

E-Collaboration Technologies in Teaching/Learning Activity

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Abstract—A proper use of e-collaboration technologies in the teaching/learning process is provided by varied cooperative networks, which penetrate teacher's and student's activity more thoroughly with the availability of broadband services. However, the successful use of e-collaboration technologies in teaching/learning activity within a multicultural environment requires that the key factors have to be considered. Aim of the following paper is to identify and to analyze these key factors in the use of e-collaboration technologies in teaching/learning activity. The meaning of the key concepts of e-collaboration technologies, collaboration and factors is studied within the search for factors affecting the use of e-collaboration technologies. The results of the paper reveal the factors forming a successful use of e-collaboration technologies in teaching/learning activity to become more mobile, to learn from the experiences of others and to work in a qualitative way.

Index Terms—*E-collaboration Technologies, Factors, Knowledge Triangle of Education, Research and Innovation*

1. INTRODUCTION

E-collaboration technologies offer potential solutions for the quality, maintenance and sustainable development of public services, social-security and health-care systems where educational system is one of them. Synergies between e-collaboration technologies are created through active collaboration, where the increased data exchange within the network is no longer a limiting parameter with the current developments in the infrastructure. With current developments such as Web 2.0 and beyond, information can be exchanged in both directions. Applications such as Facebook and MySpace are classical examples and have found widespread acceptance in the community, where with the current developments in the web infrastructure, users of e-collaboration technologies not only draw information from the Web, but also add information to it (Vossen, 2009). Aim of the paper is to identify and to analyze factors affecting the

use of e-collaboration technologies within a multicultural environment on the pedagogical discourse. The search for factors influencing the use of e-collaboration technologies within a multicultural environment involves a process of analyzing the meaning of key concepts, namely, e-collaboration technologies, collaboration and factors affecting the use of e-collaboration technologies. The study would show a potential model for development, indicating how the steps of the process are related following a logical chain: defining e-collaboration technologies → collaboration within the use of e-collaboration technologies → factor definition → factors influencing the use of e-collaboration technologies within a multicultural environment → empirical study of key factors affecting the use of e-collaboration technologies within a multicultural environment.

The remaining part of this paper is organized as follows: Teaching/learning activity is defined in section 2. Section 3 introduces e-collaboration technologies. Collaboration within the use of e-collaboration technologies is studied in section 4. Section 5 focuses on theoretical analysis whereas section 6 offers an empirical study of factors influencing the use of e-collaboration technologies within a multicultural environment. The associated results are presented and interpreted in section 7 and 8. Section 9 provides some concluding remarks. Finally, a short outlook on interesting topics for further work is given in section 10.

2. DEFINING TEACHING/LEARNING ACTIVITY

Teaching/Learning activity as a joint activity creates a context for a student and expert (teacher in the frame of the present research) interaction (Benson, 1995, p. 8).

Collaboration with the use of e-collaboration technologies, namely, Web-based chat tools, e-mail, listservs, Web-based asynchronous conferencing technologies, collaborative writing tools, group decision support system and etc., is determined as a form of life activity and, consequently, as a form of teaching/learning activity. Moreover, certain teaching/learning forms and methods are the activity's unity that allows considering collaboration with the use of e-collaboration technologies as the organization method and form of teaching/learning activity.

3. *DEFINING E-COLLABORATION TECHNOLOGIES*

E-collaboration technologies assume user participation as well as socialization. Contemporary users of e-collaboration technologies not only draw information from the Web, but also add information to it (Vossen, 2009). Moreover, the dimension of socialization (or social dimension) exhibits various overlaps with other dimensions of Web 2.0, namely, the infrastructure dimension, the functionality dimension, the data dimension: technology enables functionality, which as a "byproduct" leads to data collections, and users have a new tendency to socialize over the Web by exploiting that functionality and the technology (Vossen, 2009). According to Vossen (Vossen, 2009), e-collaboration technologies involve two forms of user participation as well as socialization. Firstly, software or even use-generated content is shared or jointly used with others. Examples can be found in a huge variety, e.g., Skype, the eBay seller evaluation, the Amazon recommendation service, or Wikipedia. Secondly, online social networks connect people with common interests and may be as simple as a blog, or as complex as Facebook or MySpace for mostly private applications.

