

Investigation of Interaction, Online Support, Course Structure and Flexibility as the Contributing Factors to Students' Satisfaction in an Online Certificate Program

Erman Yukselturk and Zahide Yildirim

Department of Computer Education and Instructional Technology, Middle East Technical University, Turkey //
eyukselturk@gmail.com, ermany@metu.edu.tr // zahidey@metu.edu.tr

ABSTRACT

The purpose of the study is to investigate some of the factors that contribute to satisfaction of participants in an online Information Technologies Certificate Program (ITCP). The program includes eight courses and lasts four semesters. The sample consisted of 30 participants who enrolled to the program and 8 instructors who gave the courses in this program in 2004-2005. The data was collected through both qualitative and quantitative methods. An online questionnaire was used to gather data on participants' satisfaction about the program, semi-structured interviews were conducted with both the participants and the instructors to analyze the factors that contribute to satisfaction in the program, and asynchronous and synchronous communication transcripts were examined to support the findings. Descriptive statistics were reported upon the participants' satisfaction in regard to learner-learner interaction, learner-instructor interaction, course structure, institutional support, and flexibility. A repeated measure analysis test was utilized to see the changes in the participants' satisfaction throughout this online program based on semester one, two, three, and four. The results of the study showed that even though the participants' overall satisfaction was generally positive, it decreased significantly toward the final semesters of the program. The findings highlighted some of the critical issues such as "learning community formation through interaction, well structured and guided project or problem-based group activities, considering instructional design and cognitive principles in the design of the program, and flexibility in time and selection of the courses" that should be taken into account in designing online programs.

Keywords

Online learner satisfaction, Online interaction, Online support, Online course structure, Online flexibility

Introduction

The recent emergence of information and communication technologies allows universities to offer distance education programs to meet the needs of nontraditional students. With the help of these technologies, the number of online courses and programs has increased drastically in the recent years. It was also expected that the number of online students will grow in the long-term (Allen & Seaman, 2004).

With the increasing number of online courses and programs, the number of institutions that provide them is also increasing. This causes competition among providers in the field of distance education (Tricker, Rangecroft, Long & Gilroy, 2001). There are factors that affect the teaching quality such as good teaching, clear goals, appropriate workload, appropriate assessment and emphasis on independence (Ramsden, 1991). Even though it is not the only factor that affects teaching quality, in this new competitive field, the focus has been shifted to learners' needs, expectations and satisfaction. Especially, learner satisfaction is more important than ever before in this new field (Roach & Lemasters, 2006). While promoting the quality of online programs in today's market, higher education institutions consider student satisfaction as one of the major principles (Moore, 2002; Moore & Kearsley, 2005). Feasely and Olgren (1998) mentioned that according to Kirkpatrick's (1998) four levels model of learning which consists of reaction, retention, application, and results, the learner's reaction to course material is categorized as the first level. In the part of reaction level, measuring learner satisfaction provides valuable information about the attentiveness of the student, the overall learning experience, and the effort exerted to learn. High level of learner satisfaction leads to lower attrition rates, an increase in learners' enrollments and motivation, and a more productive learning environment (Biner, Dean, & Mellinger, 1994; Schwitzer, Ancis, & Brown, 2001).

Student satisfaction is seen as one of the key variables in determining the success or failure of distance learners, courses, and programs in the literature. Therefore, there are many published studies on distance learner satisfaction. However, earlier studies tended to focus on learner satisfaction measured for once only at the beginning or at the end of the course with questionnaires, grades given on tests and other course assignments. Therefore, Sener and Humbert (2003) stated that more longitudinal studies are needed to investigate this issue. Phipps and Merisotis (1999) stated

that a major shortcoming of the distance learning research to date was the emphasis on student outcomes for individual courses rather than for whole academic programs. Roach and Lemasters (2006) mentioned that the researches in the literature were not specific to online professional programs.

To sum up, with the help of multiple sources that were used to collect data, such as questionnaires, student and instructor interviews, chat and discussion list transcripts, this study will help to answer questions related to offering entire online programs. Further, the results of the study help us avoid the pitfalls of a one-shot measure of student satisfaction, and provide a better understanding of changes in student satisfaction in a long period of time and in entire programs. At this stage, the theoretical framework about student satisfaction is provided to form a base for this study.

Learner Satisfaction

Learner satisfaction in distance education depends on a number of factors (Sener & Humbert, 2003). In this study, satisfaction is defined by learner-reported feelings about interaction with instructors and peers, course structure, institutional support, and flexibility.

