USING PCU-CAMEL, A WEB-BASED LEARNING ENVIRONMENT, IN EVALUATING TEACHING-LEARNING PROCESS

Arlinah Imam Rahardjo

Informatics Engineering Department , Faculty of Technology Industry, Petra Christian University
Jl. Siwalankerto 121 – 131, Surabaya 60236, Indonesia
E-mail: arlinah@petra.ac.id

ABSTRACT*:* PCU-CAMEL (Petra Christian University-Computer Aided Mechanical Engineering Department Learning Environment) has been developed to integrate the use of this web-based learning environment into the traditional, face-to-face setting of class activities. This integrated learning method is designed as an effort to enrich and improve the teaching-learning process at Petra Christian University. A study was conducted to introduce the use of PCU-CAMEL as a tool in evaluating teaching learning process. The study on this method of evaluation was conducted by using a case analysis on the integration of PCU-CAMEL to the traditional face-to-face meetings of LIS (Library Information System) class at the Informatics Engineering Department of Petra Christian University. Students' responses documented in some features of PCU-CAMEL were measured and analyzed to evaluate the effectiveness of this integrated system in developing intrinsic motivation of the LIS students of the first and second semester of 2004/2005 to learn. It is believed that intrinsic motivation can drive students to learn more. From the study conducted, it is concluded that besides its capability in developing intrinsic motivation, PCU-CAMEL as a web-based learning environment, can also serve as an effective tool for both students and instructors to evaluate the teaching-learning process. However, some weaknesses did exist in using this method of evaluating teaching-learning process. The free style and unstructured form of the documentation features of this web-based learning environment can lead to ineffective evaluation results

Keywords: e-learning, a web-based learning environment, intrinsic motivation, evaluation tool, teaching-learning process, PCU-CAMEL

INTRODUCTION

Funded by TPSDP (Technological and Professional Skills Development Project) grant from the Indonesian Government, Mechanical Engineering Department of Petra Christian University has been developing a web-based learning environment known as PCU-CAMEL (Petra Christian University-Computer Aided Mechanical Engineering Department Learning Environment) [1] since 2003. PCU-CAMEL (http://pcucamel.petra.ac.id) has been designed as an effort to enrich the students' learning experiences by integrating the use of the web into the traditional, face-to-face setting of class activities. Thus an intrinsic motivation for the students will be developed.

Intrinsic motivation is vital at work or education, [2]. Only intrinsic motivation can drive people to learn or do something at their best. So motivation is a key to do quality works. If someone thinks that he/she is having fun, then he/she will forget that he/she is learning or working hard. He/she will consider that learning is not a burden. Then he/she will have an intrinsic motivation to learn [3]. Besides the ideas of creating a fun environment in learning, Cole described the elements to develop intrinsic motivation to learn are providing opportunities for students to have clear vision and purpose of what they are learning for; to control their own choices; to work in cooperation with others; to get support from the entire community, the educators, friends, administrative staff, family; and to have challenges to create enthusiasm [4]. Based on these five elements, PCU-CAMEL is focusing on personalization, collaboration and reflective features built around the concept of Intrinsic Motivation, which are reflected into User Area and Course Area.

Though PCU-CAMEL was initially designed for Mechanical Engineering Department, it has also been implemented at the Library Information System class since the first semester of 2004/2005. A study is conducted to find the effectiveness of this web-based learning environment in evaluating a teaching-learning process by using a case analysis on integrating PCU-CAMEL into the traditional face to mace meetings to develop intrinsic motivation of LIS students to learn. This study is expected to introduce a method of evaluation using PCU-CAMEL as an effective tool in evaluating the teaching-learning process. The Lessons learned will give benefits to improve PCU-Camel more as an evaluation tool.

The report of this study is outlined into four sections. The first section introduces PCU-CAMEL as a web-based learning environment, including the

description of the theory of Intrinsic Motivation as the design basic concept of this web-based learning environment. The purpose and benefits of the study is also described. The second section elaborates three documenting features of PCU-CAMEL as the tools used in documenting and evaluating the teaching learning process. The third section discusses and analyzes messages from the students, documented in the three documenting features of PCU-CAMEL both to prove the effectiveness of this web-based learning environment in evaluating the teaching learning process and to prove the effectiveness of the integrated environment in developing intrinsic motivation to learn as well. The conclusion of the discussion and analysis, including problems identified and solutions proposed is presented at the last section of this report.