Implementation of e-collaboration technologies is based on collaboration (Tapscott, Williams, 2006).

4. *DEFINING COLLABORATION WITHIN THE USE OF E-COLLABORATION TECHNOLOGIES*

Huber and Huber (Huber and Huber, 2007) point out that "collaboration" and "cooperation" are used synonymously in many publications. However, the distinctive use of these terms is emphasized by Huber and Huber (Huber and Huber, 2007). Product orientation is linked to an understanding of collaboration and process orientation is seen as cooperation. Product on the pedagogical discourse is defined as experience. Experience is seen as the unity of knowledge, skills and attitudes gained during life, evaluated positively by the individual, strengthened in his/her habits and used in a variety of activity's situations. Moreover, the findings of neuropsychology about brain activity as intrapersonal, interpersonal and introspective processes (Roth, 2007) widen the understanding of knowledge and allow further defining product as knowledge triangle of education, research and innovation.

Thus, collaboration is seen as "a coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem" (Roschelle and Teasley, 1995) where collaboration with the use of e-collaboration technologies is an integral part. However, collaboration is formed by factors.

5. *DEFINING FACTORS*

Factor is defined as a reason of the research subject change (Lasmanis, 2008). They are

considered to be as external and internal (Lasmanis, 1997). External factors are determined as surroundings and resources whereas internal factors are seen as the aims of the student's activity, motivation, interest, skills, and experience. Thus, factors form collaboration to enable synergy between e-collaboration technologies.

6. *FACTORS AFFECTING USE OF E-COLLABORATION TECHNOLOGIES*

The analysis of external and internal factors as well as the definition of collaboration within the use of e-collaboration technologies allows considering the following factors on the pedagogical discourse: factors forming communication, teacher's purposeful activity as an external factor (Žogla, 2008) and learning factors.

6.1 *Factors Forming Communication*

Factors forming communication are determined by Shumin (Shumin, 1997) as follows: aural medium, socio-cultural factors and non-verbal communication system. All these factors will be supported by the availability of broadband services as a key component for an efficient use of e-collaboration technologies.

6.1.1 *Aural Medium*

During interaction, every speaker plays a double role – both as a listener and a speaker. Speaking feeds on listening which precedes it (Shumin, 1997): one person speaks, and the other responds through attending by means of the listening process. The main potential problems of listening comprehension are determined as follows (Ur, 1984): hearing the sounds, understanding intonation and stress, coping with redundancy and "noise", predicting, fatigue, understanding different accents and using visual and aural environmental clues. With the availability of broadband services, online-services can be used to optimize this process, where a new dimension can be achieved with new applications such as Web 2.0 where contemporary users of e-collaboration technologies not only draw information from the Web, but also add information to it (Vossen, 2009)

6.1.2 *Socio-cultural Factors*

Socio-cultural characteristics, namely, social-economical status, religion, language, address (urban, country, more or less prestigious area), interests, abilities and talents, also form communication where the shift has changed from focusing on macro-cultures to micro-cultures (family culture, school culture, class culture, professional culture, gender culture, culture of interest groups, political groups/parties, generation) (Dirba, 2007, p. 102-103). Also, each language has its own rules of usage as to when, how, and to what degree a communicator may impose a given verbal behaviour on his/her conversational partner where due to influence or interference of their own cultural norms, it is hard for non-native speakers to choose the forms

appropriate to certain situations (Shumin, 1997, p. 9). Thus, all groups/classes are understood to be multicultural. It has led to a new perspective: people behave being influenced by identification with different groups, not only one group (Dirba, 2007, p. 102-103).