Interaction is an important part of learner satisfaction. Research suggests that both quality and quantity of interaction with the instructor and peers are much more crucial to the success of online courses and student satisfaction than that are in traditional courses (Woods, 2002). In a study by Fulford and Zhang (1993), the students' perception of interaction was the critical predictor of satisfaction in a distance-learning course. In another study conducted to determine predictors of student satisfaction with a fully interactive, multi-point real-time video teleconferencing and web-based course, Debourgh (1999) found that the factors that were related to interaction were critically important. These factors are related to promptness of answers to student questions, instructors' encouragement of participation, accessibility of instructors, and promptness of instructors' feedback on students' work. In addition, Swam (2001) analyzed satisfaction of university level online students (1406 students from 73 online courses) and stated that three factors contributed significantly to satisfaction level in online courses. These factors are contact with and feedback from the instructors, active discussion among students, and clarity in course design. This result is consistent with Moore's (1989) promotion of three types of interaction in distance education: learner-instructor, learner-learner, learner-content.

Course structure is another important factor that affects the learner satisfaction. A well-designed online course is beyond publishing text. In other words, designing an online course is not simply converting traditional course material to an online format. Course structure helps distance learners plan, organize and manage their learning activities. In a study by Hara and Kling (1999), dissatisfaction with the distance course is related to the lack of prompt feedback, technical difficulties, and ambiguous course instructions.

High quality of instructional and institutional support services also result in higher student satisfaction with the educational environment. Schwitzer, Ancis and Brown (2001) stated that interactive and engaging student services were critical factors for student satisfaction. Moore and Kearsley (2005) suggested that students might interact with specialists in various forms of student support in addition to interacting with instructors who help students learn the course contents. Student's satisfaction might also increase when on-site staffs are attentive to their progress and problems (Biner, Dean, & Mellinger, 1994).

In distance education programs, the learners are mainly adult with social, occupational and family obligations (Moore & Kearsley, 2005). Therefore, distance learners want to participate in the courses or programs whenever and wherever they need or want. In other words, the convenience and flexibility of distance program is another contributor to student satisfaction (Arbaugh, 2000). Maki, Maki, Patterson and Whittaker (2000) found that students enjoyed the flexibility of online learning environment and they perceived the convenience of the online course as a major benefit. Increasing learner control by providing flexibility and different choices within the instructional programs help strengthen learner satisfaction.

To summarize, student satisfaction has been given high attention in distance learning environment like in traditional learning environment in recent years. There are number of reasons for the attention given to learners' satisfaction in online courses. First, understanding the factors that affect the student satisfaction such as interaction with instructors and peers, course structure, institutional support, and flexibility will help course designers and teachers take the

necessary measures to increase satisfaction. Second, it is seen as an important measure of program outcomes and program quality. Third, satisfaction is influenced a lot by contextual factors, making it necessary to analyze online learning within its own context. The purpose of this study is to investigate some of the contributing factors such as interactions, course structure, institutional support and flexibility to satisfaction of the participants enrolled in the online Information Technologies Certificate Program. The following research questions guided this study:

- What is the participants' satisfaction in regard to learner-learner interaction, learner-instructor interaction, course structure, institutional support, and flexibility, based on semester one, two, three and four in online Information Technologies Certificate Program (ITCP)?
- Does the participants' satisfaction change throughout online Information Technologies Certificate Program (ITCP) based on semester one, two, three, and four?
- What are the factors that contribute to the participants' satisfaction in online Information Technologies Certificate Program (ITCP)?

Online Information Technologies Certificate Program (ITCP)

Many higher education institutions have made the decision to offer online courses, certificate programs and full degree programs in recent years. One of these programs is online Information Technologies Certificate Program (ITCP). This program was the first that became valid in Turkey, it was developed at Middle East Technical University (METU) with the enterprise of METU Computer Engineering Department, technical support of METU Computer Center and collaboration of METU Continuing Education Center in 1998, and it is still active. It includes eight fundamental courses of Computer Engineering Department, and comprises of four semesters lasting nine months totally. The courses in the program are given by the instructors from Computer Engineering Department. The main aim of the online ITCP is to train the participants in the IT field to meet the demands in the field of computer technologies in Turkey. Furthermore, the online ITCP provides opportunities for the people who could not get education in information technologies or computer engineering, but interested and willing to improve themselves in this area and who are enthusiastic about making progress in their existing career. University students and people who graduated from 2 or 4 year university programs have been accepted to the programs. In addition, the participants are expected to be computer literate and to have competency in English at intermediate level (Isler, 1998a; 1998b).

The program provides online lecture notes, learning activities and visual aids, and each course has a textbook to follow. An instructor and an assistant are assigned for each course. In order to provide interaction between instructors and participants, and among participants, each course has an e-mail address, discussion list and chat sessions. At the end of each term, there are face-to-face sessions for each course within the campus of METU. For each course, at least three or four assignments are given to the participants during the semesters. At the end of each semester, there are traditional final examinations within the campus of the University. The participants' final grades are based on the final examinations, assignments, attendance to chat sessions and discussion lists. At the end of the program, graduates receive official certificate approved by the president of METU, the chair of the Computer Engineering Department and the president of the Continuing Education Center (Isler, 1998a; 1998b). The courses given in this program are as follows:

First Semester (lasting two months)

