e-Business Application to Students' Blended Learning in Higher Education

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Keywords: e-Business Application, Blended Learning, University, Blended Educational Process, Students' Achievements.

Abstract: e-Business Supports Higher Education the Same Way It Helps Companies in General. E-Business Application in higher education has already become an indispensable tool in both university staff and students' daily life. A number of technological, educational and business models of e-Business application in higher education have been developed. However, the educational models of e-Business application in higher education mostly focus on blended learning, thereby they lack the blended educational process that comprises blended teaching, peer-learning and learning. These one-sided educational models do not contribute to the qualitative blended educational process for the improvement of students' learning achievements. Aim of the present paper is to work out the educational model of e-Business application in higher education underpinning analysis of quality of the institutionalized blended educational process for the improvement of students' learning achievements. The meaning of the key concepts *e-Business application* and *blended learning* is studied. Moreover, the logical chain of analysis is shown: e-Business → blended learning → a model of the blended educational process → empirical study within a multicultural environment. The results of the present research show that students' learning achievements after having been implemented the blended educational process have been enhanced. Directions of further research are proposed.

1 INTRODUCTION

e-Business supports higher education the same way as it helps companies in general. E-Business application in higher education has already become an indispensable tool in both university staff and students' daily life. A number of models of e-Business application in higher education have been developed. However, in most cases these models represent technological innovations (Porumb et al., 2011), namely, cloud computing, RFID-equipped devices and etc, or business strategy of e-Business application in higher education (Mitchell, 2002) such as blogging, customer participation, external wikis, and etc. A couple of educational models of e-Business application in higher education exist, too. However, these educational models of e-Business application in higher education focus on blended learning. Therein, blended learning is a new learning form that combines the advantages of traditional learning in lectures or seminars with innovative e-learning in a variety of Information and Communication technology's usage. However, these educational models of e-Business application in higher education lack blended teaching and blended peer-learning. Therein, teaching means training, instruction provided by the educator to the students in higher education. Peer-learning is the sub-phase between teaching and learning in the institutionalized educational process. Peer-learning is aimed at students' interacting with each other to learn something new.

Therefore, existing educational models of e-Business application in higher education, from the researchers' view, have to be improved (Porumb et al., 2011) as these educational models do not provide the qualitative blended educational process for the improvement of students' learning achievements. In the present research, educational process, training, instruction and educational act are employed synonymously. Consequently, educational process, training, instruction and educational act in

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formal higher education are considered as the institutionalized processes. Therein, by formal higher education, an organized higher education model (university, institution, college, academy, summer school, etc), systematic, structured and administered according to a given set of laws and norms is meant. Thereby, the institutionalized educational process has to be relevant to the university's (institution, college, academy, summer school, etc) requirements such as lecture or seminar framework.

The purpose of the present paper is to analyze and work out the educational model of e-Business application in higher education underpinning analysis of quality of the institutionalized blended educational process for the improvement of students' learning achievements. The meaning of the key concepts of *e-Business* and *blended learning* is studied. Moreover, the analysis demonstrates how the key concepts are related to the idea of the *blended educational process* and shows a potential model for development, indicating how the steps of the process are related following a logical chain: defining e-Business application → determining what blended learning is → elaboration of a model of the blended educational process → empirical study within a multicultural environment.

The novel contribution of this paper is the educational model of e-Business application in higher education that represents the institutionalized blended educational process in three phases, namely, blended teaching, blended peer-learning and blended learning. Moreover, the quality of the institutionalized blended educational process in a multicultural environment is analyzed.

Our target population to generalize the educational model of e-Business application in higher education is students in formal higher education.

Our empirical results obtained in the institutionalized blended educational process within Baltic Summer School *Technical Informatics and Information Technology* organized by the Rostock University, Rostock, Germany, in the Baltic States (Lithuania, Latvia and Estonia) show that the students' learning achievements after having been implemented the institutionalized blended educational process have been enhanced.

