Collaborative Project Across Three Hong Kong Universities: A Case Study in E-Commerce Education

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ABSTRACT

This paper reports on the work undertaken by three tertiary institutions in Hong Kong to provide business students with the opportunity to experience a project-based teamwork game in learning e-commerce (EC). The teaching objective of this EC project is to develop the knowledge and skills of students, such as in the use of EC site-building tools, critical thinking, communication skills, teamwork, and entrepreneurship. This study examined student attitudes toward the learning in introductory e-commerce course via a project-based teamwork game in EC using a non-traditional teaching approach. The results of an evaluation indicate that the project-based teamwork approach performed to expectations. Based on the feedback from students from the three tertiary institutions, the project was found to facilitate the teaching and learning of EC and to be interesting, exciting, innovative, and more worthwhile than traditional textbook-based learning.

Keywords: E-commerce education, project-based teamwork approach, three universities in Hong Kong

1. INTRODUCTION

Universities are expanding their syllabuses as the thirst for knowledge grows. There is no exception for information system (IS) educators. IS educators are expanding their syllabuses and incorporating more e-commerce (EC) elements into their curricula and courses. This is prompting them to move into the areas of EC research, teaching, and learning. The teaching and learning of EC is new compared to that of traditional IS courses, and most university lecturers are still trying to figure out how best to incorporate it into existing curricula or introduce it to students. Generally, the EC courses being offered at many universities either emphasize a technical or non-technical approach. The majority of them are offered by business schools, which view the subject as a business subject and teach it from a non-technical perspective (Durlabhji and Fusilier, 2002; King et al., 2001). King et al. (2001) examined the nature and content of EC courses, and revealed that most of the course were being offered at the graduate level and used one or more textbooks as the primary reading source. In traditional teaching and learning environments, where knowledge is conveyed through textbooks and lectures, students often feel bored and

unchallenged. Meanwhile, many organizations have widely adopted EC systems, and therefore expect their employees to be skilled and to have practical experience in EC. As a result, it is necessary to develop teaching tools and environments for students that offer them practical opportunities to learn EC.

A number of non-traditional teaching approaches and tools have been designed and developed for undergraduate students (Anewalt, 2003; Dhamija et al., 1999; Ngai, 2004; Parker and Swatman, 2001). Most of them simulate an EC environment that facilitates learning or the acquisition of skills. The feedback from the students who used these tools was overwhelmingly positive. They not only gained hands-on experience in EC technologies and concepts, but also enjoyed the EC course and learned much in it. Although the idea of designing simulated environments for teaching and learning is not a novel concept, it is quite appropriate for EC courses.

This paper focuses on a project-based teamwork game in EC which formed a part of group project work carried out by undergraduates in three tertiary institutions in Hong Kong. We attempted to explore effective ways of implementing a non-traditional learning approach in the teaching and learning of EC in undergraduate courses from a business context perspective. The project involved a group of students which were required to write an e-business plan, develop an e-shop, perform on-line shopping, and finally perform an online peer evaluation of their peer's e-shop. Section II of the paper gives an overview of the collaborative project between three local Hong Kong institutions. Section III presents details of the exercise. Section IV summarizes the results of the students' attitudes towards the project-based teamwork game. Section V contains some concluding remarks.

In this study, a project-based teamwork game in EC is described that supports teaching and learning in EC through the "learning by doing" approach. This pedagogy is used in the belief that learning is most efficient and effective when it is situated in realistic settings (Schank, 1997). Three Hong Kong institutions of higher education participated and adopted this project as a part of their EC program. In order to investigate the effectiveness of this non-traditional approach to learning, the results of the evaluation will be reported and discussed in this paper.

