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Abstract: This study was mainly focused on European university students, in particular on their thinking about IT for learning. Participators came from different European countries and took part in a summer school this year. A total of 21 international students participated in this summer school program. They came from different European countries. The data collection includes a questionnaire survey and interview data. The data were analyzed and common opinions have been extracted. Finally, the authors of the present paper provide six conclusions and refer to university education in European countries to implement an IT integrated instruction. Researchers hope to promote the instructional quality by a well-performed way of IT integration into instruction in high education.

Introduction

To improve the quality of learning and teaching, the educational authority also regards IT as inevitable educational tools (Lin, 2007). Recommendations for the transformation of schools and for innovative teaching practices have been expressed in many countries — such as Japan, USA, and various European countries (Storm & Storm, 2002). To integrate IT into instruction has become a global educational objective. In recent years, the EU government has emphasized integrating IT into European curricula in high education by establishing some EU transnational projects like i2010, BIT2010, eEurope2005, U Teacher and so on. To integrate informational technology into education and training systems is make a point of doing in European countries (Uzunboylu, 2006; Salajan, 2007). Taking the i2010 for instance, the i2010 strategy is the EU policy framework for the information society and media. It promotes the positive contribution that information and communication technologies (ICT) can make to the economy, society and personal quality of life. The European Commission presented it in June 2005 as the new initiative for the years up to 2010. This i2010 strategy has three aims: (1) to create a Single European Information space, which promotes an open and competitive internal market for information society and media services, (2) to strengthen investment and innovation in ICT research, and (3) to support better public services and quality of life through the use of ICT (i2010, 2008). In addition, it is very important to understand how students think about information technology (IT) for learning during the teaching process. Discovering the students' thinking can be provided for instructional design to instructors and serve as a method of utilizing integrated IT in university curricula. This case study was mainly focused on European university students, in particular on their thinking about IT for learning. Participators came from different European countries and took part in the summer school this year.

European Information Technology for High Education

For the past few years, a Europe Action Plan was dedicated to education through an e-learning initiative. Its objectives aim at incorporating ICTs in higher education. This is the reason for a lot of researches to explore ICT on this issue. For example, Littig (2006) describes the results of a research study on eLearning across Europe. He found what is needed. However, his main focus is the learners and their needs. The need for innovation in eLearning is not in the area of technological innovation; rather pedagogical innovation. However, today's technological opportunities can be utilized for pedagogical innovation. As shown in (Knauf et al., 2008), for example, Knowledge Engineering and Data Mining technologies are used to

optimize university students' curricula with respect to individual profiles and success chances. It is of an increased value for the learners and needs to play a more important role in eLearning projects. That's why this research mainly explores European students' perspectives. Salajan (2007) studied e-learning programs for higher education systems of the member states of the European Union. The study takes a look behind the scenes of the e-learning program and other e-learning actions within other European programs by tapping into the perceptions of academics at universities in the European Union. Through a series of in-depth open-ended interviews, the study investigates the interactions of academics and researchers with the European-funded programs in e-learning. Finally, this study points out that European 'technocracy' is the main reason for failing to induce sweeping changes in European higher education. It is really dependent on the universities and the national governments to take measures that can quicken the appropriation of ICTs in higher education. Uzunboylu (2006) conduct the literature review of the e-learning strategies in European Union, specifically related to two mainline e-learning projects: the eLearning Action Plan and the E-learning Program. He provided that the European Commission should continue to fund this critical research as a means of furthering Europe's move toward a knowledge-based society.

Research Design
Methods of the study
This study was taken a method of case study. Jennifer Platt（1988）points out that a case could be a person, a group, a community, an event or an episode. Case study research is as useful only as an exploratory tool. The data of the cases was collected between 13 July and 26 July this year. During the two weeks period, the main author of the present paper participated in the Summer School and implemented a formal questionnaire survey and an unstructured interview with students.