The remaining part of this paper is organized as follows: Section 2 introduces e-Business and its application in higher education. Blended learning is defined, and the model of the institutionalized blended educational process is presented in Section 3. The associated results of an empirical study will be presented in Section 4. Finally, some concluding remarks are provided in Section 5 followed by a short outlook on interesting topics for further work.

2 e-BUSINESS

e-Business means conducting business electronically, both within an organisation and externally, with clients, communities and partners (Mitchell, 2002). New business ideas such as the payment service offered by RevolutionMoney, the mail service offered by eSnailer, the flight service offered by Virgin Charter, or the personalized TV service from Current.com, Skype, the eBay seller evaluation, or the Amazon recommendation service are classical examples (Vossen, 2009) and have found widespread acceptance in the community. Typical e-Business applications include corporate blogs, wikis, feeds and podcasts (Vossen, 2009) as shown in Figure 1.

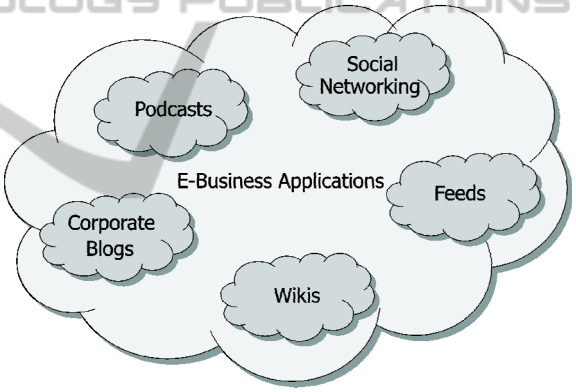

Figure 1: e-Business applications.

As e-Business serves delivering information via the Internet, e-Business includes e-Education as illustrated in Figure 2.

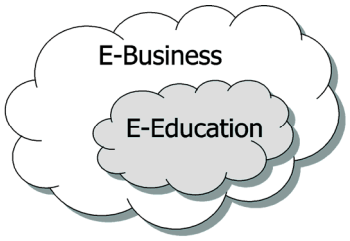

Figure 2: The relationship between e-Business and e-Education.

Business goals made possible by e-Education include improving efficiencies, reducing costs,

increasing speed of transactions, expanding markets, enhancing business partnerships and, most importantly, providing additional value for clients (Mitchell, 2002). e-Business applications in the institutionalized blended educational process of higher education are based on the assumption that higher education is centred on research. E-Business applications for implementing research activities in the institutionalized blended educational process of higher education include as demonstrated in Figure 3 use of

- university e-Libraries,
- patent databases such as European Patent Office (EPO), US Patent and Trademark Office (PTO),
- bibliographic databases such as SciVerse Scopus (SCOPUS), Thomson Reuters, Education Resources Information Center (ERIC),
- research communities' networks such as www.researchgate.com, www.ResearcherID.com, etc.

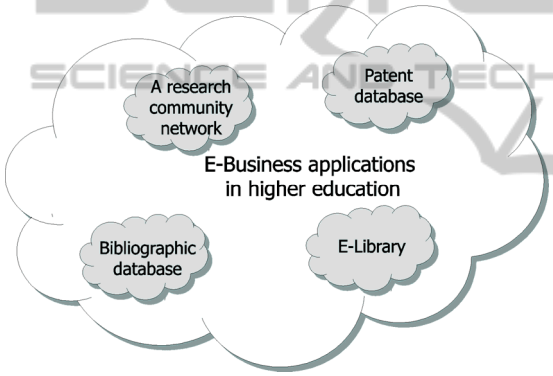

Figure 3: e-Business applications in higher education.

While e-Business involves re-designing the business process and use of information and networking technologies (Mitchell, 2002), e-Education focuses on organizing the institutionalized educational process and use of information and networking technologies.