2. BACKGROUND

The collaborative project described in this paper was carried out as part of work funded by the Teaching Development Grants (TDG) of the University Grants Committee (UGC) of Hong Kong that aims to encourage UGC-funded institutions to adopt innovative approaches to teaching, and to improve the quality of the learning environment. The establishment of the TDG is part of the UGC's efforts to develop, in collaboration with the institutions, increased awareness of the importance of the quality of teaching and learning. The project, "Electronic Commerce Platform for Teaching and Learning," was undertaken by members of the Department of Management and Marketing, The Hong Kong Polytechnic University (PolyU); the Department of Information and Applied Technology, The Hong Kong Institute of Education (HKIEd); and the Division of Commerce, City University of Hong Kong (CityU). The project aims to facilitate and support teachers and students at tertiary institutions in Hong Kong in the teaching and learning of EC. This project has a three-fold purpose: i) to design and develop EC platforms for teaching and learning; ii) to enable students to have their first experience with EC models; and iii) to develop knowledge and skills such as in the use of EC site building tools, problem-solving, critical and creative thinking, communication skills, teamwork, and entrepreneurship through participation in the project. We believe that all colleagues who offer an EC curriculum will benefit from this project through inter- and intra-institution participation.

The organizing team at each university was composed of at least one member of academic staff plus research assistants. PolyU was the host of this project. The planning of such a collaborative project needed to take a number of factors in account, such as:

- the different degree structures, emphases, and technical backgrounds of the participating institutions. e.g., HKIEd provides pre-service and in-service teaching training in Hong Kong, while PolyU and CityU equip students with professional competency;
- different assessment requirements; and
- different teaching periods at the three universities.

3. PROJECT-BASED TEAMWORK GAME

The project-based teamwork game is part of the project "Electronic Commerce Platform for Teaching and Learning" that we carried out to support and improve the quality of the teaching and learning environment. We created this teaching and learning environment with different requirements and expectations for students and instructors. The teaching objectives of the project-based teamwork game in EC were to develop the students' knowledge and skills in such areas as using EC site-building tools, problem-solving, critical thinking, communication skills, teamwork, and entrepreneurship.

The students were told to think of themselves as working for a company that expected them to investigate the building of an e-shop to market and sell products or services. They were told that there was an interactive platform on which users could design, develop, and host e-shops without a high initial investment or programming knowledge. The supporting documentation of the project was both distributed to the class and made available online. This project consisted of five-phases of a project-based teamwork approach in the teaching and learning of EC: (1) the formation of teams, (2) the writing of an e-business plan, (3) the development of an e-shop, (4) online shopping, (5) online peer and tutor evaluations, and the submission of a report.

a. Project phases for students to carry out

Phase 1 – formation of teams. The students were asked to form groups consisting of not more than five members by using an online team formation system. The web-based self-formation of teams made it easy for the students to form teams anywhere and anytime.

Phase 2 – writing the business plan. The students were asked to propose a business plan outlining the product/service line and targets, describing how the business would operate, and forecasting its profitability using the suggested proposal form, which was available online (http://ec.mgt.polyu.edu.hk/ecplatform/LabSheet/businessplan.doc). A soft copy of the business plan was submitted to the respective tutors. Once a group's proposal was accepted, the group received a login id, password, and shop number for the platform hosted at PolyU. The groups then had to login to their e-shops, assign names to the e-shops, and write short introductory descriptions for the e-shops.

Phase 3 – development of e-shops. The students were asked to design and develop their e-shops by uploading three main items to the platform: (a) product/service images with descriptions, (b) a Flash logo to represent their shop, and (c) a Flash banner to promote their e-shop via a "shop owner template." The students could use HTML or JavaScript in their product/service descriptions to enhance the layout of their e-shops.

Phase 4 – online shopping. Each group was given HK$10,000 in e-cash. The students then acted as customers and were asked to visit other e-shops to buy their products/services. The students could browse the e-shops on their own time and experience online shopping, as most of them had no previous experience in shopping online.

Phase 5 – online peer and tutor evaluations and submission of reports. We believe that it is important to assess what we teach and what the students learn. The online peer and tutor evaluation system can be formative (for learning), where the emphasis is on online feedback; and can be summative (for grading), for an evaluation of work performance. The online marking system could be accessed online (http://en.mgt.polyu.edu.hk:8080/OMS_Peer). The students were asked to submit a debriefing report after the game had ended. They were expected to cover the e-shop setup and performance, specify what they had learned from this project, and describe the difficulties they had encountered. Details of the description of the platform design and system architecture are mentioned in (Ngai, 2004).