- Computer Systems and Structures
- Introduction to Computer Programming with C

Second Semester (lasting two months)

- Data Structure and Algorithms with C Operating Systems with Unix

Third Semester (lasting two months)

- Software Engineering
- Database Management Systems

Fourth Semester (lasting two months)

- Web Programming
- Software Development Project

Method

Design of the Study

This study is a mixed methods case study which is an in-depth study of a chosen event, activity, process of group using extensive data collection (Merriam, 1998). A case study approach is advantageous when “why” and “how” questions are being asked, and it is recommended when the researcher believes that the contextual conditions are highly relevant to the phenomenon under study (Yin, 1994). It means that case study method is useful to understand

particular situation, course, and program in depth, such as online certificate program. A program-level case study was used to determine how satisfied the online certificate program's participants were in general, and what factors contributed to their satisfaction in this study. A combination of quantitative and qualitative methods was used to collect relevant data in this case study. The satisfaction of participants about this program was examined in depth through interviews, questionnaire and online communication transcripts. The careful and purposeful combinations of different methods in social and behavioral research strengthen and deepen the analysis, and decrease the weaknesses of the study (Johnson and Turner, 2003).

Participants

The study included 30 ITCP participants and eighth instructors at Middle East Technical University in Ankara, Turkey (October 2004 - June 2005). Originally, sixty two students were registered to the program, however this study included the students the ones who completed the program, got IT certificate, and were volunteer to participate in the study. All participants who registered to the program were computer literate and had an intermediate level of English. The number of male participants (N= 22) was greater than the number of female participants (N=8), and the participants' age ranged from 20 to 40 and above. The majority of the participants' ages were between 20 and 29 (N=21). The majority of the participants were university graduates and undergraduate students.

The eight instructors included in this study were the ones who gave the eight online courses in the program. The instructors were interviewed individually about the factors that affect or contribute to participants' satisfaction. The instructors were faculty members at the Department of Computer Engineering of the university. All of them have given online courses in this program for over six years, and they developed their own course materials.

Instrumentation

An online questionnaire was used to collect data on participants' satisfaction about the program. The questionnaire was developed based on four questionnaires in the literature (Instructor and Course Evaluation System, ICES, (University of New Mexico, 2001), Distance and Open Learning Environment Scale, DOLES, (Jegede, Fraser and Curtin, 1995), Class Interaction, Structure and Support, CISS, (Johnson et al., 1999), and Web-Based Learning Environment Inventory, WEBLEI, (Chang and Fisher, 1999). It consists of five main subscales; (1) Learner-learner interaction (with 3 questions, the Cronbach Alpha value is 0.80); (2) Learner-instructor interaction (with 12 questions, the Cronbach Alpha value is 0.93); (3) Course structure (with 12 questions, the Cronbach Alpha value is 0.92); (4) Institutional support (with 12 questions, the Cronbach Alpha value is 0.88); and (5) Flexibility (with 3 questions, the Cronbach Alpha value is 0.59). It consisted of 38 five-point likert type items, and the overall Cronbach Alpha value of the questionnaire is 0.95 (Parlak, 2004).

In addition to the questionnaire, semi-structured interviews were conducted with the participants and the instructors to elicit additional information regarding participants' satisfaction. The interview schedules were developed around the central themes related to the components of the satisfaction (interaction with instructors and peers, course structure, institutional support, and flexibility), and consisted of 16 questions for the participants and 12 questions for the instructors. The interview schedules were examined for clarity by three experts in the field of instructional technology at the university. Additionally, pilot interviews were conducted with 5 participants and 2 instructors in the previous program, and based on the feedback gathered from the pilot interviews, the interview schedules were improved.

Data Collection and Analysis

The Online Certificate Program comprises of four semesters lasting nine months totally. After completing each semester lasting two months, the participants were requested to fill out the online satisfaction questionnaire. The data gathered through the questionnaire were analyzed by descriptive and inferential statistics such as means and standard deviations, and repeated measures analysis and *t* test to examine the changes in the participants' satisfaction throughout the first, second, third and fourth semesters.

Semi-structured interviews were conducted with three participants and two instructors at the end of each consecutive semester. Until the end of the program, interviews were conducted with totally 12 participants and 8 instructors. Bogdan and Biklen (1998) stated that researchers are confident of receiving comparable data with semi-structured interviews. In order to represent variety among participants, the interviewers were selected from different participation levels (high, average and low) in online discussions, and from different field of experience. Before each interview took place, the participants and instructors were informed of the purpose of the interview. Each interview took about 20-30 minutes, and was tape-recorded with the permission of the participants. The data analysis was continuous and iterative throughout the data collection and the report writing. This analysis process went through in iterative cycles of examining the data, exploring similarities and differences among the participants, and searching for confirming and disconfirming evidence that would be incorporated into the conclusions (Merriam, 1998). Additionally, participants' online discussion logs were examined to find out the level of participation to the online communication in the program.