3 BLENDED LEARNING AND BLENDED EDUCATIONAL PROCESS

A successful university's graduate has to be able to demonstrate next to his/her scientific background good oral skills, delivery of good presentations and speech improvisation, convince others, control his/her physical reactions to stress, having a good appearance. However, students' mastering these skills in e-Education becomes difficult without face-to-face communication in a real-life environment. Therefore, e-Education offers the combination of e-Business applications and face-to-face university training in educational settings. However, this blended training (instruction, teaching) does not provide positive results till blended learning is engaged. This differentiation between blended instruction and blended learning is highly significant as many researchers define blended learning as a combination of face-to-face (traditional classroom) and online instruction (Grgurovic, 2011); (Myllymäki and Hakala, 2013). On the one hand, teaching and learning have been differentiated, but, on the other hand, teaching and learning are inter-connected: no teaching without learning, and vice versa. Teaching and learning together form the educational process. In formal higher education, the educational process is determined as the institutionalized educational process as it is organized, systematized, structured and administered within formal higher education according to a given set of laws and norms. Hence, learning is not teaching, instruction or training. Teaching in formal higher education is defined as a purposefully organized process of educator's sharing experience (knowledge, skills and attitudes) with students. In its turn, learning is defined as a purposefully organized or spontaneous process of students' improvement of his/her individual experience (knowledge, skills and attitudes) based on cognition.

The authors of the present contribution support the definition of blended (hybrid) learning as one of the approaches that is utilized to help students for meaningful learning via information and communication technologies in educational settings suggested by Gecer and Dag (Gecer and Dag, 2012). Thus, blended learning is the combination of learning and e-Learning as depicted in Figure 4 by the authors of the present contribution.

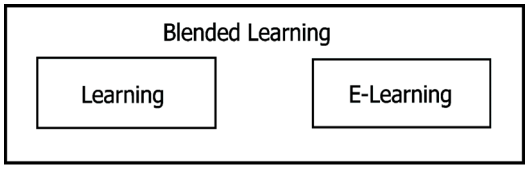

Figure 4: Elements of blended learning.

e-Learning differs from learning by use of information and networking technologies in the process of cognition.

A number of blended learning models have been proposed (Porumb et al., 2011). The models' authors suggest that blended learning proceeds in the

educational act of two main phases (Porumb et al., 2011) as shown in Figure 5:

- regular teaching in Phase 1 and
- Internet-based learning in Phase 2.

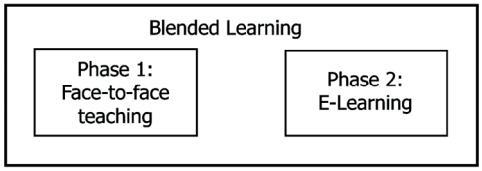

Figure 5: The educational act of blended learning.

Analysis of these particular models by the authors of the present contribution shows that blended learning is only a part of the educational process as it includes teaching and learning. Furthermore, the authors of the present contribution consider the proposed models not to be complete due to the fact that the models' authors do not introduce such an educational innovation as peer-learning (Zaščerinska and Ahrens, 2010).

Thus, the educational process includes teaching, peer-learning and learning (Zaščerinska and Ahrens, 2010). Each phase of the educational process is separated from the previous one, and the following phase is based on the previous one. Therefore, the blended educational process and, consequently, the institutionalized blended educational process includes blended teaching, blended peer-learning and blended learning as depicted in Figure 6.

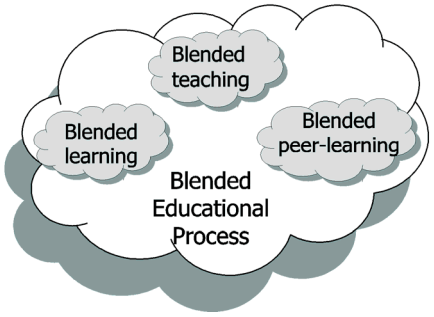

Figure 6: Elements of the institutionalized blended educational process.

Further on, the blended educational process and, consequently, the institutionalized blended educational process proceeds as demonstrated in Figure 7

- from blended teaching in Phase 1
- through blended peer-learning in Phase 2
- to blended learning in Phase 3.

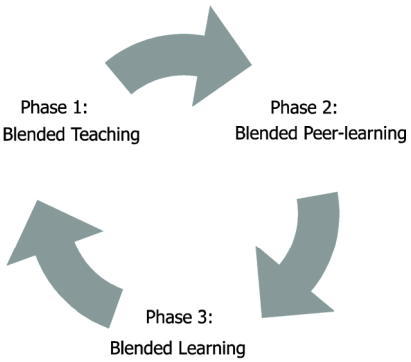

Figure 7: The phases of the institutionalized blended educational process.