4. EVALUATION

The project-based teamwork game in EC described above was evaluated based on the feedback of the students, who came from three tertiary institutes in Hong Kong. Student views and feedback were obtained using a formal questionnaire. The evaluations by the students were used to help determine the acceptability of the project in terms of the following four criteria: (1) the effectiveness of the project-based teamwork assignment in helping develop skills and knowledge, (2) the usability of the system, (3) attitudes toward the system platform, and (4) attitudes toward the project assignment. The effectiveness, usability, and attitudes toward the system and towards the project were measured using a five-point Likert scale (1 = strongly disagree, 3 = undecided, 5 = strongly agree). By measuring the effectiveness of the system, we were able to judge whether the project had succeeded in accomplishing its objectives or mission. The items employed to measure the usability of the system reflected the usefulness and ease of use of the system and the project. It was therefore possible to assess the satisfaction of the users as one potential indicator of the success of the project-based teamwork game in EC.

The project-based teamwork game was first introduced to the 110 undergraduate students enrolled in the course, "E-commerce for Management" at PolyU. These students were second- and third-year business students enrolled in the Bachelor of Arts program in Business Studies/Management/Marketing. Three hours of classes were held per week (2 hours of lectures + 1 hour of tutorial), with a total of 14 class meetings. All of the students had already taken "IT for Business" as their first IT course in the first year of study. Most of the students had no prior programming experience.

A project-based teamwork game was given to the students as one of the assignments in the EC course. A total of 25 teams were formed to design and develop 25 e-shops. The evaluation form was distributed to students who had taken on this project at the end of the course.

At CityU, this project-based teamwork game was introduced to 118 students taking the course "Fundamentals of E-commerce." Twenty four teams were formed and the groups were asked to design and develop their own e-shop. The course, "Fundamentals of E-commerce" was offered to all second-year students enrolled in the Associate of Arts in General Studies and as an elective to students of the Associate of Business Administration programmes at the Division of Commerce of CityU. Through lectures and tutorials, students were expected to learn and attempt business applications and creativity on the Web. In particular, they were expected to become accustomed to a virtual networking environment of business in the Cyber-age. Three hours of classes were held per week (1 hour of lectures + 2 hours of tutorials), with 13 class meetings. No pre-requisites were needed to take this course.

HKIEd is a higher education institute dedicated to providing pre-service and in-service teacher training in Hong Kong. At HKIEd, the project-based teamwork game was introduced to students taking the course, "IT in Business," hosted by the department of Information and Applied Technology. The game was assigned to all second-year business students registered in the Bachelor of Education (Secondary) Program in Business Studies at HKIEd. The objective of the program is to produce well-qualified teachers who have the knowledge and skills to teach IT for business activities. Because of the increasing importance of

EC in the business world, EC is emphasized throughout in this course. Fourteen undergraduate student teachers of business at HKIEd participated in the project-based teamwork game as one of the exercises in their course, held in the second semester 2003/04. The students formed a total of four teams to conduct this project.

5. ANALYSIS OF THE EVALUATION

After the students had completed the exercise of forming a team, proposing an e-business plan, developing an e-shop, engaging in online shopping, and evaluating the e-shop, they were asked to evaluate the whole system and the project-based teamwork game exercise as well. Evaluations by the students were used to help determine the acceptability of the project according to four criteria: (1) the effectiveness of the project-based teamwork assignment in helping to develop skills and knowledge, (2) the usability of the system, (3) attitudes toward this project-based e-commerce platform, and (4) attitudes toward the project assignment.

A total of seventy-eight responses from PolyU, eighty-eight from CityU, and fourteen from HKIEd were collected for data analysis. Table 1 summarizes the profile of the students. The majority of the respondents were female (124, 70.5%), and 63.1 percent of the whole sample had not had any experience with online shopping. Of those students who had no online shopping experience, nearly half stated that they intended to try shopping online. Nagi (2004) shows the questions on the evaluation form that was distributed to the students from thee three institutions, and the means and standard deviation of the responses on a scale of 1 to 5, where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.

