

THE USE OF COMPUTER-ASSISTED, INTERACTIVE ROLE-PLAY SIMULATION IN CHINA

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ABSTRACT

This paper reports feedback from postgraduate students' participation in Fish Bank, Ltd., a computer-assisted, interactive role-playing simulation in which teams are to manage a fishing company to compete in the fishing industry. The survey focused on how students in China viewed computer-assisted, interactive role-playing simulation as a learning tool for them and how they perceived that this type of role-playing simulation can actually help them understand the subject matter more in depth. Overall results are highly favorable.

INTRODUCTION

Significant points of views have been sought on the use of business games from both the teachers and students (Roberts and Strauss, 1975; Hegarty, 1976; Wolf 1985; Faria, 1987, Faria and Wellington, 2004; Decker, et al 1993; Williams, 1993; Keefee, et al 1993; and Chang et al, 1997, 2003, 2005, and 2007), but still there has not been much study sought out from the students' points of view on a computer-assisted, interactive role-playing simulation in China. In this case, Fish Bank, Ltd., (supplied by Sustainability Institute) a computer-assisted, interactive role-playing simulation of which teams are formed to manage a fishing company, was selected to be used in Strategic Quality Management class of MA Programme offered in Xi'an, China by the Hong Kong Polytechnic University in collaboration with the Xi'an Polytechnic University. As the postgraduate students had no prior experience and exposure on the simulation and gaming, it is the authors' wish to explore how postgraduate students in the Northern part of China view the use

of such computer-assisted, interactive role-playing simulation as part of their learning experience.

DATA COLLECTION

A survey questionnaire was conducted amongst the part-time postgraduate students who enrolled in the subject of Strategic Quality Management. Participants in this survey attended a 3-hour workshop on Fish Bank, Ltd, a computer-assisted, interactive role-playing simulation in Xi'an, China in October 13, 2008. A total of 45 survey questionnaires for the postgraduate students in China were administered right after the business game. The response, 45 usable questionnaires were received. A follow-up interview was also conducted after the 2-day teaching in Xi'an.

RESULTS AND DISCUSSION

In section A of the survey questionnaire, students were asked if they had any prior experience to simulation and gaming. The result showed that no postgraduate students had previously participated in any computer simulations at all (Please see Section A on Table 1). In a follow-up interview with the respondents, it is noted that the computer simulations were not used at all as a teaching and learning tool in their undergraduate studies. In fact, this is the first time they were exposed to business game and thus they were highly involved and took an active role in participating and playing the game. To a certain extent, this suggests that simulation and gaming is still not popular and actually is quite new among universities in Xi'an, a Northern part of China.

Table 1. Descriptive Statistics on Respondents' Feedback on Business Game

	N	Minimum	Maximum	Mean	Std. Deviation
Session A					
1. Participation	45	Yes (100%)	No	n/a	n/a
Session B*					
2. Understanding	45	4 (11.1%)	5 (88.9%)	4.89	.318
3. Interesting	45	4 (11.1%)	5 (88.9%)	4.89	.318
4. Application	45	4 (4.4%)	5 (95.6%)	4.96	.208
5. Business strategy	45	4 (13.3%)	5 (86.7%)	4.87	.344
6. Involvement	45	4 (11.1%)	5 (88.9%)	4.89	.318
7. Enjoyable	45	4 (11.1%)	5 (88.9%)	4.89	.318
8. Valuable	45	4 (11.1%)	5 (88.9%)	4.89	.318
9. Insight	45	4 (6.7%)	5 (93.3%)	4.93	.252
10. Recommendation	45	4 (11.1%)	5 (88.9%)	4.89	.318
11. Caring	45	4 (11.1%)	5 (88.9%)	4.89	.318
12. Worthy	45	4 (11.1%)	5 (88.9%)	4.89	.318
13. Regeneration	45	4 (0%)	5 (100%)	5	0
14. Communication & Leadership	45	4 (11.1%)	5 (88.9%)	4.89	.318
15. Ethics	45	4 (4.4%)	5 (95.6%)	4.96	.208
16. Complex & nonlinear system	45	4 (6.7%)	5 (93.3%)	4.93	.252
Session C					
17. To win	45	Yes (100%)	No (0%)	n/a	n/a
18. Kill all the fish	45	Yes (100%)	No (0%)	n/a	n/a
19. No change on current strategy	45	Yes (100%)	No (0%)	n/a	n/a
20. No more fish	45	Yes (44.4%)	No (55.6%)	n/a	n/a
21. Change current Strategy	45	Yes (22.2%)	No (77.8%)	n/a	n/a
22. Cooperation	45	Yes (0%)	No (100%)	n/a	n/a
Valid N (listwise)	45				