Phase 1 *Blended Teaching* is aimed at a safe environment for all the students. In order to provide a safe environment, the essence of constructive social interaction and its organizational regulations are considered by both the educator and students. The present phase of the institutionalized blended educational process is organized in a frontal way involving the students to participate.

- Educator makes previous experience rational. The activity includes choice of forms and use of resources including e-Business applications as shown in Figure 3 that motivates the students. The blended teaching process is under the educator's guidance.
- Peers do not participate in guidance of the blended educational process. This phase of the blended educational process is carried out qualitatively only with the help of the educator. Dependence on the educator is observed. The students study alongside but not together.
- Students create the system of the aim and objectives, search for a variety of information source including e-Business applications as depicted in Figure 3 and obtain techniques of information compiling including e-Business applications as illustrated in Figure 3. Students fulfil the present phase of the blended educational process qualitatively only with the educator's help. Dependence on the educator is observed, not dependent on peers.

Phase 2 *Blended Peer-learning* is designed for the students' analysis of an open academic problem situation and their search for a solution including e-Business applications as depicted in Figure 3. The same materials can be prepared for all of the group students. But these materials are different whereas learning styles and opportunities are different. This phase of the institutionalized blended educational process involves the students to act in peers.

- Educator functions as a resource and moderator. Educator delegates his/her duties to the students.
- Peers regulate each other: it is typical for students to regulate each other. The students study together, study from others including and teach others including e-Business applications as demonstrated in Figure 3. The present phase of the blended educational process is under peer's guidance. Forms and methods of the blended educational process are exchanged.
- The students fulfil the present phase of the blended educational process qualitatively with the peers' help. Partial independence is observed. The relevant activity is performed jointly with other students and with shared responsibility. It is typical for students to regulate each other.

Phase 3 *Blended Learning* emphasizes the students' self-regulation with use of assessment of the process and self-evaluation of the results.

- Educator functions as a consultant and an assistant. Educator delegates his/her duties to the students.
- Peers have consultative and advisory functions including e-Business applications as demonstrated in Figure 3.
- Students' self-regulation is typical. The students learn independently including e-Business applications as illustrated in Figure 3. The students fulfil the present phase of the blended educational process including e-Business applications as shown in Figure 3 qualitatively on their own, and their independence is observed. The participants' self-regulation on the basis of the process assessment and the result of self-evaluation is used. The relevant activity is performed with a high sense of responsibility. Self-regulation is typical, and a student does not depend on peers.

The advantages of the blended educational process and, consequently, the institutionalized blended educational process are as follows:

- widening opportunities for each student in order to construct the experience in social interaction and cognitive activity and
- promoting opportunities for self-realization.

4 EMPIRICAL RESULTS

The research question is as follows: has the institutionalized blended educational process been qualitative? Therefore, the research is aimed at analyzing the quality of the institutionalized blended educational process in higher education.

Interpretative research paradigm which corresponds to the nature of humanistic pedagogy (Lūka, 2008) has been determined. Interpretative paradigm is characterized by the researchers' practical interest in the research question (Cohen et al., 2003).

Checking the quality of pedagogic interventions and organizational changes in complex and constantly self-regenerating environments employs the qualitative evaluation research (Flick, 2004). Therefore, the qualitative evaluation research has been used in the empirical study.

The qualitative evaluation research is aimed at examining the quality of the institutionalized blended educational process. Therein, quality of the institutionalized blended educational process is regarded as the improvement of students' learning achievements. The authors of the present contribution define students' learning achievements as quantitative evaluation of students' learning results' qualitative level made by the educator with use of marks or grades. Further on, the blended educational process is qualitative if the inputs (the institutionalized blended educational process) produce the maximum output (students' learning achievements) (Commission of the European Communities, 2006). Therein, students' learning achievements are the criterion of the quality of the institutionalized blended educational process.