Summer School Program
The Summer School is an intensive program project, kindly supported by the Erasmus program of the EU. The Summer School aims are

(1)　to provide an intensive training in Wireless Communication Technologies as part of the MARE curriculum,

(2)　to mediate fundamentals, applications and experiences in these fields of remote engineering by an interdisciplinary approach in combination with "learning by doing" phases,

(3)　to promote transnational cooperation and exchanges between students and teachers of European universities, encourage efficient and multinational teaching of special topics of remote engineering,

(4)　to enable students and teachers from several European universities to work together in multinational groups, so as it will be normal in international development and working teams in remote engineering, and

(5)　to foster multidisciplinary approach, using the different competencies of the participants concerning technology enhanced learning, control engineering, net technologies and robotics (TARET, 2008).

Participators
These students are from all over and outside Europe and required at least some prerequisites in mathematics, informatics, electronics and mechanics. In addition, they should be qualified and have some capabilities to comply with requests to act as a forum for technology enhanced learning and to support the so called Bologna process.[1]

In this study, total 21 international students have participated in the summer school program. 21 questionnaires were distributed to summer school students, and the response rate was 95.24%, there are 17

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[1] The Bologna Process aims to create a European Higher Education Area by 2010, in which students can choose from a wide and transparent range of high quality courses and benefit from smooth recognition procedures. The Bologna Declaration of June 1999 has put in motion a series of reforms needed to make European Higher Education more compatible and comparable, more competitive and more attractive for Europeans and for students and scholars from other continents. Reform was needed then and reform is still needed today if Europe is to match the performance of the best performing systems in the world, notably the United States and Asia.

males and 3 females. Almost all students are 21-25 years old. They come from different European countries including Austria, Germany, Sweden, Romania, and Slovenia. There are 5 Diploma students, 14 Master students and 1 Doctoral student.

Design the questionnaire

The main questionnaire items were a revised version of the content of Jennifer's (2001) attitude toward the use of instructional technology questionnaire (the questionnaire Cronbach's Coefficient Alpha is 0.97 by the current paper's main author). This questionnaire is divided into three parts, the first part is personal information, the second part is students' attitude toward to use of information technology (IT) for learning and final part consists of open-end questions. Each construct was evaluated using a 6-point Likert-type scale as follows: "6" - strongly agree; "5" - agree; "4"- slightly agree; "3"- slightly disagree; "2"- disagree; "1"- strongly disagree.

Data collection and analysis

European university students' attitude toward to use of information technology (IT) for learning were used as the survey tools. The data obtained were analyzed by descriptive statistics, and the unstructured interview. And then, the results of open-end questions were provided to five Doctoral students who have their major expertise in educational technology. They have been asked to analyze the reply to open-end questions. Same opinions have been extracted from the answers and the analysis results were identified. Finally, we tried to compose a report by the triangulation of data. Figure 1 illustrates the method of data analysis.
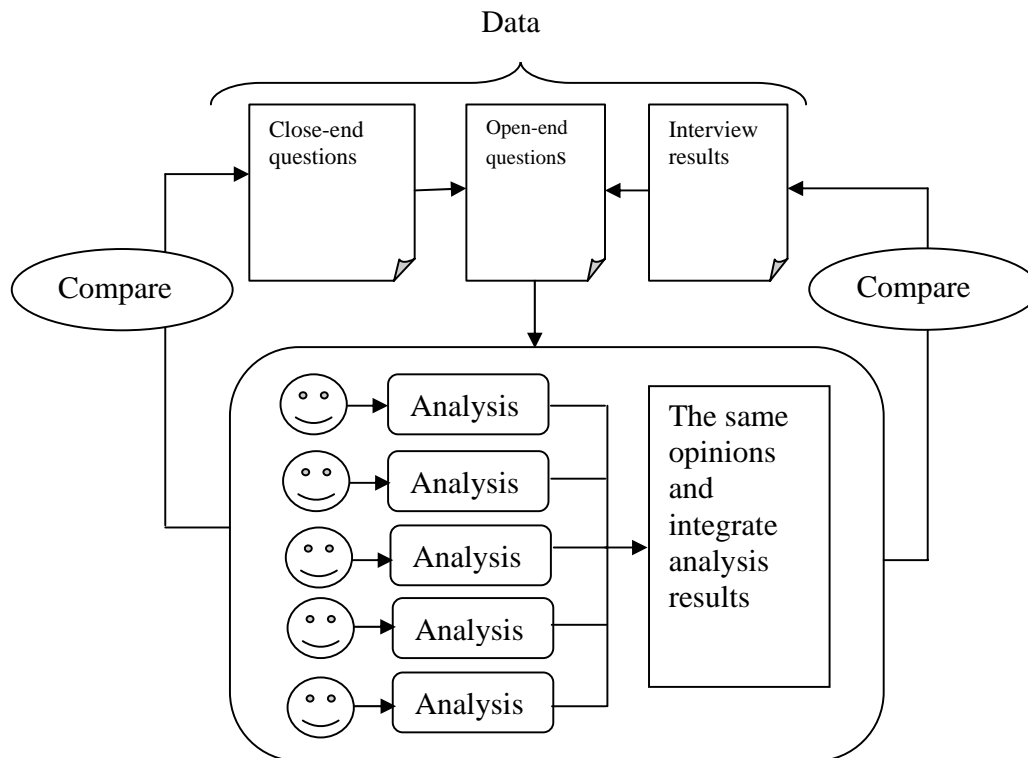