Note: 1. In session A, either yes or no is recorded

2. In session B, A five-point Likert Scale: strongly agree=1, agree=2, neutral=3, disagree=4, and strongly disagree=5

3. In session C, either yes or no is recorded

RESPONDNETS' FEEDBACK ON COMPUTER-ASSISTED, INTERACTIVE ROLE-PLAYING SIMULATION

In section B of the survey questionnaire, students were asked to evaluate this computer-assisted, interactive role-playing simulation based on 15 questions after completion of a 3-hour session which included briefing, play, debriefing, and question and answer. A five-point Likert Scale: strongly agree=1, agree=2, neutral=3, disagree=4, and strongly disagree=5 was

adopted for use by respondents to indicate their opinions. In section C, students were asked to answer either yes or no on questions 17 to 22. These questions are listed in Appendix B.

There are three categories of questions. First, questions 2, 5, 8, 10, and 13 asked students of their opinions on the merits of the computer simulation itself on helping them to understand the subject matter. Second, questions 3, 6, 7, 11, and 12 look at students' emotional state towards the simulation and gaming since this particular computer simulation also emphasizes their role-play as well. Finally, questions 4, 9, 14, 5, and 16 makes an

attempt to find out if respondents agree that the business game can help them better understand the real-life situation and apply what they learned into the simulated real world as well especially in the renewable resources.

The overall results of the survey undertaken by the MA students in Xi'an, China were very favourable towards the business game. It is interesting to note that only “strongly agree=5” and “agree=4” were recorded in the survey and thus the combined scores of “strongly agree=5” and “agree=4” are 100 percent for all of the questions in session B. There were no “neutral”, “disagree” and “strongly disagree” recorded at all.

The highest score of “strongly agree=5” is 100% which is on question 13 – Fish Bank Ltd. can convey important principles about regeneration and sustainable harvesting of renewable resources. The second highest score of “strongly agree=5” is 95.6% which are question 4 – Fish Bank allowed me to apply what I learned to a real-life situation and question 15 – Fish Bank can provide a case study for discussion of ethics. On the other hand, the lowest score recorded here for “strongly agree=5” is 86.7% on question 5 – I learned a lot about the field of business strategy from the Fish Bank Ltd., such as scanning the environment, strategy formulation, and strategy implementation. Please see table 1 for more details.

Table 2 shows respondents’ feedback on the subject matter. Overall results here (questions 2, 5, 8, 10, and 13) show a very high mean ranging from 4.87 to 5. This suggests that the computer simulation can actually serve the purpose to teach students about the subject matter very well on its own and is best to be combined with lecture and case study method in order to enhance the overall learning experience for the students. A

follow-up interview confirmed this new learning experience of students as they first took lecture and worked on case studies in 2-days, 14-hours session followed by a simulation gaming workshop.

Table 3 shows respondents’ feedback on their feelings towards the business game – Fish Bank Ltd. used in this survey. Results from questions 3, 6, 7, 11, and 12 also show a high mean of 4.89. 88.9% of respondents chose “strongly agree=5” while the rest (11.1%) selected “agree=4”. A follow-up interview also indicated that they felt more relaxed and positive towards the simulation and gaming. Indeed, they were willing to participate for the extended periods of three hours time and to recommend it to their friends as it was worthy of experience with Fish Bank Ltd.

Table 4 shows respondents’ feedbacks on how business game can help them better understand the real-life situation and use it to make decision. Overall results here (questions 4, 9, 14, 15, and 16) show a very high mean ranging from 4.89 to 4.96. 95.6 percent of the respondents strongly agreed that the business game allowed them to apply what they learned to a real-life situation as well as provide them a case study for discussion of ethics. A follow-up interview also confirmed that they could learn better from experiencing through the simulated real world – Fish Bank. They really had a “real-world-like” contact when they were told they had killed all the fish in the sea. The simulated experience made them possible to learn through interaction with the simulated real world - fish depletion and other renewable resources. They learn and know the fact that they have to be environmental friendly and this extends to groundwater, forests, game animals, and ozone.