6.1.3 *Non-verbal Communication System*

Moreover, communication involves a very powerful non-verbal communication system (gestures such as the language of gazes, the language of poses and bodily movements; interaction through the use of their bodies, faces, hands, legs, eyes, mimicry, intonation, space management, dress code, gift giving, emoticons or smileys) adding meaning to verbal judgments, which sometimes contradicts the messages provided through the verbal listening channel. A lack of familiarity with the non-verbal communication system of the target language often leads to misunderstanding (Shumin, 1997, p. 9). Out of all types of non-verbal components of communication it is significant to concentrate on the description of several aspects of mimics and gazes that constitutes a separate language, the so called "kinesic gaze". Mimicry is often considered to be the most universal way of communication. The representatives of different cultures express six main human feelings: fear, disgust, fury, astonishment and happiness – in a similar way. Facial expression is a "mask", a mask that at the same time reflects the emotional state and certain cultural predispositions or customs of an individual. It is common knowledge that in order to function in society successfully one has "to put up a proper face" to show proper attitude towards particular situations, to observe etiquette.

6.2 *Teacher Activity*

In order to organize teaching activity, teacher needs to take into consideration several areas (Kramiņa, 2000, p. 75): careful preparation of material including specifically chosen lexical areas and seeking repetition of information, careful clarification of the task before undertaking it, planning whether the activity should fit into the general progression of the syllabus or whether it should be an independent activity aimed at satisfying the study purpose of certain individual learners, finding out whether it fits in with other and parallel teaching situations, negotiating a balance between task needs and individual or group needs, planning how varied the types of activities should be, competition as a stimulus and not as a hostile activity, scoring the activity results to help the learners to be aware of their progress and ensuring sensitivity to any emotional or cultural blockages which might interfere with the learners' confidence to use the knowledge in relation to the particular topic, situation or functional purpose. Thus, the teacher is identified in a number of roles that relate to the process of organizing teaching activity (Hedge, 2000, p. 26): assessor, corrector, organizer in giving instructions for the pair work, e.g., initiating it,

monitoring it, and organizing feedback, prompter while students are working together and resource if students need help. Correction can be made up of two distinct stages (Harmer, 2001, p. 106): teachers show students that a mistake has been made and teachers help the students to do something about it. There are a number of different ways how to show incorrectness (Harmer, 2001, p. 106-107), e.g., repeating, i.e., by asking the students to repeat what they have said, echoing, i.e., by repeating what the student has said and emphasizing the part of the utterance that was wrong and questioning, i.e., by indicating that something has not quite worked. An alternative way is to use simple facial expression or a gesture (for example, a wobbling hand) by indicate that something does not quite work. However, this needs to be done with care as the wrong expression or gesture can, in some circumstances, appear to be mocking or cruel. Hinting can also be considered to be a quick way of helping students to activate rules they already know (but which they are temporarily "disobeyed"). For example, we might just say the word "tense" to make them think that perhaps they should have used the past simple rather than the present perfect or "countable" to make them think about a concord mistake they have made. This kind of hinting depends upon the students and the teacher sharing metalanguage (linguistic terms) which, when whispered to students, will help them correct themselves. Reformulation is another correction technique for the teacher to repeat what the student has said correctly, by reformulating the sentence without making a big issue of it. Furthermore, teachers can write down points they want to refer to later; teachers can also record students' performance on audio or videotape. Another alternative is to divide students into groups and have each group watch for something different – for example, one group focuses on pronunciation, one group listens for the use of appropriate or inappropriate phrases, etc. Another possibility is for the teacher to transcribe parts of the recording for future study. However, after the event teachers might want to give an assessment of an activity, saying how well the teacher thought the students did in it and getting the students to tell us what they found easiest or most difficult. Teachers can put some of the mistakes they have recorded on the board and ask students firstly if they can recognize the problem, and then whether they can put it right. Another possibility is for teachers to write individual notes to students, recording mistakes they heard from those particular students with suggestions about where they might look for information about the language – in dictionaries, grammar books, or on the Internet, which is becoming more and more popular among the young generation.