PCU-CAMEL DOCUMENTS COLLECTING FEATURES

One of the advantages of a web-based learning environment is its capability in documenting the teaching-learning process and results. There have been some features of PCU-CAMEL functioning as document collecting and archiving systems. Those features, among others, are Reflective Expectation, Reflective Evaluation, and Discussion Forum.

The feature on Reflective Expectation is meant to let the students understand themselves better by encouraging them to exercise thinking reflectively on their vision and purposes of study. By knowing what the students expect, the instructor will also be able to adjust the learning activities with the needs of the students to meet the objectives of the class.

A feature on reflective evaluation is also provided to let the students exercise self-evaluation on their learning process and give feedbacks to the betterment of the future development of the class.

The feature of Discussion Forum provides opportunities for students to exercise interaction in group without limitation of time and space and to express their opinions on class subject knowledge as well as other subjects. Through these features, students' progress of learning and flow of ideas were recorded from the very start up to the end of class sessions.

DISCUSSION AND ANALYSIS

The discussion and analysis cover the inter-related studies. Discussion and analysis on the case analysis on the effectiveness of implementing the integrated environment in developing intrinsic moti-

vation also serves to prove the effectiveness of PCU-CAMEL in evaluating the teaching-learning process.

Assigned with 3 credits, 36 students participated in this LIS class both during the first and 2nd semester of 2004/2005. All course information including class description, objectives, policy, lesson plans, class news, course materials, online tests, class assignments and student grades are accessible anytime from PCU-CAMEL.

The students were expected to write their reflective expectations and reasons for joining the LIS class at the first meetings. As reflected in the Table 1 below, the students of both semesters had various reasons in taking the class. The top number of percentage belonged to the students (48.65 % from the 1st semester and 25.81% from the 2nd semester) who took the class with the expectation to understand the subject knowledge of the course. However, the 2nd semester students were also as much interested in developing their life skills as stated in the objectives of the class. 25.81 % of them expected to learn to be critical, creative and develop their potentialities compared to only 5.41 % of the 1st semester students. Though only in a small percentage, there were 1st semester students who took the class based on extrinsic motivation such as their friends' influence (5.41 %), the intention to meet the credits required (2.70%), find ideas for final project (2.70 %). None of the 2nd semester students expressed those kinds of reasons. Instead, a greater number of students expressed their reasons on taking the class was out of the various and different teaching methods used in this class (16.13 %); challenges they had to face in using e learning (12.90 %). These reasons pointed to the elements of control and challenge in intrinsic motivation. The traditional method of teaching practiced by most faculty members is lecturing. These 2nd semester students seemed to have heard the methods used in this class from their seniors. It means that students do need challenges and various methods of teaching learning activities including the use of e learning to allow them to control their own choices of learning. It also means that students did have clear vision and purpose of taking this class as they did participate in this class out of the prior knowledge gained from their senior.

By providing opportunities for the students to write reflectively and document their expectations, the students are encouraged to think over their purposes and reasons in their learning process. The awareness on their vision and purpose of studies is expected to develop their intrinsic motivation to learn. It also helps the teacher to get to know the students more.

At the end of the class sessions, the students were also encouraged to write reflective evaluations on the performance of the class compared to their reflective expectations at the beginning of the class including suggestions on the improvement for the class in the future. The students from both semesters also expressed various comments, although there were different distribution of percentages between expectations and evaluations as listed in Table 1. Quite a few number of students from both semesters stated that the class was interesting, fun, relaxing, informal and different from other classes of Informatics Engineering Department (30.77 % of the 1st semester and 48.48 % of the 2nd semester); This fact, added by a few positive comments on The Various Teaching

Methods, The Use of E-learning Environment and Students Are Actively Involved, gave evidences that a fun learning environment and the teaching learning methods that provide various learning experiences impress the students besides the subject content goals.

From the study above, the integrated environment proved to serve its purpose as an effective tool in providing opportunities for students to develop intrinsic motivation.