Table 2. Descriptive Statistics of Respondents’ Feedback on Subject Matter

	N	Minimum	Maximum	Mean	Std. Deviation
Session B*					
2. Understanding	45	4 (11.1%)	5 (88.9%)	4.89	.318
5. Business strategy	45	4 (13.3%)	5 (86.7%)	4.87	.344
8. Valuable	45	4 (11.1%)	5 (88.9%)	4.89	.318
10. Recommendation	45	4 (11.1%)	5 (88.9%)	4.89	.318
13. Regeneration	45	4 (0%)	5 (100%)	5	0
Valid N (list wise)	45				

Note: In session B, A five-point Likert Scale: strongly agree=1, agree=2, neutral=3, disagree

Table 3. Descriptive Statistics of Respondents’ Feedback on Emotional State

	N	Minimum	Maximum	Mean	Std. Deviation
Session B*					
3. Interesting	45	4 (11.1%)	5 (88.9%)	4.89	.318
6. Involvement	45	4 (11.1%)	5 (88.9%)	4.89	.318
7. Enjoyable	45	4 (11.1%)	5 (88.9%)	4.89	.318
11. Caring	45	4 (11.1%)	5 (88.9%)	4.89	.318
12. Worthy	45	4 (11.1%)	5 (88.9%)	4.89	.318
Valid N (list wise)	45				

Note: In session B, a five-point Likert Scale: strongly agree=1, agree=2, neutral=3, disagree

Table 4. Descriptive Statistics of Respondents' Feedback on Application

	N	Minimum	Maximum	Mean	Std. Deviation
Session B*					
4. Application	45	4 (4.4%)	5 (95.6%)	4.96	.208
9. Insight	45	4 (6.7%)	5 (93.3%)	4.93	.252
14. Communication & Leadership	45	4 (11.1%)	5 (88.9%)	4.89	.318
15. Ethics	45	4 (4.4%)	5 (95.6%)	4.96	.208
16. Complex & nonlinear system	45	4 (6.7%)	5 (93.3%)	4.93	.252
Valid N (listwise)	45				

Note: In session B, a five-point Likert Scale: strongly agree=1, agree=2, neutral=3, disagree

Table 5. Descriptive Statistics of Respondents on Their Strategy Formulation during the Game Session

	N	Minimum	Maximum	Mean	Std. Deviation
Session C					
17. To win	45	Yes (100%)	No (0%)	n/a	n/a
18. Kill all the fish	45	Yes (100%)	No (0%)	n/a	n/a
19. No change on current strategy	45	Yes (100%)	No (0%)	n/a	n/a
20. No more fish	45	Yes (44.4%)	No (55.6%)	n/a	n/a
21. Change current Strategy	45	Yes (22.2%)	No (77.8%)	n/a	n/a
22. Cooperation	45	Yes (0%)	No (100%)	n/a	n/a
Valid N (listwise)	45				

Note: In session C, either yes or no is recorded

RESPONDENTS' FEEDBACK ON THEIR STRATEGY FORMULATION DURING THE GAME SESSION

Table 5 records respondents' feedback on their strategy formulation during the game play. All the 45 respondents (Question 17, Table 5) indicated that they were there to win and wanted their teams to be the leader in the Fish Bank industry. In addition, all the respondents (Question 18, Table 5) had never thought they could have killed all the fish. Thus, all respondents continued to expand by investing more money into their fishing boats for more harvesting. It is interesting to note that 44.4 percent of the respondents (Question 20, Table 5) sensed that there might not be any fish left as a result of over harvesting and yet only 22.2 percent of the respondents (Question 21, Table 5) claimed they had actually changed their strategy from expansion to retrenchment. In theory, 22 ships could be sent out to each area – deep sea or coast fishing areas without depleting the fish populations below densities of 0.6 (Fish Bank, 2004), but in reality here, a combined 120 boats were sent out to these two fishing areas - an average of 60 boats in each fishing areas. Thus, the move had eliminated all the fish in a very short period of

time. On the other hand, none of the respondents (Question 22, Table 22) showed that they had changed their strategy not to compete but to collaborate. A follow-up interview confirmed that they had produced irrational results for the entire fishing system (renewable resources) as a result of making rational, short-term, individual decisions. They also admitted that the society conditions them to be better off to compete and to win but now they learned that it is better off for them to collaborate with other people. They also learned that the technology is neither the cause nor the cure for unsustainable development. It is only a tool and better fishing boats could enhance a good standard of living for fishermen or they could eventually cause the depletion of the fisheries. Overall, they tended to understand the problem did not lie in the technology but in the motivations and ethics of people who practiced it.