The present empirical study employs the qualitatively oriented research. Traditionally, the qualitatively oriented research uses only few cases (Mayring, 2007). Use of only few cases in the qualitatively oriented research is opposed to the quantitatively oriented research which usually demands on a big sample of data to be collected. Moreover, the cases themselves are not of interest, only the conclusions and transfers drawn from these cases (Mayring, 2007). Selecting the cases for the case study comprises use of information-oriented sampling (Flyvbjerg, 2006). This is because an average case is often not the richest in information. In addition, it is often more important to clarify the deeper causes behind a given problem and its consequences than to describe the symptoms of the problem and how frequently they occur (Flyvbjerg, 2006).

The empirical study consisted of the following stages:

- pre- and post-surveys' data collection,
- data processing, analysis and data interpretation,
- analysis of the results and
- elaboration of conclusions and directions of further research.

The present empirical study was conducted during

the blended educational process within the *Academic Presentation* course in the Eighth Baltic Summer School *Technical Informatics and Information Technology* at the University of Tartu, Tartu, Estonia, July 28 – August 12, 2012. The sample involved 29 respondents represented by engineering students who participated in the Eighth Baltic Summer School *Technical Informatics and Information Technology* at the University of Tartu, Tartu, Estonia, July 28 – August 12, 2012.

All 29 engineering students have got Bachelor or Master Degree in different fields of computer sciences and working experience in different fields. These 29 engineering students represent different cultural backgrounds and diverse educational approaches from different countries, namely, Nigeria, Ethiopia, Lithuania, Estonia, Belarus, Poland, India, Russia, Ukraine, Turkey, Nepal, Sweden, Canada, China and Pakistan. Whereas cultural similarity aids mutual understanding between people (Robbins, 2007), the students' different cultural and educational backgrounds contribute to successful learning. These diverse backgrounds become an instrument of bringing the students together more closely under certain conditions such as appropriate materials, teaching/learning methods and forms, motivation and friendly positioning of the educator (Abasheva, 2010). Therein, the sample of 29 engineering students is multicultural.

This International Summer School offers special courses to support internationalization of education and cooperation among the universities of the Baltic Sea Region. As the aims of Baltic Summer Schools *Technical Informatics and Information Technology* are preparation for international Master and Ph.D. programmes in Germany, further specialization in computer science and information technology and learning in a simulated environment, the Baltic Summer School provides the *Academic Presentation* course in English and German. The *Academic Presentation* course is aimed at improving engineering students' communicative competence in English for the active participation in international research activities. The selected students can choose the *Academic Presentation* course to be taught in English or German as the Baltic Summer School sets students' enrolment based on the students' results shown in certificate of examinations or academic transcript and language certificate for German and/or English. In the present research, results of the students' enrolment are considered as the students' learning achievements of the placement test in the pre-survey. By the end of Baltic Summer School, students have to pass the final examination. Results of the final test are described in the certificate which confirms grades awarded to the students. In the present research, certificates' grades are determined as the students' learning achievements of the final test in the post-survey.

In order to determine the developmental dynamics of each student's learning achievements in the *Academic Presentation* course, the qualitative evaluation research included the comparison of the pre-survey and post-survey results of each student's learning achievements.

The comparison revealed that 27 engineering students' learning achievements had increased as shown in Figure 8.

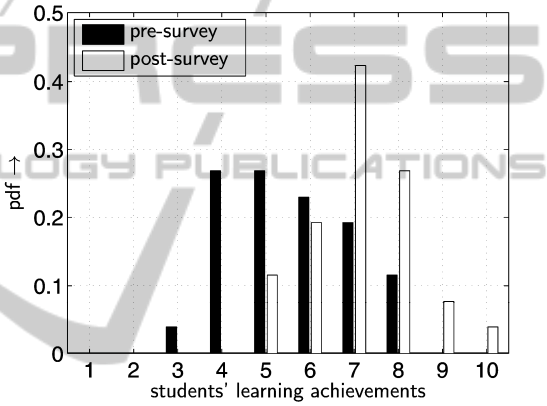

Figure 8: Probability density function (pdf) highlighting the inter-connections of the pre-survey and post-survey of students' learning achievements.