This evidence also shows that the documentation features of PCU-CAMEL on the students' reflective expectation and evaluation do not only serve as a strategy to conduct effective teaching-learning process but can be used as an effectiveness tool in evaluating the teaching-learning process, as reflected in the case

Table 1. Students' Expectations & Evaluations (2004/2006)

	Opinions	Expectations				Evaluations			
		1st Sem		2nd Sem		1st Sem		2nd Sem	
		Item	%	Item	%	Item	%	Item	%
1	Develop life skills	2	5.41	8	**25.81**	7	6.73	6	**18.18**
2	Understand library/LIS	18	48.65	8	**25.81**	20	19.23	0	**0.00**
3	Develop reading habits	1	2.70	0	**0.00**	0	0.00	0	**0.00**
4	For future career	7	18.92	3	**9.68**	0	0.00	0	**0.00**
5	Be knowledge- able system engineer	3	8.11	0	**0.00**	0	0.00	0	**0.00**
6	Contribute to the advancement of knowledge/libraries	2	5.41	1	**3.23**	0	0.00	0	**0.00**
7	Friends' influence	2	5.41	0	**0.00**	0	0.00	0	**0.00**
8	meet the required credits	1	2.70	0	**0.00**	0	0.00	0	**0.00**
9	Ideas for final project	1	2.70	0	**0.00**	0	0.00	0	**0.00**
10	Various teaching methods	0	0.00	5	**16.13**	5	4.81	0	**0.00**
11	Challenged using e- learning	0	0.00	4	**12.90**	0	0.00	2	**6.06**
12	Interesting class/creative /fun/ relaxing/ different from other courses	0	0.00	0	**0.00**	32	30.77	8	**48.48**
13	Students are actively involved	0	0.00	0	**0.00**	6	5.77	3	**9.09**
14	Assignments use ful than lectures	0	0.00	0	**0.00**	5	4.81	3	**9.09**
15	Supportive teacher	0	0.00	0	**0.00**	10	9.62	2	**6.06**
17	Others	0	0.00	1	**3.23**	0	0.00	0	**0.00**
18	Too many assignments	0	0.00	0	**0.00**	8	7.69	1	**3.03**
19	Undisciplined time	0	0.00	0	**0.00**	9	8.65	0	**0.00**
20	Assignments not clear	0	0.00	0	**0.00**	1	0.96	0	**0.00**
21	Some students not serious	0	0.00	0	**0.00**	1	0.96	0	**0.00**
	TOTAL	37	100.00	31	**100.00**	104	100.00	33	**100.00**

study of the students' intrinsic motivation to learn. The documentation function as well as the capabilities to be accessed openly to anybody allow the students to document and evaluate their learning process and at the same time provide the instructors of different method of evaluation for the teaching learning process. The instructors can use the documented data to evaluate the success and failure of the teaching strategy in attaining the class objectives or how the students can meet their expectation.

However the free form and not-compulsory type of reflection might create difficulties in interpreting the results. The good thing on this style of reflection is allowing original evaluation or even ideas for improvement of the teaching-learning process from the students. However the evaluation posted can be potentially unmatched with the postings on the expectation. Then it will be difficult for the instructors to evaluate the success of failure of the teaching-learning process.

The other documentation feature that can serve as an evaluation tool is the Discussion Forum. As the reading materials were available online, the students were expected to read the class materials independently before classes and be ready to be actively involved in the class discussions. These class discussions were followed by online discussions in PCU-CAMEL covering class materials as well as other enriching topics facilitated by the instructor or posted by the students themselves.