CONCLUSION

The authors attempt to find out how students at postgraduate level in China Hong Kong view the use of Fish Bank, Ltd, a computer-assisted, interactive role-play simulation

in their class. Overall, the majority of the respondents in both groups showed very favorable results and strongly agreed to the questions being asked. The combined scores of “strongly agree=5” and “agree=4” are 100 percent and the average score for the postgraduate students is between a low of 4.87 and a high of 5.00 for all of the questions in session B. As a matter of fact, the results are shown to be extremely favorable to Fish Bank since the all of the respondents have not been exposed to this type of computer-assisted, interactive role-playing simulation before.

The implication seems to be that Chinese students showed a great preference to have the computer simulation in their class and they have benefited from it. Perhaps, further research is needed to target and study why computer simulation in general is not included in the classroom for teaching and learning purposes in China. Thus, a preliminary study is needed to focus on faculty members in universities of Xi’an, China to find out why there is not more use of computer simulations in the teaching of business subjects.

Though the current study is limited in that it includes only a sample population of 43 Chinese students in 2008, it attempts to explore the impact of incorporating computer-assisted, interactive role-playing simulation in the course of teaching with lecture and case study. In addition, further research is needed to include a broader student population as well as more comprehensive research methods to explore whether the computer simulations used in the strategic management class would really enhance and stimulate the process of student learning and lecturer teaching.

REFERENCE

- Burgess, T.F. (1991). “The use of computerized management and business simulation in United Kingdom”. *Simulation & Games*, 22(2), 174-195.
- Chang, J. (1997) "The Use of Business Gaming Simulations in Hong Kong Academic Institutions", *Developments in Business Simulation and Experiential Learning*, Vol. 24, pp. 218-219.
- Chang, J., Ng, K.L. & Lee, M. (1998). “Students' views of the use of business gaming in Hong Kong”, *Developments in business simulation and experiential learning*, Vol. 25, 259-260.
- Chang, J. (2003). “Use of Business Simulation Games in Hong Kong”, *Simulation & Gaming*, Vol. 34, No. 3, 358-366.
- Chang, J., Lee, M., Ng, K.L. and Moon, K.L. (2003). “Business Simulation Games: The Hong Kong Experience”, *Simulation & Gaming*, Vol. 34, No. 3, 367-376.
- Chang, J., Ng, K.L., Moon, K.L. and To, K.M.C. (2005). “The Use of Business Gaming in China”, *Developments in business simulation and experiential learning*, Vol. 32, 91-96.
- Chang, J., Mak, W.M., To, K.M.C, Moon, K.L., and Choi, K.F. (2007). “The use of computer-assisted, interactive role-play simulation in Hong Kong”, *Developments in Business Simulation and Experiential Learning*, Vol. 34, 94-100.
- Decker, C.R., J.F. Bibb, and C. Likins (1993). “Simulations: their use in business policy”, *Developments in business simulation and experiential learning*, Vol. 20
- Faria, A. J. (1987). “A survey of the use of business games in academia and business”, *Simulation & Games*, 1 (2), 207-224.
- Faria, A. J. and Wellington, W. (2004). “A survey of simulation game users, former users, and never-users”, *Simulation & Games*, 35(2), 178-207.
- Keeffe, M.C., D.A. Dyson, and R.R. Edwards (1993). “Strategic management simulations: a current assessment”, *Simulation & Gaming*, 24 (3), 363-368.
- Hegarty, W.H. (1976). Contextual and pedagogy differences in teaching business policy among academicians. *1976 Academy of Management Proceedings*, 125-129, Kansas City, KS.
- Mckenna, R.J. (1991). “Business computerized simulations: The Australian experience”. *Simulation & Gaming*, 22(1), 36-62.
- Roberts, R.M., & A. Strauss (1975). Management games in higher education 1962 to 1974 - an increasing acceptance, *Proceedings of the North American Simulation & Gaming Association*, 381-385.
- Stone, R.A. (1995). “The business strategy game: faculty experience and student perceptions”. *Journal of Management Education*, 19(2), 281-289.
- Williams, E.L., (1993). Computerized simulation in the policy course. *Simulation & Gaming*, 24(2), 230-239.
- Wolfe, J. (1985). “The teaching effectiveness of games in collegiate business courses – a 1973-1983 update”, *Simulation & Games*, 16 (3), 251-288.
- Wolfe, J. & Crookall, D. (1998). “Developing a scientific knowledge of simulation/gaming”. *Simulation & Games*, 29(1), 7-19.