Results

The Participants' Satisfaction Level in the Program

Table 1 presents the participants' satisfaction in regard to learner-learner interaction, learner-instructor interaction, course structure, institutional support, and flexibility. The participants' overall satisfaction scores were $M=3.5$; $M=3.5$; $M=3.4$; and $M=3.2$ at consecutive semesters one, two, three and four indicating that majority of the participants agreed with the statements for the first, second and third semesters but they were neutral for the fourth semester. When overall satisfactions of the participants in regard to satisfaction themes were examined, learner-learner interaction had the lowest mean (2.9), and course structure had the highest mean (3.9). The results also indicated that the participants did not agree that the fourth semester's courses were flexible enough ($M=2.3$).

Table 1. The Participants' Satisfaction in the Semesters of the Program

	Semester-1		Semester-2		Semester-3		Semester-4		Overall	
	M	SD	M	SD	M	SD	M	SD	M	SD
Learner-learner interaction	2.7	1.0	2.8	1.1	2.9	1.0	3.0	1.1	2.9	1.1
Learner-instructor interaction	3.6	0.7	3.7	0.9	3.6	1.0	3.5	1.1	3.6	0.9
Course structure	4.1	0.8	4.1	0.8	3.8	0.9	3.6	0.9	3.9	0.9
Institutional support	3.4	0.8	3.4	1.1	3.5	0.9	3.4	1.0	3.4	1.0
Flexibility	3.9	0.8	3.7	1.1	3.1	0.9	2.3	0.9	3.3	0.9
Overall Satisfaction in each semester	3.5	0.8	3.5	1.0	3.4	0.9	3.2	1.0	3.4	0.9

M: Mean, SD: Standard Deviation

The Changes (Variations) in the Participants' Satisfaction throughout the Program

In order to answer whether participants' satisfaction changes throughout the semesters of the program, a repeated measure analysis and *t* test was employed at a significance level of .05.

The repeated measure analysis indicated that there was no significant difference among the means of four semesters in regard to *learner-learner interaction*, $F(3, 87) = 0.82$ $p=0.48$; *learner-instructor interaction*, $F(3, 87) = 0.65$ $p=0.58$ and the *institutional support*, $F(3, 87) = 0.28$ $p=0.83$.

In regard to satisfaction on *course structure*, the repeated measures analysis showed that there was a significant difference among the means of four semesters, $F(3, 87) = 7.2$ $p=0.00$. Course structure measures decreased especially during the last two semesters. In order to find out the means differ from each other at a significant level, a paired-samples *t* test was used. The *t* test results indicated that there was a significant mean difference between the first and the fourth semesters ($p=0.03$), the second and the third semesters ($p=0.013$), the second and the fourth semesters ($p=0.01$), and the third and fourth semesters ($p=0.023$) on course structure satisfaction.

The repeated measures analysis also indicated that there was a significant difference among the means of four semesters for the *flexibility* measures, $F(3, 87) = 26.86$ $p=0.000$. Flexibility measures decreased gradually

throughout the semesters. The paired-samples t test was used to find out the means differ from each other. The results showed that there was a significant mean difference between the first and the third semesters ($p=0.001$), the first and the fourth semesters ($p=0.001$), the second and the third semesters ($p=0.001$), the second and the fourth semesters ($p=0.000$), and the third and the fourth semesters ($p=0.000$) in regard to satisfaction in flexibility.

The results of the study showed that there was a statistically significant decrease, $F(3, 87) = 5.35$, $p = 0.002$ in *overall satisfaction* of the participants through out the program. As it shown in Figure 1, overall satisfaction decreased gradually from the first to the fourth semesters. The paired-samples t test results showed that there was a significant mean difference between the first and the fourth semesters ($p=0.01$), the second and the fourth semesters ($p=0.008$), and the third and the fourth semesters ($p=0.005$) in regard to overall satisfaction of the participants.

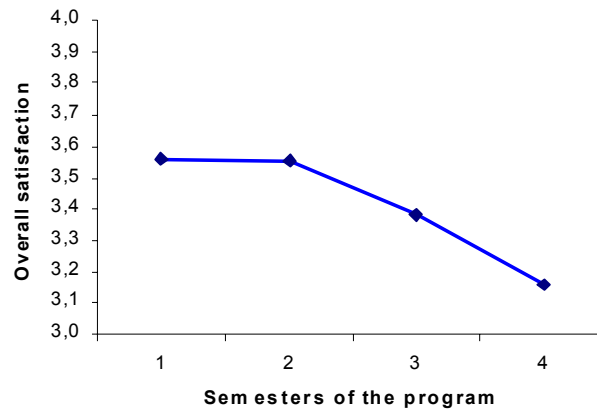


Figure 1. Participants' Overall Satisfaction throughout the Semesters

Interaction

Usage of CMC Tools

In this online certificate program, mainly asynchronous (e.g. discussion list, e-mail) and synchronous (e.g. chat sessions) communication tools were used to facilitate interaction among the participants, and between the participants and instructors.