In case students do not know or understand what the problem is because it is dealt with an error or an attempt that is beyond the students'

knowledge or capability the teacher will want to help the students get it right (Harmer, 2001, p. 106-107). Alternatively, if the student is not able to correct him/herself, or respond to reformulation, we need to focus on the correct version in more detail. The correct version emphasizes the part where the problem is (e.g. Flight 309 GOES to Paris) before saying the sentence normally (e.g. Flight 309 goes to Paris), or we can say the incorrect part correctly (e.g. Not "go". Listen, "goes"). If necessary we can explain the grammar or a lexical issue. We will then ask the student to repeat the utterance correctly. We sometimes ask students to correct each other. We might hope that other students know the correct version of the utterance – after which the student who made the mistake should be able to say the sentence, question, or phrase accurately. Student-to-student correction works well in classes where there is a genuinely cooperative atmosphere; the idea of the group helping all of its members is a powerful concept (Harmer, 2001, p. 107). Nevertheless it can go wrong where the error-making individual feels belittled by the process, thinking that she/he is the only one who does not know grammar or vocabulary: there is a need to be exceptionally sensitive here, only encouraging the technique where it does not undermine such students.

Thornbory (1999, p. 92) concludes that a practice activity which is good for knowledge improving will have these characteristics: attention to form, i.e., the practice activity should motivate learners to be accurate, and they should not be so confused on what they are saying so that they have no left-over attention to allocate to how they are saying it. Learners need to be familiar with the subject that they are trying to get right, thinking time, i.e., monitoring for accuracy is easier and therefore more successful if there is sufficient time available to think and reflect and feedback, i.e., learners need unambiguous messages as to how accurate they are – this traditionally takes the form of correction. Teachers need to respond to the content not just the language form; teachers need to be able to untangle problems which students have encountered or are encountering (Harmer, 2001, p. 107). Discussing the role of teacher as resource it is important to remember that students are also resources (Hay, 1996, p. 5). In order to have sufficient subject-specific knowledge, Popova (1996, p. 14-15) suggests to keep in touch with other students' subject teachers. She claims that it is a time-consuming task but it pays. It gives you information about: what they have already studied, what they are studying now, what sources they need to consult for subject-specific information and what the subject teacher can help you with in terms of diagram reading, equivalents of terms, specific skills that students need to develop in relation to their job prospects. If the teacher has all this information, she/he can (Popova, 1996, p. 14-15) draw on students' former knowledge and experience, teach those aspects that will help them acquire subject-specific information, make use of what each student is good at for classroom

activities and tasks and boost his/her self-confidence by relying on expert information and consultancy.

Another way that can be suggested is to contact other teachers doing the same work. That reveals the necessity to emphasize on more general social and political theories such as democracy, social justice, equality and legitimacy in order to be able to (Feerick, 2007, p. 4-5) work with information, technology and knowledge, work with their fellow human beings – pupils, students, trainees, adult learners, colleagues, and other partners in education and work with and in society – at local, regional, national, European and broader global levels. There is also a discussion on the issue of a European Teacher (Auziņa, 2009, p. 10) where common European teacher's principles are as follows (Feerick, 2007, p. 5): a graduate profession with three cycles, a profession placed within the context of lifelong learning, a mobile profession and a profession based on partnerships.

6.3 Learning Factors

There is a range of learning factors. Learning achievements depend on (Shumin, 1997, p. 8; Maslo, 2007, p. 42) the age of students, affective factors, namely, such as emotions, self-esteem, empathy, anxiety, attitude, motivation and learning experience.

6.3.1 Age

The age is considered as one of the most commonly cited determinant factors of success or failure in learning (Shumin, 1997, p. 8). For example, beginning to learn a foreign language in early childhood through natural exposure gives higher proficiency than those beginning as adults.

