouraging and add to the body of information of other research studies in this regard for introducing simulated games as an experimental teaching strategy (Cebula and Toma 2002; Klasen and Willoughby 2003; Kumar and Lightner 2007; Tsigaris 2008; Van Wyk 2013). The researchers contend that the use of simulations and games for economics education for this study was an appropriate experimental approach utilized in exploring the gains for students' learning for this particular study. Study conducted on the impact of simulated games on student performances by Tsigaris (2008) as well as Franklin et al. (2003) reported on a number of benefits that accrue to the instructor for using simulation games in economics education that offer further support for previous findings of similar research studies that applied an experiential approach. Van Wyk (2013) pointed to a number of benefits that accrue to the students from using experimental classroom games such as a break from routine, motivation, fun and repetition of Economics. From the responses it became clear that students were positive, motivated and alluded to the empowerment of the in-class games regarding Economics lessons preparations, planning, presentations of simulation games, facilitation and the use of applicable assessment activities during class sessions. Lastly, the assessment instruments used for the seven games were

transparent, fair and reliable. Students viewed the simulated games as contributing positively to their learning. The majority of the respondents (n=118) indicated that they agreed (74.9%) to strongly agreed (82.8%) that the games were a valuable contribution to their learning. Research studies reported that playing games had a positive effect on students' learning on the long run (Keys and Wolfe 1990; Subrahmanyam et al. 2001; Kiili 2005). Furthermore, two research studies conducted by Van Wyk (2013) and Rieber (1996) on students' learning revealed that critical thinking and problem solving skills were enhanced by using simulations and games in the blending of micro-worlds. Van Wyk (2013) reported that through debriefing and feedback, learning by doing, learning from mistakes and cooperation contributed to student learning after each game were identified as major educational values. With reference to this study, the seven simulated games (see Table 2) played helped students to have fun and enjoy themselves in the classroom. The outcomes of this study concurred with similar outcomes of Reuben's study (1999) regarding effectiveness that simulated games promoted engagement, interactivity, and active participation of student teachers in the economics education classroom. The findings revealed that the majority of the respondents (N=138) indicated that they strongly agreed (53.0%) to agreed (39.5%) that they enjoyed the simulated games compared to the lecture method that other lecturers often used in the faculty. The researchers argue that the simulated economics games provide a great deal of highly interactive feedback, which is crucial to learning. Moreover, economics games also provided the student teachers with a variety of decision making situations which are frequently encountered in real world scenarios. Some students give other students first hand advice since they had been confronted with identified problems and were able to construct real life solutions to these problems while playing these games. According to Van Wyk (2013) and Rieber (1996), economics gaming elements are linked to enjoyable activities that promote the flowing stage of the game. Thus, gaming activities have the potential to engross the student into a state of flow and consequently cause better learning through focus and pleasant rewards. Additionally, Gredler (1996) states that intellectual skills and 'cognitive strategies' are acquired during

academic games. Further, Subrahmanyam et al. (2001) confirmed that games have cognitive development effects on visual skills including 'spatial representation', 'iconic skills' and 'visual attention'. Emanating from the outcomes of previous studies conducted on effectiveness of games, student teachers in this study have the opportunity to use their decision making, problem solving and communication skills previously learned in this course and refine them into marketable skills such as business ethics, diversity, responsibility and honesty. Student teachers experienced real life forces via cooperation and collaboration learning while developing problem solving skills in teams. Virtue of practicing the issue of honesty while playing the game and making a transaction with other role players in the market. Throughout the games, dishonesty and breaking the rules were severely punished if caught for unethical and unfair business practices in and between groups. This issue was highlighted before the games began for unfair business dealings. Student teachers realize that economics games have become a bridge that linked students to real-life market operation experiences. The use of simulated games in the economics classroom as a device for motivating which ultimately supported students' conceptual and concentration levels during contact sessions. These games were effective when attempting to alter the attitudes of students. They became more positive towards the experiential approach to teaching and learning in Economics. The games motivated students to take responsibility for their own learning, which in turn lead to intrinsic motivation contained by the method itself (Rieber 1996; Glynn et al. 2005; Van Wyk 2013). Other outcomes emerged out of this study, that student teachers demonstrated their individual abilities in an environment different from the traditional lecture room setting. The games effectively enabled student teachers to acquire factual and conceptual knowledge and retain the knowledge and acquired skills. Student teachers' communication skills were refined. Oral communications improved as individuals learned to give and understand directions, clarify tasks, and share in problem solving, decision making, presentation and demonstrations during the games. Coyne (2003) reported that the experimental games enabled student teachers to acquire improved social skills and gain confidence in their ability to

employ those skills effectively during the games in the classroom. The use of simulated games as a social laboratory provided students an opportunity to exercise the social skills and knowledge previously acquired to utilize them in an artificial environment, and to gain some comprehension for the complexities of selected social, Economics, and business processes (Rieber 1996; Prensky 2001; Tsigaris 2008; van Wyk 2011, 2013). Students with all levels of abilities and skills work together successfully. The value of teamwork was not overlooked. Students learned the significance of working together in cooperative learning.

### CONCLUSION

Several of the literature reviews attempt to measure the effect of experimental games that accrue only to student learning in terms of academic performances. This paper presented evidences about the benefits that accrued to students' learning as a result of running different in-class simulation-based economics games in an Economics and Management Sciences module for PGCE-student teachers. It is evident that most students were positive, motivated and alluded to the games which enhanced their subject content knowledge (SCK), pedagogical content knowledge (PCK) and accommodated their diverse learning styles during this study. Participants also indicated that their intellectual skills and 'cognitive strategies' were enhanced after playing the academic economics games. They further eluded that effective facilitation and the use of applicable assessment activities during class sessions empowered them to reflect constructively and successfully implement most of the simulated games during teaching practice placements. The educational value of the different economics games effectively enabled students to acquire factual, conceptual knowledge, and retain the knowledge and acquired skills which they applied during their micro-lesson planning sessions and experimental classes. Students viewed the simulated games as contributing positively to their learning experiences. Lastly, students responded to the application of the assessment instruments used during the seven economics games which were transparent, fair and reliable. In summation, the educational benefits of these simulated economics games increased students' academic performanc-

es, strengthening social skills and enhanced reflective teaching practice skills.

### RECOMMENDATIONS FOR FURTHER RESEARCH

Despite the positive results in support of these seven experimental games, only a few studies conducted in teaching economics education at universities of faculties of education did exist. Research needs to be conducted by employing more experimental games in teaching and learning environments amongst diverse student populations which will ultimately reveal different results. The application of in-class economics games on students' decision making, problem solving and communication skills as a means to cultivate critical and creative skills should be explored. A comparative study should be conducted to determine student teachers' attitudes and behaviors regarding discipline knowledge and pedagogical content knowledge and how it may impact on their teaching practice.

### ACKNOWLEDGEMENTS

The author is indebted to the critical reviewers for constructive feedback. The author acknowledged the financial contributions made by the National Research Foundation of South Africa (NRF) for Grant Funding (No. 90498). Acknowledgement is extended to the PGCE students who voluntarily participated in this research study. Lastly, the quality of language revision work done by the Unisa language editing unit is acknowledged. Any opinions, findings, and conclusions expressed in this paper are those of the author's own and do not reflect the views of the NRF or the Department of Curriculum and Instructional Studies in the College of Education.

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