Figure 1. The method of Data analysis

Findings

The quantitative results of IT for learning

Twenty of 21 students completed and returned the surveys with Lickert 6-point scale questions designed to assess students' learning attitudes about the IT for learning. The result of the s survey is summarized in Table 1. Here, the question 7 has the highest mean (M=5.10) among all questions. According to this finding, most students agree that the use of IT would improve their learning effectiveness. The mean of questions related to alleged obstacles, such as questions one through three is between 2~3. Students' attitudes

for those questions range from "disagree" to "slightly disagree" among these questions. Thus, these questions are negative results from students' opinions. From this table 1, we can also get some information about the interactive issues from question 5 and question 9. There are no agreeable results (M=3.30) between "slightly agree" and "slightly disagree". Whether or not IT reduces the interaction between teachers and students can not be concluded from the result as shown in table 1.

		Mean	Std. Deviation
1.	IT is too time consuming for me	**2.60**	1.231
2.	IT is too rigid to use in the classroom	**2.40**	1.142
3.	IT is unreliable to use in the classroom	**2.40**	1.314
4.	IT increases my learning	4.90	.718
5.	IT reduces interactions between students and teachers	3.30	1.342
6.	IT enriches the learning methods	4.95	0.887
7.	By using the IT, I will improve my learning effectiveness	**5.10**	**0.788**
8.	By using the IT, my teacher will be able to teach more	4.30	1.302
9.	Using IT will reduce the interaction between the teacher and me	3.30	1.380
10.	I will enrich my learning methods by using IT	4.85	0.933
11.	IT will cause positive changes to my learning methods	4.75	1.070

Table 1: Descriptive Statistics

Ps. "6" - strongly agree; "5" - agree; "4"- slightly agree; "3"- slightly disagree; "2"- disagree; "1"- strongly disagree.

The analysis results of open-end questions
Q1: What do you think about the E-learning in the university?

Total are 21 international students, here denoted as S1… S21, participated the summer school program. There are 15 students who hold positive thinking toward e-learning in the university. 4 students point out that e-learning is a kind of good assistance instructional material (S9, S12, S13, S20). 2 students point out that e-learning cannot be a replacement of traditional teaching and teacher's role (S9, S14). Another 3 students pointed out that e-learning can provide autonomous learning (S3, S11). 2 students pointed out that social action between students and teacher and themselves is cardinal for students' learning in an e-learning environment (S3, S11). 1 student points out, it has enabled the teacher to teach and manage students easily (S8). In summary, we analyzed students' opinions and found out three conclusions, namely

(1) traditional teachers and social interactions are irreplaceable, and
(2) there are two functions of teaching and learning by e-learning, *which are* autonomous learning and providing assistance in using learning resources.
(3) most students think E-learning is a good way for learning and teaching and very popular in the university.