6.3.2 Affective Factors

The affective factors related to learning are emotions, self-esteem, empathy, anxiety, attitude and motivation (Shumin, 1997, p. 9). Also, the tendency to be sensitive to perceived views of themselves by others is a worry about personal images of great personal importance for everyone thereby developing extreme anxiety as a variable of emotional responses where seven categories of anxiety are emphasized (Shumin, 1997): comparison of myself with other students, emotive responses to the comparisons described above, the desire to outdo the other students, emphasis on tests and grades, the desire to gain the teacher's approval, anxiety experiences during the class and withdrawal from the learning experience when the competition was overpowering. In order to overcome ethnocentricity as an attitudinal variable there is a need to build positive attitudes to the subject study through motivating content and tasks (Hedge, 2000, p. 20).

6.3.3 Motivation

Then, a significant aspect in the learning/teaching process is seen as motivation defined as that we have to want to do something to succeed at it (Harmer, 2001, p. 51). Motivation can be

extrinsic, i.e., caused by a number of outside factors and intrinsic, i.e., motivation that comes from within the individual and is especially important for encouraging (Harmer, 2001, p. 52). Intrinsic motivation consists of six components (Kalkiene and Virbickaite, 2008, p. 50): enthusiasm, feeling when you can control situation yourself, rejoice when you have some achievements, own experience in interesting learning process, an ability to estimate your achievements and any support from environment. Motivation is ensured by earning a living, intellectual stimulation, a feeling of satisfaction and fulfillment and receiving recognition.

There are three areas where teacher can attract students' continuing participation (Harmer, 2001, p. 53): goals and goal settings, learning environment and interesting classes. A way to motivate students is to focus on creating successful employment prospects for students (Hedge, 2000, p. 23-24). A new outlook emphasizes focusing not on today's problems or contradictions but on student's desires where desire is a subjective component of motivation. Moreover, individuals are especially motivated if they can control their own learning process, set their own goals, take responsibility for their learning, are able to work independently, are able to evaluate their own learning process and continue to improve their skills (Maslo, 2007, p. 39).

6.3.4 Learning Experiences

Also, drawing upon the experiences of individuals is important; both life-experiences as well as abilities that may be dormant (Maslo, 2007, p. 39). The following description of language acquisition/learning illustrates the role of experience in learning: acquisition, i.e., native or second language, and learning, i.e., the first, second or third foreign Language. The model of first language acquiring outlines two dimensions: the universal (born condition in order to learn a language) and the learning environment that is an investment a child takes life-long (everything that is around the child during his/her life can influence it (people, circumstances, possibilities, etc.)). The process of second as a foreign language learning already involves three more factors: native language experience, private life experience and learning experience, including motivation. In accordance with the ideal model of foreign language learning, the next foreign language learning becomes easier (Maslo, 2007, p. 43). But real life reveals problems that appeared in the process of previous language learning and make next foreign language learning difficult: even creating ideal circumstances for foreign language learning, teacher cannot be sure about learning ideal results because there is a student who acquire a new language therefore it is more important to pay attention to what the student get from different types of activities in the classroom (Maslo, 2007, p. 43).

7. EMPIRICAL STUDY

The target population of the present empirical study involves 22 participants of Fifth Baltic Summer School *Technical Informatics and Information Technology* at the Institute of Computer Science of the Tartu University from the 7th to the 22nd of August 2009 in Tartu, Estonia.

All 22 students have got Bachelor or Master Degree in different fields of Computer Sciences and working experience in the different fields.

The International Summer School offers special courses to support the internationalization of education and the cooperation among the universities of the Baltic Sea Region.

The aims of the Baltic Summer Schools *Technical Informatics and Information Technology* are determined as preparation for international Master and Ph.D. programs in Germany, further specialization in computer science and information technology and learning in a simulated environment.

The Summer School *Technical Informatics and Information Technology* contains a special module on Web 2.0 where e-collaboration technologies are an integral part.