Most Indonesian students including PCU students are still used to be passive learners, focusing more on listening to lectures, and are not used to expressing ideas openly. The use of e-learning was also still new to PCU students. Therefore extrinsic motivation strategy was still used to encourage students to use PCU-CAMEL and participate on the online Discussion Forum. Each student was required to post messages at least 8 postings during the 1st semester. Based on the arrangement between the instructor and the students, 10 points of grades were contributed to the final grade if the students met the requirement. Table 2 shows that 19% of the 1st semester students posted less than 8 times. 8% of them met the requirements and 73% posted more than required. An increase to 16 postings were offered to and agreed by the class as the minimum requirement during the second semester. Table 2 also indicates that the same percentage of the 2nd semester students (19%) posted less than the minimum requirements (16 times), 19 % of them met the exact number of requirements and 61 % met more than required. Though the percentage of the postings seemed similar and even looked decreasing in the second semester. Yet, actually there

was an improvement in the 2nd semester compared to the 1st semester as the number or required postings were doubled. It means that students from the 2nd semester were more ready to interact. It also shows that students participated on the discussion not only to meet the requirement as an extrinsic motivation. They did enjoy the discussions which allowed cooperation and supports as elements of intrinsic motivation.

Table 2. Percentages of students Discussion Forum postings (2004/2005)

	1st semester (8 postings required)	2nd semester (16 postings required)
Percentage of students posted less than required	7 (19) %	7 (19 %)
Percentage of students posted as required	3 (8 %)	7 (19 %)
Percentage of students posted more than required	26 (73 %)	22 (61%)

So from the number of postings in the discussion forum during the teaching-learning process, the performance indicator of the students on intrinsic motivation can be measured. An evaluation with different type of purpose can also be conducted from this documenting system as indicated in these following examples of analysis and evaluation.

From the number of postings and response time recorded in the PCU-CAMEL Discussion Forum, the 2nd semester students seemed to be more prepared to post messages compared to the 1st semester students. During the 1st semester 2004/2005, the first topic was posted by the student after the 2nd class meeting and was responded 19 days later. The second topic discussion was posted 7 weeks after the first topic and was responded 12 days later. Interestingly the first topic posted was not on the class subject knowledge but on the teaching-learning methods used for the class. The 2nd semester students were more ready in conducting online discussion since the first topic was posted 2 days after the first class meeting and was responded the next day. The second topic was posted 5 days from the first topic. The first three topics were also not on the class materials, but on e-learning, including PCU-CAMEL as one of the teaching-learning methods used for the class and on the students' learning strategies they were going to use to meet their learning goals. It showed that teaching learning method is an important aspect for the students in their learning process.

The indication of being more prepared is also reflected on the number of topics posted during the

two semesters. During the first semester, there were 22 topics posted on the Discussion Forum. The LIS instructor posted 3 topics, while 10 students posted the other 19 topics. Those topics were responded by 386 postings by the LIS instructor as well as students. While during the second semester, there was an increase up to 44 topics posted on the Discussion Forum and responded by 676 postings from all students. 30 students posted the topics. During this 2nd semester the instructor did not have any opportunities to post any topic, as the students had actively responded the topics posted by the other students.

From those two analyses above, the level of preparedness of students from different class can be mapped. This evaluation can give inputs to design more effective ways of teaching strategy to improve the class performance.

The documentation of the messages of the discussion forum also serves as a tool to recognize the scope of the topics discussed. Thus the interests of the students can easily be detected. For example the topics of the two LIS classes discussed, ranged from LIS materials, teaching and learning methods, activities, the use of e-learning including PCU-CAMEL and assignments. These active participations from the students show that students do enjoy interaction, collaborative learning and supports from other parties such as instructors and other fellow students. This enjoyment contributes the development of intrinsic motivation to learn as indicated by the facts that both semesters focused their discussions more on the

subject knowledge of the course, though the 2nd semester students covered more class materials topics as 36.36% of the 1st semester and 86.36 % of the 2nd semester as described on Table 3. It indicates that online discussion forum provides enrichments to the class materials.

So by analyzing the messages posted on PCU-CAMEL Discussion Forum, it can be detected that PCU-CAMEL provides alternatives means to exercise the students' thinking skills and to enrich the discussion on class materials; provides enough control for the students to choose their points of interest in expressing their ideas; as well as provides support groups from class members to encourage the students especially the quiet ones to express ideas. Meanwhile, from this type of documenting tool, any evaluation and suggestion on the improvement of teaching-learning activities can also detected such shown on their preferences on teaching-learning activities as listed on Table 4.

This feature can also used as a tool to evaluate the media of learning such as e-learning and PCU-CAMEL as reflected on the online discussion topics on e learning during the 2nd semester. The reasons on the pro and contra on using e-learning are listed on Table 5 below. Despite the benefits gained from using e learning, some problems did exist mostly on the speed of the Internet access. A problem on digital divide was also expressed to indicate that problems exist for students who had no computer and Internet access at home.