Overall, the students rated the project highly on the four criteria for evaluation, with a mean score of at least 3.18 on a five-point Likert scale. In order to ensure that the values of most of the mean responses were statistically significantly different from the neutral value of the scale, which is "3 – neutral," one-sample t test using a test value of "3" was conducted for the eighteen items. The results indicated that all measuring items were significantly different with from the value of "3" and that the mean rating was larger than 3. The viability of the project-based teamwork assignment in supporting teaching and learning in EC was ascertained by the positive feedback obtained in the evaluation forms.

A further analysis was conducted to investigate whether or not a difference existed between PolyU, CityU, and HKIEd students in the mean ratings of the effectiveness, usability, and attitude toward the assignment and the system. A one-way analysis of the variance (ANOVA) test was used to compare and determine whether there were any significant differences among these three institutions while one sample t-test with a test value of "3" was conducted for each institution. Durlabhji and Fusilier (2002) summarize the results and indicates that half of the measurement items did not show any significant differences among three institutions. Specially, all of the students held the same attitudes toward the project assignment. It is clear that the project-based teamwork approach using a system that can facilitate the teaching and learning of EC is interesting, exciting, innovative, and more worthwhile than traditional textbook-based learning.

Table 1: Profile of the Students Who Participated in the Project-based Teamwork Assignment

	Frequency	Percentage
Gender		
Male	52	29.5
Female	124	70.5
Total	*176*	*100%*
Has online shopping experience		
Yes	65	36.9
No	111	63.1
Total	*176*	*100%*
Will try online shopping (For those who do not have online shopping experience)		
Yes	55	50.5
No	54	49.5
Total	*109*	*100%*
Will conduct online business (e.g., e-shops)		
Yes	59	34.7
No	111	65.3
Total	*170*	*100%*

Table 2: Results of the Evaluation of the Project-based Teamwork Assignment from Three Institutions of Higher Education in Hong Kong

	Mean+ (All)	SD (All)	Mean+ (HKIEd) n=14	Mean+ (CityU) n=88	Mean+ (PolyU) n=78	ANOVA F value	Significant Difference (Fisher's LSD)
This assignment allows us to gain hands-on experience in							
1. e-shop development	3.46***	.699	3.00	3.53***	3.49***	3.976*	HKIEd<CityU , PolyU
2. e-business plan development	3.58***	.682	3.07	3.67***	3.51***	5.710**	HKIEd<CityU , PolyU
3. basic e-shop management (including setting product prices, writing descriptions)	3.47***	.741	3.36	3.49***	3.36***	.658	
The project-based teamwork game system is							
4. easy to use	3.83***	.711	4.14***	3.78***	3.58***	4.299*	PolyU < HKIEd
5. easy to learn	3.80***	.704	4.07***	3.76***	3.65***	2.312	
6. user friendly	3.64***	.701	3.64**	3.64***	3.35***	2.980	
7. stable and reliable	3.62***	.719	3.57*	3.63***	2.69*	27.513***	PolyU<HKIEd , CityU
8. simulated in a real online shopping environment	3.23**	.839	2.57	3.34***	2.94	7.777***	HKIEd, PolyU<CityU
Using this system is							
9. fun	3.35***	.792	3.36	3.35***	3.18*	1.082	
10. pleasant	3.47***	.792	3.50*	3.47***	3.14	3.844*	PolyU < CityU
11. exciting	3.18*	.767	2.86	3.23**	2.91	3.685*	PolyU < CityU
12. pleasurable	3.47***	.756	3.43**	3.47***	3.10	4.725*	PolyU < CityU
13. enjoyable	3.46***	.767	3.43*	3.47***	2.96	8.702***	PolyU < CityU
Overall, this assignment is							
14. more interesting than just traditional textbook learning	3.85***	.695	3.93***	3.84***	3.86***	.102	
15. more exciting than just traditional textbook learning	3.82***	.713	3.64*	3.85***	3.71***	1.065	
16. more innovative than just traditional textbook learning	3.75***	.754	3.86***	3.73***	3.92***	1.499	
17. helping me understand more about the development of e-shops	3.72***	.723	3.64*	3.73***	3.59***	.729	
18. worth doing in relation to this subject	3.62***	.797	3.79***	3.59***	3.62***	.375	