Analysis of key factors in the use of e-collaboration technologies in teaching/learning activity is based on the following questionnaire: Question 1: Do you know the basic idea of Web 2.0? Question 2: Do you think Web 2.0 is useful for your individual needs? Question 3: Do you think Web 2.0 is useful for your organizational use? Question 4: Do you think Web 2.0 is useful for your professional use?

Key factors in the student use of e-collaboration technologies were evaluated by the students themselves on the first day, namely, the 7th August 2009, and on the fifth day, namely, the 11th August 2009, of Baltic Summer School 2009. The analysis of the first measurement (see Figure 1) revealed that the student use of e-collaboration technologies is heterogeneous and the students consider Web 2.0 where e-collaboration technologies are an integral part to be most useful for their individual needs (see Question 2).

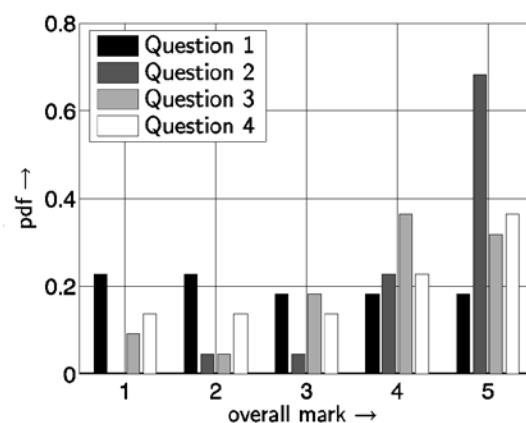


Figure 1: PDF (probability density function) of the first student's evaluation on August 6th, 2009

Between the first and second student's evaluation of key factors in the student use of e-collaboration technologies teaching/learning activity involved

courses in Technical Informatics and Information Technology (German and English), preconference tutorials for introduction into advanced research topics, attendance of conference *Advanced Topics in Telecommunication*, tutorials and practical tasks, language training for talk and presentation (optional in English or German), leisure activities and social contacts and practical work at IT Company.

Then, the analysis of the second measurement (see Figure 2) revealed that the student use of e-collaboration technologies has become homogeneous and the students have put the emphasis on the use of Web 2.0 where e-collaboration technologies are an integral part for professional needs (see Question 4).

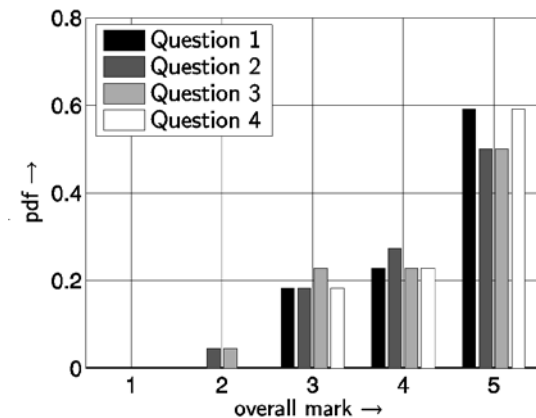


Figure 2: PDF (probability density function) of the second student's evaluation on August 11th, 2009

8. RESULTS

The search for factors forming the use of e-collaboration technologies within a multicultural environment involves a process of analyzing the meaning of key concepts, namely, e-collaboration technologies, collaboration and factors affecting the use of e-collaboration technologies. The study shows a potential model for development, indicating how the steps of the process are related following a logical chain: defining e-collaboration technologies → collaboration within the use of e-collaboration technologies → factor definition → factors affecting the use of e-collaboration technologies within a multicultural environment → empirical study of key factors affecting the use of e-collaboration technologies within a multicultural environment.

9. CONCLUSIONS

The identified and analyzed factors allow forming productive collaboration within a multicultural environment that enables synergy between e-collaboration technologies to increase their use.

10. OUTLOOK

Further research on factors affecting productive e-collaboration within a multicultural environment that enables synergy between e-collaboration technologies to increase their use is considered to include criteria, indicators and levels of collaboration, a relevant set of methods to

evaluate each criterion, the questionnaire development, other samples for further empirical studies and their statistical analysis.

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