Appendix A

Fish Banks, Ltd.

A computer-assisted, interactive role-playing simulation is supplied by Sustainability Institute. Teams are formed to manage a fishing company. Participants try to maximize their assets in a world with renewable natural resources and economic competition. This game exercises higher-order reasoning, communication, and group problem solving. Each Fish Banks game kit includes: a board, wooden playing pieces, manuals, Mac/PC program CD (v.8), and a complimentary copy of the introductory video.

Appendix B

Survey Questionnaire on Fish Bank (Simulation and Gaming)

Section A

1. Have you ever been asked to participate in any computer simulations in your previous study in university before?

____ yes If yes, the name _____ and used in what subject _____
____ no

Section B

Please select answers 1-5 for the following questions 2-16:

1 – Strongly Disagree; 2 – Disagree; 3 – Neutral; 4 – Agree; 5 - Strongly Agree

- | | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 2. Using the Fish Bank Ltd. (Simulation & Gaming) was helpful to me in understanding the subject matter in business strategy class. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. Fish Bank Ltd. (Simulation & Gaming) made the course more interesting. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. Fish Bank Ltd. (Simulation & Gaming) allowed me to apply what I learned to a real-life situation. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. I learned a lot about the field of business strategy from the Fish Bank. Ltd. (Simulation & Gaming) such as scanning the environment, strategy formulation, and strategy implementation. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. I was highly involved with the Fish Bank Ltd. (Simulation & Gaming). | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. Playing Fish Bank Ltd. (Simulation & Gaming) was enjoyable. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. I believe the Fish Bank Ltd. (Simulation & Gaming) is valuable for business policy and strategic management courses. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9. Fish Bank Ltd. (Simulation & Gaming) helped me gain insight into the pressures faced by strategy makers when we were forced to make decisions in each round of play. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 10. I recommend using the Fish Bank Ltd. (Simulation & Gaming) for other business strategy classes. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 11. Incorporating the Fish Bank Ltd. (Simulation & Gaming) into the class curriculum suggests that the instructor cares about me learning business strategy and provide me a chance to look at it from different perspective. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 12. Learning the Fish Bank Ltd. (Simulation & Gaming) was worth the effort. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

13. The Fish Bank Ltd can convey important principles about regeneration and sustainable harvesting of renewable resources.

14. The Fish Bank Ltd can offer participants an opportunity to practice group communication and leadership skills.

15. The Fish Bank Ltd can provide a case study for discussion of ethics.

16. The Fish Bank Ltd can illustrate the problems associated with control of complex and nonlinear systems.

Section C

Please select answers on yes or no for the following questions 17-22:

17. Our team's overall objective is to win and to be the number 1 team in the Fish Bank Industry.

Yes ____ No ____

18. We never have thought that we could kill all the fish at the end of our game.

Yes ____ No ____

19. Based on previous question 18, we, therefore, made no changes on our current expansion strategy – increasing our numbers of fishing boats.

Yes ____ No ____

20. I have sensed that in the middle of the game there may be no more fish left at all .

Yes ____ No ____

21. Based on previous question 20, we, therefore, changed our expansion strategy to retrenchment strategy by leaving our boats mainly on harbour and at the same time trying to reduce our size of fishing boats.

Yes ____ No ____

22. Based on previous question 20, we changed our strategy not to compete but to cooperate by talking to other groups to save the fishing industry.

Yes ____ No ____