In Figure 8

- the vertical numbers mean 10 levels of learning achievements,
- the horizontal numbers present the grades of the learning achievements achieved by the students (represented by the pdf in Figure 8) who participated in the pre- and post-surveys,
- Code *Pre-survey* shows the pre-survey's results of the students' learning achievements and
- Code *Post-survey* shows the post-survey's results of the students' learning achievements.

The post-survey's results, highlighted in Table 1 by analysing the mean values, demonstrate Level 7 of the students' learning achievements in the *Academic Presentation* course in comparison with Level 5 in the pre-survey.

Finally, the *Mean* results of the descriptive statistics show that the level of the engineering students' learning achievements in the Baltic Summer School *Technical Informatics and*

Information Technology in 2012 has positively changed as demonstrated in Table 1.

Table 1: Mean analysis of the pre- and post-surveys.

Quality criterion	Mean in the Pre-survey	Mean in the Post-survey
Students' learning achievements	5,5	7,1

Hence, considering judgment to be part of the art of statistics (Gigerenzer, 2004), the conclusion has been drawn that the institutionalized blended educational process in the *Academic Presentation* course in 2012 influenced the development of the engineering students' learning achievements. This positive influence is demonstrated by the difference between the levels of the students' learning achievements in the pre- and post-survey.

5 CONCLUSIONS

The findings of the present research allow drawing conclusions on the quality of the institutionalized blended educational process applied to enhance learning achievements of the students in the *Academic Presentation* course within the Eighth Baltic Summer School *Technical Informatics and Information Technology* in 2012.

Regarding *quality assurance* it is evident that the students' learning achievements has been improved. The students have gained their experience during the institutionalized blended educational process implemented for the improvement of their learning achievements. This experience changed into the means of gaining new opportunities and advantages. Irrespective of levels in the students' initial learning achievements, the institutionalized blended educational process has become an effective means of acquiring experience by the students and has served as a motivating factor to continue learning in order to increase their learning achievements. The provided support for students, namely, the institutionalized blended educational process, in the *Academic Presentation* course resulted in the improved students' learning achievements. Therein, the institutionalized blended educational process in the *Academic Presentation* course has contributed to the improvement of the students' learning achievements.

Thus, the conclusion can be drawn that the institutionalized blended educational process in the *Academic Presentation* course enhanced engineering students' learning achievements. Hence, the institutionalized blended educational process in the *Academic Presentation* course for the improvement of students' learning achievements influences and determines the students' success or failure for acquiring higher education and profession as depicted in Figure 9.

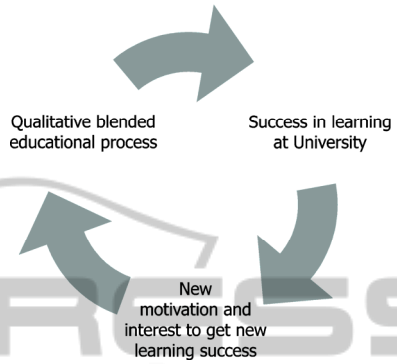

Figure 9: Successful blended educational process for the improvement of students' learning achievements in higher education.

The present research has *limitations*. The inter-connections between e-Business applications in higher education, blended learning and institutionalized blended educational process have been set. A limitation is the empirical study conducted by involving the students of one tertiary institution. Therein, the results of the study cannot be representative for the whole tertiary area. Nevertheless, the results of the research - e-Business application in higher education, the educational model of e-Business application in higher education and the qualitative evaluation research design to examine the quality of the institutionalized blended educational process for the improvement of students' learning achievements - may be used as a basis of the development of students' learning achievements of other tertiary institutions. If the results of other tertiary institutions had been available for analysis, different results could have been attained. There is a possibility to continue the study.

Further research on students' learning achievements in e-Business application is proposed. The search for relevant methods for evaluation of students' learning outcomes influenced by e-Business application could be suggested.

Empirical studies on students' learning outcomes in e-Business application in other tertiary institutions could be investigated. A comparative research of different countries could be carried out, too.