The participants and instructors thought that learning with interaction through CMC tools was one of the major benefits of online learning when it is compared to learning from texts by themselves. While the participants used e-mail to ask about specific issues that were primarily related to their personal problems, the instructors used e-mail when the content of the e-mail was not related to all participants. Furthermore, almost all instructors and participants expressed that the course discussion lists were the most useful and preferable tool in this online program, and they used them mostly for interaction and communication in the program. They wrote messages and received answers in a short time in the discussion lists. The participants mentioned that they could write longer messages in the discussion list compared to the chat sessions. Therefore, they could discuss more topics in a detailed way. According to the instructors, another major advantage of discussion lists was that participants could see others' problems and solutions which they might also have faced. The instructors generally posted messages in the discussion list to announce course related issues such as, assignments, exams. Moreover, with the chat sessions, instructors and participants could ask questions and get immediate answers in real time. Original and natural discussion environment similar to the face-to-face environment could be created in this way. In brief, asynchronous and synchronous communications were used complementarily to prove more beneficial in the online program since instructors thought that both of them have different weaknesses and strengths.

Interaction among the Participants

The findings of interviews with instructors and participants, and the findings of chat session and discussion list transcripts supported the results of the questionnaire on interaction in the program. Almost all participants and instructors expressed that the interaction in the program, especially among the participants, was not enough in all semesters. Table 2 shows that the participants' participation to the online communication in the program was insufficient. Even though the number of messages sent by participants, some of which was related to meeting and introducing themselves, was high in the first semester, it was very low at the chat sessions and discussion lists in the last three semesters. Although the number of messages was higher in chat session than that was in discussion list, the number of participants in the discussion list was greater than that was in the chat sessions.

Table 2. The Participants' and the Instructors' Participation to Online Communication

	Semester-1		Semester-2		Semester-3		Semester-4		Overall	
	M	SD	M	SD	M	SD	M	SD	M	SD
# of attended participants in CS	17.5	6.0	7.1	3.6	5.6	0.7	5.9	2.1	9.0	3.1
Total # of messages sent by participants in CS	525	231.1	74.4	34	104	58.2	111	66.8	203.6	97.6
Total # of messages sent by instructors in CS	276	56.8	112	38.6	144	45	140	45	168	46.4
Total messages in CS	804.8	247.9	186	38.2	248	97	251	89	372.5	118
# of attended participants in DL	29	1.4	12	1.4	12	0.0	13.5	4.9	16.6	1.9
Total # of messages sent by participants in DL	174.5	0.7	37	1.4	38	9.8	76	35.3	81.36	11.8
# of messages sent by instructors in DL	112	7.07	47.5	12.0	43	28.2	65	7.1	66.86	13.6
Total messages in DL	286.5	7.7	84.5	13.4	81	38.1	141	42.4	148.3	25.4

CS: Chat Sessions, DL: Discussion Lists, M: Mean, SD: Standard Deviation

Even though the interaction among the participants was weak in the program, interview results showed that participants wanted to interact among themselves during the program. For instance, five participants thought that the participants in the program could help each other by using communication tools. Although the participants were eager, the majority of them did not get help from and interact with others often during the program. Moreover, participants mentioned that they sometimes attempted to interact with others in the program. For example, they tried to interact and meet with others during the face-to-face courses at the end of the semesters. Also, some participants submitted their ICQ numbers to ICQ club web sites in the program, and two participants attended program chat rooms two or three times randomly, but they did not encounter with the other participants. It can be concluded that although some participants tried to interact with others, they were not much successful to increase interaction with other participants.

Interaction with the Instructor

In contrast to the level of interaction among participants, most participants agreed that they were satisfied with the interaction with the instructors in the program. For example, six participants mentioned that the instructors replied to their messages quickly, and they were quite satisfied with timely feedback. The findings of communication tool transcripts showed in Table 2 supported the participants' thought. For instance, overall number of messages sent by the instructors in both chat session and discussion lists was more than that of participants when the number of students was considered. According to the instructors, participants generally interacted with them about the requirements of the courses with which they had problems. They needed help from the instructors when they did not understand the course notes, exercises, and assignments.

The Reasons for Low Level of Interaction

The participants and the instructors mentioned that there were several reasons for the low level interaction, especially among the participants. The first reason was due to the nature of the program that it was an online program.

Although there were face-to-face and chat sessions for each course in the program, they did not meet face-to-face continuously. They generally attended course web sites asynchronously; therefore, they generally were alone during their learning process. Moreover, they stated that the progress of interaction among the participants over the Internet took more time compared to face-to-face interaction.

The second reason was as stated by the participants and instructors that almost all participants had different responsibilities, and had various occupations in their life. They were busy, their life was dense, and their mind was full. Further, they stated that their background, previous knowledge levels, ages and occupation were different. The participants were over 18 and mostly set a different direction in their lives. This might influence the low level of interaction with others.