+One Sample T-test with a test value of 3. * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

indicates that half of the measurement items did not show any significant differences among three institutions. Specially, all of the students held the same attitudes toward the project assignment. It is clear that the project-based teamwork approach using a system that can facilitate the teaching and learning of EC is interesting, exciting, innovative, and more worthwhile than traditional textbook-based learning.

The ANOVA test revealed nine measurement items that varied significantly among the three institutions. To facilitate the interpretation of the solution, a multiple analysis comparing the mean differences based on a post-hoc Fisher's LSD test was undertaken. The post-hoc test results show that PolyU and CityU students gain more hands-on experience in "e-shop development" and "e-business plan development" than HKIEd students. Obviously, the HKIEd respondents gave these two items

lower mean scores than the respondents from the other institutions. The reason why HKIEd respondents perceived that they had a relatively lower extent of exposure to technology and business plan development is understandable (Q2). Unlike their PolyU and CityU counterparts, the development of an e-business plan development was not a primary requirement for HKIEd respondents, and the plan was not assessed.

In an informal discussion with HKIEd participants, the students stated that EMP should be further developed in terms of scalability and flexibility. They suggested some improvements, all centering on how to strengthen the level of sophistication of the system. It was clear that the HKIEd participants had high expectations of the E-learning tools. Their expectations were clearly higher than those of the PolyU participants, and so the results of their evaluation were lower (Q.1). This may be due to the fact that some of the participants from HKIEd have IT as their minor and are student teachers in the field of business. Thus, they are more IT-literate and critical when evaluating IT systems.

More HKIEd students than PolyU students perceived that the system was easy to use. Again, the fact that HKIEd students had relatively higher competence in IT because of their academic training may help to explain their warm embrace of the system. Regarding the stability and reliability of the system, the HKIEd and CityU participants perceived a much higher level of performance than the PolyU students. The PolyU students were not satisfied with the stability and reliability of the system, as can be seen from the mean score for "stable and reliable" of 2.69, which is significantly less than the value of "3" – a stark contrast with the ratings given by the HKIEd and CityU students. One possible explanation for this is that the project-based teamwork assignment was first introduced to PolyU students in the second semester of 2002/03. At the end of the assignment, the students reported some bugs in the system platform. The bug-free version of system was then launched at CityU and HKIEd in the second semester of 2003/04. The CityU and HKIEd students therefore used a more stable and reliable EMP platform when doing the assignment.

Interestingly, CityU students, more than those from the HKIEd and PolyU, agreed that the system simulated a real online shopping environment. With regard to their attitude toward system platform, CityU students more than PolyU students perceived that using the system was "pleasant," "exciting," "pleasurable," and "enjoyable." Although significant differences were found in these nine measurement items among the three groups of students, with the exception of Q.8, the mean rating in each institution was either significantly larger than the value of "3" or not statistically different when compared with that value.

6. CONCLUSIONS AND IMPLICATIONS

We have created this platform for students to make part of their EC learning experience enjoyable and meaningful. Learning EC can be a joyous adventure that arouses interest in learning about business. If students can learn the process in a properly guided and effective environment, this can prepare them to learn successfully at university and for personal fulfillment. EC can be a difficult subject to teach, as no simple computing package can be used for teaching undergraduate business students, most commercial EC software require the learning of new computer languages, and time is limited, particularly in EC overview courses. Our pedagogy is based on the belief that learning is most efficient and effective when it is learning by doing.