Furthermore, e-Business application used the

technology of online networks to assemble and manage large business communities with a common interest in peer contribution (Ahrens and Zaščerinska, 2011). However, e-Business application will be derived from the full application of Web 4.0 concepts such as ambient intelligence, WebOS or Web operating system and artificial intelligence, rather than Web 3.0 point solutions (Ahrens and Zaščerinska, 2011). This remains as an open point for the future. It should be noted that the concept of a Web operating system or WebOS is distinct from Internet operating systems. Web operating system or WebOS is independent of the traditional individual computer operating system (Ahrens and Zaščerinska, 2011).

REFERENCES

Abasheva, C., 2010. Specifics of the English Language Education in the Study Groups with Different Mother Tongues. In *Proceedings of the 5th International Scientific Conference Theory for Practice in the Education of Contemporary Society.* Riga Teacher Training and Educational Management Academy.

Ahrens, A., Zaščerinska, J., 2011. Enterprise 3.0 in Engineering Education. In *Proceedings of the 15th international student scientific practical conference "Human. Environment. Technology" of the Engineering Faculty of Rezekne Higher Education Institution.* Rezekne: Publishing House of Rezekne Higher Education Institution, Latvia.

Cohen, L., Manion, L., et al., 2003. *Research Methods in Education,* London, New York: Routledge/Falmer Taylor & Francis Group.

Commission of the European Communities, 2006. *Efficiency and Equity in European Education and Training Systems,* Communication from the Commission to the Council and to the European Parliament, Brussels.

Flick, U., 2004. Design and Process in Qualitative Research. In U. Flick, E. Von Kardoff and I. Steine (Eds) *A Companion to Qualitative Research*, SAGE, Glasgow UK.

Flyvbjerg, B., 2006. Five Misunderstandings About Case-Study Research. *Qualitative Inquiry, 12*(2), 219-245.

Gecer, A., Dag, F., 2012. A Blended Learning Experience Educational Sciences: Theory and Practice, 12*(1)*, 2012, 438-442.

Gigerenzer, G., 2004. Mindless Statistics. *The Journal of Socio-Economics, 33*(5), 2004, 587-606.

Grgurovic, M., 2011. Blended Learning in an ESL Class: A Case Study. CALICO Journal, 29*(1)*, 100-117.

Lūka, I., 2008. Development of Students' ESP Competence and Educator's Professional Activity in Tertiary Level Tourism Studies. In *Proceedings of ATEE Spring University Conference Teacher of the 21st Century: Quality Education for Quality Teaching.* University of Latvia, Riga, Latvia.

Mayring, P., 2007. On Generalization in Qualitatively Oriented Research. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *8*(3), Art. 26, 2007, 1-8.

Mitchell, J., 2002. *E-Business in Education.* Commonwealth of Australia: the National Office for the Information Economy.

Myllymäki, M., Hakala, I., 2013. Video-Based Blended Learning Practice in Master Studies. Proceedings of the IASTED International Conference Web-based Education (WBE 2013) February 13 - 15, 2013 Innsbruck, Austria.

Porumb, S., Orza, B., Vlaicu, A., Porumb, C., Hoza, I., 2011. Cloud Computing and its Application to Blended Learning in Engineering. In *CLOUD COMPUTING 2011: The Second International Conference on Cloud Computing, GRIDs, and Virtualization.* IARIA.

Robbins, D., 2007. Vygotsky's and Leontiev's Non-classical Psychology related to second Language Acquisition. In *International Nordic-Baltic Conference of FIPLV Innovations in Language Teaching and Learning in the Multicultural Context.* Rīga: SIA "Izglītības soļi", Latvia.

Vossen, G., 2009. Web 2.0: a buzzword, a serious development, just fun, or what? In *International Conference on e-Business,* Milan, Italy.

Zaščerinska, J., Ahrens, A., 2010. Social Dimension of Web 2.0 in Teacher Education: Focus on Peer-Learning. In *Proceedings of London International Conference on Education (LICE-2010).* Infonomics Society, London, UK.