According to conclusion (3), however, there are some students who consider the problem that e-learning is not adaptive enough in some instructional situations. For example, mathematics is a subject, which requires a high degree of adaptability (Interview, S21). In fact, adaptability of e-learning requests a modeling approach for learning processes, which anticipates various learning variants for the same learning objective,

such as storyboarding (Jantke & Knauf, 2005).

Q2: What's the positive impact of information technology on teaching and learning?
Researchers analyzed the students' opinions and came three conclusions:
(1)   The teaching materials were presented easily and efficiently by different media, for example video, picture, and animations. The same as knowledge could be taught better due to better visualization. This opinion is the one that most students pointed out (S4, S6, S8, S10, S11, S17, S20).
(2)   5 students think the positive impact is the easily to access information (S1, S3, S9, S13, S16). As the same
(3)   2 students pointed out students can learn more easily and IT makes it easier to understand the concept (S2, S14). As the same interview result, the Remote Lab application can promote training and support flexible learning anywhere, anytime for anyone (Interview, S21).

Q3: What's the negative impact of information technology on teaching and learning?
There are 7 students who pointed out a negative impact of information technology on teaching and learning, which is interaction and communication between teachers and students (S1, S3, S4, S11, S13, S17, S20). 3 students pointed out that the accurateness of the information is uncertain (S7, S9, S10). Other negative impacts were stated, in particular changes of the students' attention compared to reading books, which are the original sources of knowledge[2]. It makes us dependent upon the net (web) (S8), and some teachers totally shift on multimedia and that effects the student's learning (S14). To generalize a conclusion from those reply of the negative impacts of IT on teaching and learning, we find that "social interaction" is mainly the biggest factors on it as interview results (S21).

Q4: What's the largest benefit about IT on your learning?
Researchers analyzed students' opinions and came to four conclusions:
(1)   There are 6 students pointed out they can get more learning resources easily (S3, S8, S12, S13, S14, S20).
(2)   4 students pointed out they can learn more things alone by independent and self-directed learning (S2, S5, S6, S11).
(3)   3 students pointed out that IT enriches their learning methods (S1, S10, S20).
(4)   One student pointed out IT eliminates the distance barrier between teachers and students (S17).
Thus, the main points of the largest benefits about IT on their learning should be that they can get more learning resources easily.

Q5: Do you have other suggestions in integration information technology for teachers' instruction in the university?
There are 3 students, who pointed out that teachers should use information technology like a supplemental method of teaching and IT cannot be replacement of teacher's role (S1, S2, S14). 2 students suggested a suitable compromise/balance should be maintained and an enabling environment provided for teacher-student interaction (S3, S7). Other suggestions are following, such as to promote the international cooperation instruction by IT (S8). For this purpose, courses in electric format should be available to these students (S10). Some interactive e-learning materials will improve students' understanding (S17) by providing much more items that enrich the expressiveness compared to printed material such as hyperlinks, flashing picture items, inclusion of audio content, and so on. In addition, it's useful to provide some students' learning experiences successfully by e-learning. Because the experience of students is easier to be understand by other students (S20). For an interesting approach to utilize (former) students' experience for the curriculum composition of current students by a Data Mining method, the reader may see (Knauf et al., 2008).
Based on the above analyses of these reply, students have a positive attitude to e-learning, and they hope it could really fulfill in the instructional process. They hope teachers should adopt more and more opinions of students, and they believe they will have a great progress on learning. On the other hand, those

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[2] Simply transferring books' content into web sources may be acceptable as an initial way to establish e-learn content. However, a web representation of topical (to learn) knowledge has much more means of expressivity than "sequences of well-formed inkblots and pictures on paper". These advantages must be utilized, when producing the web content already without the detour through this "bottleneck of expressiveness".

reply ideas of summer school students match the Adult Learning of Principles to put the learner back at the center of learning (Aragon,2001), students focus on how great benefits from E-learning and practical-oriented to solve the problems that they encounter.