As the third reason, instructors mentioned that not studying regularly and difficulty in learning the subject hindered participants' interactions. Similarly, five participants mentioned that if they did not study regularly, they could not interact successfully in the courses. Two participants indicated that some courses were too difficult for them and they could not understand the topics. Therefore, they could not know what to ask or how to ask questions.

As the fourth reason, participants who had more knowledge wanted to ask more and complex questions, and they wanted to be dominant and more active; therefore, some participants did not attend the discussions. Similarly, the instructors stated that some participants might sometimes hesitate to attend discussions in order not to ask unrelated or silly questions.

Fifth, three participants stated that there were not enough activities to have interaction among the participants in the courses, so they could not find common topics to talk to each other and they might not improve their interaction.

Sixth, three instructors and two participants mentioned that some participants preferred to study alone. They did not need to interact with others much. Therefore, they only read communication log files. Also, some participants generally preferred to communicate with others who had common backgrounds or who knew each other before the program.

Course Structure

Instructors stated that they tried to give eight basic computer engineering courses to the participants in this online program. All of them expressed that designing and giving these online courses properly was not easy job for them when compared to traditional one. They agreed that it was troublesome process for them to design online course materials especially at the first time. They knew that online education placed all major responsibilities on the students; therefore, they tried to create a more effective learning environment.

Assignments

The results showed that most participants were satisfied with the contents of the courses that included various materials (e.g. exercises, assignments and reference books). Eight participants highlighted the importance of exercises and assignments by stating that exercises and examples in the courses helped them practice and learn the topics. With the help of preparing weekly assignments, they studied the course notes regularly, so that they could already be prepared for the exams.

Content

Even though there were mostly positive thoughts about the course structure, some participants found deficiencies especially in the last two semesters' courses. Four participants mentioned that these courses consisted of too much general information, and examples and exercises were not sufficient to understand the topics. Five participants indicated that courses, especially during the third semester, contained a large amount of conceptual information. They could not understand them easily. Participants thought that even though they studied the course notes, they had to improve themselves more to understand the content. They had to read the textbooks and investigate other web

sites in the Internet to understand these concepts. These brought extra load and difficulties for the participants while they were studying.

Parallel to the participants, the instructors highlighted the major difficulty student faced while they were studying the theoretical and abstract course materials. They indicated that these materials were not easily understandable by the students just by reading especially when they face at the first time. At the same time, the instructors thought that online learners should be self-regulated. They mentioned that they tried to use self-study methods in their courses. They expected that the participants should learn the course topics not only through the course web pages but also through asking questions, searching, and investigating the provided resources.

Duration of the Program

Another problem stated by the participants was about the duration of the program. They indicated that the program had a heavy and intensive curriculum since eight different courses were given in nine months. They could not grasp all the course topics in this limited amount of time. Also, a problem stated was the increased difficulty level of the courses from one semester to the next. Participants were expected to learn more than they could achieve in one semester. Likewise, the instructors agreed that this program had a heavy curriculum. Eight courses were given in the limited time and course contents were not easy to learn immediately. Therefore, they thought that the participants should study more than they do in traditional education.

Exercises and Examples

Another concern of the participants was about the examples given in the courses. They thought that some examples were not applicable and practicable, and they could not apply what they learned. Participants suggested that course notes including examples, exercises and conceptual information should support online learning. These notes should be visual, clear and understandable to all.

The instructors also agreed that there were some deficiencies in the course structures, and they could be improved. Some course topics, especially the topics that were not easily comprehensible could be designed with the help of rich materials (i.e. interactive examples, multimedia applications). Further, they thought that course notes were updated regularly, some of them were changed and more current topics and contents were added. Additionally, the instructors indicated that the participants generally were satisfied with the courses when they implemented what they learnt to the real life immediately. Therefore, they tried to provide exercises to the participants in the course notes. However, these might not be sufficient for some students in certain courses.

Support

The participants mentioned that this program provided many learner support activities to the participants during their education. They pointed out that while the registration period, they were informed about all the necessary issues and procedures. Throughout the orientation program, the course instructors met with them, and provided information about the program's properties. The participants also indicated that if they could not attend to face-to-face exams at the end of the semester, two more exams for each course were given at the end of the subsequent semesters. Additionally, they were pleased with the surveys given to them at the end of each semester for program and course evaluation.

Almost all instructors thought that the support given to the participants with one instructor and one or two assistants for each course was enough. They stated that they supported the participants with instructional activities during their education in the program, such as, face to face meetings at the beginning and at the end of the semesters, interaction through computer mediated communication tools (i.e. chat sessions, discussion lists), exercises, assignments and exams. Similarly, most participants agreed that they generally got response to their questions during the program. All kinds of problems, i.e. administrative, educational, communicational were tried to be solved by the program coordinators and instructors.