Table 3. Number of Discussion Topics (2004/2005)

No	Type	1st Semester		2nd Semester	
		Item	Percentage (%)	Item	Percentage (%)
1	On LIS topics	8	36.36	38	86.36
2	Teaching-learning activities, learning strategy, students' works presentation	5	22.73	2	4.55
3	PCU Camel & e-learning	4	18.18	3	6.82
4	Assignments	2	9.09	0	0.00
5	Others	3	13.64	1	2.27
	TOTAL	22	100.00	44	100.00

Table 4. Discussion on the topic of Teaching-Learning Activities (2004/2005)

Opinions/suggestion	1st Semester		2nd Semester	
	Item	%	Item	%
More games, fun	6	30.00	2	10.53
Sharing knowledge, using PCU CAMEL	3	15.00	2	10.53
Learning from Movies	0	0.00	3	15.79
Visiting Libraries	3	15.00	2	10.53
Working as an apprentice in the library	0	0.00	1	5.26
Discussion outside class	0	0.00	2	10.53
Active in class discussion, use creative/critical thinking	6	30.00	0	0.00
Other	2	10.00	7	36.84
TOTAL	20	100.00	19	100.00

Table 5. Discussion on the topic of e-learning (2nd semester 2004/2005)

	Opinions	%
Positive responses	Learning something new	13.64
	Students are more active in the learning process	11.36
	Broaden the perspectives on IT and internet	9.09
	Kept updated, broadening knowledge, access to inform.	9.09
	Flexibility in attending class, online lecture	4.55
	Develop critical/creative thinking, motivation to learn	6.82
	Learning effectively and independently	4.55
	Increasing interactions between teacher and students	2.27
	Tests can be developed online	2.27
Negative responses	Can't keep up with the class if no access to internet	11.36
	Not used to	4.55
	Will prevent students to go to school	4.55
	Problems on the Speed of access	4.55
	Costly	4.55
	Causing ruins in their eyes	2.27
	Indonesia does not have unlimited access	2.27
	Internet connection isn't available all over Indonesia	2.27
	TOTAL	**100.00**

Similar problem does exist in using this Discussion Forum to evaluate the teaching learning process. Without the intervention of the instructor as the facilitator of learning, the topics can go uncontrolled. Again as original portraits of the students can be captured, the data can lead to the type of unimportant information not designed to be captured and evaluated. A purpose-driven evaluation might also not be able to be conducted as no such messages posted.

CONCLUSION

An analysis of the 1st and 2nd semester 2004/2005 LIS-PCU students' responses, documented on some features of PCU-CAMEL such as Reflective Expectation, Reflective Evaluation and Discussion Forum has been conducted. The study results in various positive and negative responses on the effectiveness of integrating PCU-CAMEL system into the traditional meetings of LIS classes in enriching the teaching learning process and thus developing the intrinsic motivation of the students.

The study on the teaching strategy mentioned above also proves that this web-based learning environment can serve as an effective tool for students as well as of the instructors in .documenting and evaluating a teaching-learning process. The open online documentation allows students to share and learn the purposes of study and opinions on the process of learning from each other. Through the documentation on their reflective expectation and evaluation, as well as of their postings in the discussion forum, the students can evaluate their learning process.

Detailed analysis of the documentation of postings on the three types of PCU-CAMEL documenting features allow the instructors to get to know the students better, the students' progress of learning, or to compare the effectiveness of classes from one semester to the other . The documentation also provides the data for the instructors to evaluate the effective use of a teaching strategy or media.

Despite of the effectiveness of this web-based tool to evaluate the teaching-learning process, there are still problems to be considered. The free stype and not-compulsory form of messages, posted as the students' reflective expectation, evaluation can lead to ambiguous results. Besides the free form, there should be a guided type of feature required to be posted by all students. This form serves as a kind of required questionnaires designed for certain purposes of evaluation. There should also be interferes from the part of the instructors in posting topics on the discussion forum, designed to serve certain purposes of evaluation.

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