In this study, a case study using a project-based teamwork approach for teaching and learning in EC was presented. Cooperative work among students can always yield remarkable performances (Jensen, 2002). However, learning effectiveness will not be maximized if collaboration among students is not sufficiently structured and supported. The Web has truly made cooperative learning possible by enabling there to be an interactive and dynamic learning environment (Evans, 2000). Regarding the learning and teaching of information systems, education researchers have recommended group learning as an effective tool (Fellers, 1996). As a Web-based platform, the project-based teamwork game in EC realizes the benefits provided by the Web to support group learning in EC.

The result of an evaluation indicates that the project-based teamwork approach to teaching EC performs to expectations. The student evaluations indicate that students like the practical components of the course and are interested in using the learning-by-doing approach. Specially, no significant differences were found in the four items (attitudes toward the project teamwork game in EC) used to evaluate the overall effectiveness of the project. This essentially shows that this project approach is emerging as an effective learning system in the eyes of the PolyU, CityU, and HKIEd participants. The project-based teamwork game in EC using this system can support the learning and teaching of EC that it is built on, and prove to be effective system-wise and pedagogically. The system is appropriately used to support learning and teaching for EC courses. The combination of the lectures and the project-based teamwork game turned out to be a very effective way of teaching introductory EC to undergraduate business students. The hands-on approach of learning by doing enabled students to take direct action in designing and setting up e-shops.

However, the design and development of such a dynamic teaching and learning approach in EC is difficult. According to Gunasekaran et al. (2004), the lack of a budget for EC technology, the lack of expertise in teaching EC, the dynamics of EC, and so forth are some major barriers preventing educational institutions from offering effective EC education. Similarly, running EC courses with such practical components poses some challenges to educational institutions. The first challenge is getting the support of educational institutions or the government because obtaining the appropriate training materials/tools requires lot of resources including people, technology, and a budget.

Both EC and technical knowledge are essential for success in designing and developing effective practical tools for teaching and learning EC. The release of EC experts with relevant knowledge about the project is very important to designing what should be included, and how to run the project in a way that best fits the needs of the students. Technical experts can make use of the latest EC technology and communicate with EC experts to design and implement the systems. Appropriate hardware and software should be provided for design and implementation. Such technology and experts require sufficient financial support to obtain. In order to ensure the quality and effectiveness of the development of these practical EC teaching tools, government and educational institutions must be committed by becoming involved and being willing to allocate valuable resources to the implementation effort. The second challenge is the rapidly changing environment of EC. It is difficult to find up-to-date cases and to absorb a constant flow of new EC knowledge and technology. In order to keep current materials in front of the students, the contents or the design of our systems need to be frequently revised.

There is no doubt that the non-traditional EC approach to teaching through simulation games and structured exercises are widely accepted by students. That they all enjoyed and found it quite rewarding is supported by the case study presented in this paper. The project-based teamwork game has been successfully promoted and tested in three Hong Kong institutions of higher education. The next step will be to further revise the project-based e-commerce game to support more roles such as promoters, e-shop-owners, bankers, customers, administrators, and customer relationship analyzers, to help students develop insights into the group dynamics of problem-solving situations in EC environments. The system should allow university teachers to have real-time access to the students' work performance and allow them to provide timely feedback to the students. We believe that other institutions of higher education with EC curricula will benefit from this approach. In addition, a wider-scale evaluation remains to be done before the system can be made operational in the other programs and institutions. Apart from enhancing the system, rigorous testing of the improved system will later be performed on a wider scale.

7. ACKNOWLEDGEMENTS

This project was supported in part by the Teaching Development Grants provided by the University Grants Committee (UGC) of Hong Kong. The authors are grateful for the assistance provided by Mr. Francis Wat on this project and the constructive comments of the two referees on an earlier version of this paper.

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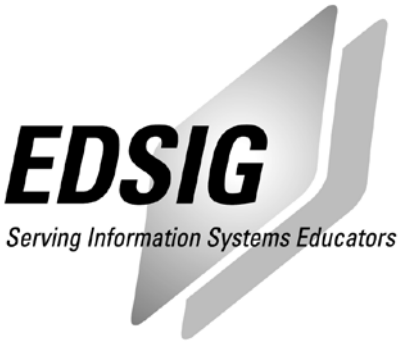

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ISSN 1055-3096