Conclusions

The result of this research can be summarized by six conclusions as follows:

(1)   Students emphasized that the **interaction** between teachers and students is the most important issue by integrating IT into instruction.

(2)   IT promotes the rich instructional resources and access easier than before, but learners have to be careful of the accurateness of the information and knowledge.

(3)   IT accelerates the instructional materials' presentation. However, teachers should choose to use it by themselves.

(4)   The e-learning instructional method is not adaptable to each subject. (Interview, S21)*.*

(5)   IT provides students a way to perform autonomous learning and rich learning methods.

(6)   IT makes a great advance in teaching, but teachers still play an essential role in education.

Based on above, the authors of the present paper will provide their superiorities and refer to university education in European countries to implement an IT integrated instruction. Finally, we hope to promote the instructional quality by a well-performed way of IT integration into instruction in high education.

References

Aragon, S. R. (2001). Back to Basics: Using Adult Learning Principles to Create E-Learning Success. available at http://citeseerx.ist.psu.edu/viewdoc/versions?doi=10.1.1.21.7634 (accessed 26 July, 2008)

Bologna (1999). Joint declaration of the European Ministers of Education. Available at http://www.bologna-bergen2005.no/Docs/00-Main_doc/990719BOLOGNA_DECLARATION.PDF (accessed 26 July, 2008)

i2010 (2008). available online at: http://ec.europa.eu/information_society/eeurope/i2010/index_en.htm (accessed 26 July, 2008)

Jantke, K.P., Knauf, R.(2005). Didactic Design though Storyboarding: Standard Concepts for Standard Tools. *Proceedings of the 4th International Symposium on Information and Communication Technologies (ISICT), Workshop on Dissemination of e-Learning Technologies and Applications*, Cape Town, South Africa, New York: ACM Press, ISBN 0-9544145-6-X, pp. 20-25.

Jennifer Platt (1988). What Can a Case Study Do? in Burgess, Robert G. (ed.) Studies in *Qualitative Methodology: A Research Annual*, Vol. 1. pp. 1-25. London: JAI Press.

Jennifer, Y. M. (2001). *Parks and recreation faculty's intention towards the use of instructional technology: An application of the theory of planned behavior*. Unpublished doctoral dissertation, Indiana University.

Knauf, R., Sakurai, Y., Tsuruta, S. (2008): Applying Knowledge Engineering Methods to Didactic Knowledge - First Steps towards an Ultimate Goal. *Proceedings of the 2008 IEEE World Congress on Computational Intelligence (WCCI 2008), International Joint Conference on Neuronal Networks (IJCNN 2008), Special Session on Computational Intelligence Approach for E-Learning*, Hong Kong, 2008,   IEEE Catalog Number CFP08IJS-CDR, ISBN 978-1-4244-1821-1, ISSN 1098-7576, pp. 38-45.

Lin, C. P. (2007). Effective integration of ICT in Singapore schools: pedagogical and policy implications. *Educational Technology, Research and Development*, 55(1), 83-116.

Littig, P. (2006). New media-supported learning today and tomorrow: Recommendations for the next generation of education and training concepts supported by new learning media. *Industrial and Commercial Training* 38 (2), 86-92.

Storm, R. D., & Storm, P. S. (2002). Changing the rules: education for creative thinking, *Journal of the Creative Teacher*, 36(3), 183–200.

Salajan, F.D. (2007). The European eLearning Programme(s): Between rhetoric and reality .*European Educational Research Journal*, 6 (4), pp. 364-381.

TARET (2008). International Summer School in Advanced Remote Technologies - Wireless Communication. Available online at: http://www.online-lab.net/taret/ (accessed 26 July, 2008)

Uzunboylu, H. (2006). A review of two mainline e-learning projects in the European Union. *Educational Technology Research and Development*, 54 (2), 201-209.