Even though a general consensus about the support system in the program was enough, the participants and instructors thought that it could be improved. They indicated that it might be helpful when participants were guided by the instructors individually during each course. Additionally, three participants mentioned that they sometimes needed immediate feedback while studying the course materials. If their questions were not solved at that time, they sometimes could not continue to study their courses. In addition, four participants mentioned that they needed more synchronous activities in the program. For example, number of chat sessions in each course might be increased; therefore, participants could attend suitable sessions.

Flexibility

All instructors and participants mentioned that online education brought many advantages and disadvantages to both students and instructors when compared to traditional one. The major advantages of online education were providing much flexibility while taking or giving courses. For instance, the major flexibility of the program for almost all participants was that they were not obligated to be at a place or a school psychically to take the courses. They could study whenever and wherever they desired in this Internet-based program. Additionally, this program helped them learn eight basic computer engineering courses systematically.

Responsibilities for the Students

This program brought some difficulties to the participants as well. For instance, most instructors and participants mentioned that this education placed all the responsibilities on the participants. They learned the content through the course materials and tried to apply them to new situations. Some instructors stated that several participants were not used to learning with this method, and it might not be proper for all participants.

The findings indicated that participants exerted too much effort to carry out their program related requirements. Almost all participants complained that they could not spend enough time to the courses due to their other responsibilities, i.e. job, family. Some participants stated that they sometimes sacrificed their special things to study for their courses (i.e. their hobbies).

Moreover, the instructors emphasized that participants had to study the course materials regularly and ask for help from peers or instructors when they needed. If they did not study the courses and perform their requirements regularly, they could not compensate them. They might stay behind all topics and might break off easily. After some time, the subjects to be studied were accumulated; therefore, they might not catch the others and loose their motivation to the courses. In such cases, participants might even leave the program.

Lack of Elective Courses

The participants wanted more flexibility over the semesters in the program. For example, the aim of the program is to give eight basic computer engineering courses to the participants. However, some participants expressed that rather than taking all of the courses, they liked to take the courses they wanted. They also suggested that some elective courses should be added to the program.

Discussion

Learner's satisfaction of online learning is regarded as positive in the literature (i.e. Allen & Seaman, 2004). A meta-analysis about studies of comparison between distance education and traditional methods showed that students find distance education as satisfactory as traditional classroom (see Allen, Bourhis, Burrell, and Mabry, 2002). In this study, the participants' satisfaction with online learning was generally positive. However, it decreased over the semesters of the program. The major factors considered in this study and affecting the satisfaction were interaction with instructors and peers, course structure, institutional support, and flexibility.

Interaction through communication tools seems to be one of the most influential features of online courses (Swan, 2001). The results of this study supported this idea. Asynchronous (e.g. discussion list) and synchronous (e.g. chat sessions) communication tools were used mainly for interaction among participants, and between participants and instructors in this online certificate program. According to the results, participants were generally satisfied with the interaction with their instructors in all semesters of the program. They were pleased for the effort of the instructors, and they could reach them easily. However, interaction among learners was not strong enough in this study. The lowest mean score factors affecting satisfaction was related to learner-learner interaction in the program. Similarly, the lack of interaction causes lack of attentiveness and lower satisfaction level with the learning experience in the literature (i.e. Bouhnik & Marcus, 2006; Daugherty & Funke, 1998; Swan, 2001).

The results demonstrated that there were number of reasons for low level interaction in the program. The reasons of low level interaction included having different responsibilities and various occupations, lack of time, interacting only with participants with common background or preferring to study alone, not enough possible interaction in Internet-based education environments, progress of interaction over the Internet was taking more time, not having enough interactive activities in the program, not studying course topics regularly, having little knowledge about the topics, hesitancy about writing messages, and participants' dominance in the discussions. Additionally, the participants could not create learning communities in the program. The lack of social interaction while learning in online environment resulted in the low levels of satisfaction. These issues related to the reasons of low level interaction were also stated by Dennen (2005), Hara and Kling (1999) and Northrup (2001) in their studies.

Participants' thoughts about the course structure were generally positive in the program. The basic computer engineering courses in the program were selected properly and their topics were arranged from the beginner to the advanced level. Participants were satisfied with the courses materials, e.g. examples, exercises, homeworks, reference books. Although participants' thoughts about the course structure were generally positive, their satisfaction decreased significantly over the semesters of the program, especially in the last two semesters. The interview results showed that some deficiencies such as lack of visual elements and richness in the materials in the courses affected the participants' satisfaction negatively. Additionally, loaded and intensive curriculum, and lack of elective courses in the program were the important points made by the participants.

Course structure and design appeared to be some of the key elements that affected student satisfaction along interaction. The results showed that even though some courses in the program were designed sufficiently, the structure of the whole program and design of the courses needed more attention. There was no one strategy for all courses and different strategies might be used for each course and semester (Northrup, 2001). As McPherson & Nunes (2004) indicated educators and designers must interact, and invest more time and effort on the analysis of learners, content, context, application, technologies, and curriculum to design for an effective online program (McPherson & Nunes, 2004).

Based on the research studies in distance education, Rumble (2000) summarized that learners without support delay program completion; contact between students and institution is beneficial; and advice given during enrollment affects later performance. In this program, the program coordinators and instructors tried to solve participants' problems when they arose. Participants were guided during the registrations and orientation program in this certificate program. Although the participants were satisfied with institutional support, the results showed that some participants desire more feedback while taking courses. They wanted to get individual and timely feedback about their progress. Thurmond et al. (2002) stated that instructors teaching online courses need to plan their schedules carefully for student evaluations and feedback activities since timely feedback from instructor contributed significantly to students' satisfaction. In line with this statement, the participants suggested more synchronous activities and more feedback.

The participants and instructors in this study agreed that this Internet-based certificate program provided some flexibility to them. For example, participants could study whenever and wherever they wanted. On the other hand, participants' satisfaction about flexibility of the program decreased significantly in the program. Over the semesters of the program, participants realized that this program brought some difficulties to them, such as responsibility of learning is on students, lack of time to spare for the program due to other responsibilities, lack of flexibility in course selection and the time of synchronous communication, and intense curriculum. These findings indicated that being ready and self-disciplined for such education are some of the characteristics that online students should possess.

Additionally, flexibility in the course selection, time of the online communication and extended amount of time for the program were the demands of the online learners.

These results emphasized the importance of responsibilities of online learners. In the literature, researchers stated that online learning placed more responsibilities on learners than traditional face-to-face learning did (Moore & Kearsley, 2005). It means that a different learning strategy, self-regulated learning, is necessary for online learning to be effective. Self-regulated learning requires changing roles of students from passive learners to active learners. However, the results of the study showed that participants might not be ready or adapted to this type of learning since, active learners or self-regulated learners select, organize, create advantageous learning environments for themselves and plan and control the form and amount of their own instruction for their academic achievement (Zimmerman, 2002).

As a summary, this study investigated some of the factors that affect satisfaction of participants enrolled in the online certificate program. The major factors that affected the participants' satisfaction and their changes over the semesters of the program and issues related to each factor were summarized in Table 3.

Table 3. The Summary of Findings about Participants' Satisfaction in the Program

Factors affecting satisfaction	Changes in the factors over the semesters	Issues related to each factor
Interaction with peers	Increase (not significantly)	• participant's characteristics (i.e. lack of time, not studying course topics regularly) • internet's characteristics (i.e. progress of interaction over the Internet taking more time) • program's characteristics (i.e. not having enough interactive activities)
Interaction with instructors	Almost the same	• giving timely feedback • using both asynchronous and synchronous tools complementarily
Course structure	Decrease (significantly)	• designing course materials (i.e. examples, exercises, multimedia applications) • designing semesters and curriculum of program (i.e. numbers of courses, difficulties among semesters)
Institutional support	Almost the same	• designing institutional support activities (i.e. registrations and orientation program) • dealing with student problems regularly • individual and timely feedback
Flexibility	Decrease (significantly)	• having self-regulated learner skills • providing choices for the time of synchronous activities • providing enough time to fulfill program obligations • providing elective courses

Conclusions

Although it is not the only factor, satisfaction of the students is one of the important indicators of the success and quality of online programs. Therefore, this research analyzed a number of factors contributing to the learner's satisfaction for designing more effective online programs. In addition, as online education evolves, there is a number of rapidly growing factors that affect the learner satisfaction. Thus, it is essential to investigate what contributes to students' satisfaction in online education for a better design.

The findings of the study emphasized several critical issues for a better design in online programs. It can be stated that learning community formation and involvement plays a major role on student interaction. As Woods (2002) stated both quality and quantity of interaction with the instructor and peers are crucial for student satisfaction. In order to facilitate interaction among students, well structured instructional activities like projects or problems can be

designed and assigned to the groups, and guided by the instructors throughout the activities. The second finding was the necessity of giving importance to use of instructional design and cognitive principles in designing program courses and instructional materials. Arbaugh (2000) highlighted the importance of convenience and flexibility of distance program for student satisfaction. The findings of this study points out same direction. The third finding was the importance of having flexible online program and being self-regulated learner to benefit from such program. Together with this, it is also important to provide flexible time period (e.g. one course for each semester or time extension for each semester, choices for synchronous online sessions) for the participants since they have some other obligations to fulfill. Additionally, it would be convenient to provide elective courses to address different needs of the participants and make the program more flexible for the learners. Even though the findings of this study may help higher education institutions and online education designers consider some of the potential factors that affect students' satisfaction in entire online programs, one needs to be cautious in generalizing these findings to other online programs since the sample of this study was small. Therefore, further studies are needed to explore the factors that affect students' satisfaction in online learning environment in different subject areas, with larger student groups with different profiles. In addition, the relationship between the satisfaction and students' profiles such as online readiness, online technology competence, locus of control and self efficacy can be investigated.

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