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The impact of demographic factors on selected aspects of e-learning in higher education

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Abstract

Purpose – In higher education, a combination of traditional face-to-face learning and e-learning is becoming very popular. During their studies, students are enrolled in several e-courses. They perceive various aspects of e-courses and show different responses when using teaching materials and learning in an e-course. The purpose of this paper is to measure such aspects from the students' perspective and explore the differences among various subgroups of students.

Design/methodology/approach – In the survey, students expressed their opinions on 13 different aspects (a seven-level scale) of the e-courses in which they were enrolled. In addition, the influence of some demographic characteristics was analysed. The authors used statistical tests (*t*-test and ANOVA) to compare the means among the analysed subgroups.

Findings – The empirical results reveal some differences among the subgroups of students. Students' attitudes to blended learning increase significantly by year of study and decrease according to the amount of other non-study activities. Simplicity of finding materials in an e-course is the factor where male and female students differ significantly. This finding serves as a guideline for faculty management concerned with how to adjust blended learning to fulfil the various expectations of different student subgroups.

Originality/value – This paper's insights will be of value to individuals and institutions engaged in the e-learning process in higher education. In particular, the results will be helpful to the faculty management and teachers with the main task to increase the engagement of particular groups of students regarding the work in e-courses.

Keywords Higher education, Blended learning, Demographic factors, LMS Moodle, Public administration education, Students' perspective

Paper type Research paper

Introduction

The growth of information and communication technology is bringing rapid and significant changes to the development of teaching and learning techniques. E-learning is emerging as the new paradigm of modern education (Bostrom, 2012; Islam, 2013). The rise in the usage of e-learning in the last two decades is due to the tougher competition between higher education institutions to attract students and meet their educational needs and goals (Clark and Meyer, 2011) and to support both face-to-face and remote course delivery without the constraints of time and distance (Park, 2009).

Despite the popularity of online education, attrition remains a problem faced by many institutions (Hart, 2012; Saba, 2012; Upadhyaya and Mallik, 2013). The effectiveness of e-learning systems (Hart, 2012; Hassanzadeh *et al.*, 2012; Islam *et al.*, 2011; Mbarek and Zaddem, 2013) and students' perceived satisfaction (Al-Adwan *et al.*, 2013; Joo *et al.*, 2014; Kassab *et al.*, 2015; Liaw, 2007; Lim *et al.*, 2013; Ozkan and Koseler, 2009; Sun *et al.*, 2008)



have been important subjects of research in the last few decades. Many factors influence the effectiveness of e-learning, with some being connected with technology/technics and others with people. Upadhyaya and Mallik (2013) claim that e-learning involves interaction between people and processes. Namely that it has to be treated as a socio-technical system rather than a social system, only considering the people aspect, e.g. students, teachers and other stakeholders, or a technical system, only considering the standards and processes aspect, e.g. course content, technology, learning management system (LMS) and content management tools. E-learning is a complex process that depends not only on these aspects in isolation but also the interaction among them. A successful e-learning system must at least be designed with good and adequate programme content, which is presented well and can be accessed easily, and allows high user participation and involvement in the virtual learning environment (Lim *et al.*, 2013). Johson *et al.* (2008) in their study found out that social presence is important in e-learning effectiveness and suggested that teachers should include activities with social interaction to increase e-learning success. If students refuse to use the system, its benefits will not be fully exploited (Tarhini *et al.*, 2013). Additionally, although the internet may be considered a global technology, the efficiency of e-learning tools should be measured locally as users typically work in local/national contexts (Teo, 2011).

Besides understanding the students' psychological aspects of learning in blended learning, it is very important to monitor and understand how students themselves perceive different aspects of e-courses and how they feel when using teaching materials and learning in an e-course. As the latter is designed by a teacher, this kind of assessment could be understood as a student evaluation of teaching (SET). SET is important for two primary reasons. First, student evaluation provides data used for managerial decisions such as tenure, promotion, and salary increases. Second, teaching evaluations provide feedback to help teachers improve their future teaching performance (Loveland, 2007; Sheehan and DuPrey, 1999).

The rapid growth in the number of online classes poses some challenges for academic management. They include difficulties hiring teachers with online teaching interests and experience; increases costs associated with technology, training and faculty incentives; and problems associated with the comparison of traditional and online teaching in terms of workload, compensation and evaluation (Loveland, 2007). In any case, teachers should themselves be interested in the feedback from students – in order to improve the e-courses and student's engagement within them.

When students are provided with the same LMS and learn in the same e-courses, not everyone has the same perception of a specific aspect of work in the e-course and a general impression about it. It is therefore important to understand that the variations between genders, location of students' homes, years of study, occupation with other activities, participation in different programmes and students' high school backgrounds exist and should not be ignored when developing and implementing e-courses. Similar reasoning was offered by Lim *et al.* (2013) where the focus was on students' perceptions of LMS design and the demographic factors, such as role, gender, experience and age, influencing those perceptions and by Wu and Liu (2013) in whose research there were differences in the satisfaction with blended learning between postgraduate and undergraduate students.

In our study, we analysed the students' points of view on different aspects of the e-courses in which they were enrolled. We examined the results, received from students of two undergraduate programmes at the University of Ljubljana, Faculty of Public Administration, where LMS Moodle is used for e-learning, and linked them with the demographic characteristics of the surveyed students. The latter was acquired from the student databases.

The purpose of the paper is to present the analysis of the demographic factors influencing students' assessment of aspects of each e-course. The paper explains which demographic factors influence the students' perceptions of e-courses and discusses the variances between the different subgroups of students.

The paper is structured as follows: after the introduction, which includes defining the problem, the purpose and structure of the paper as well as a brief literature review on different aspects of e-learning and factors affecting them, the results of an empirical study are presented. At the end, conclusions are offered based on the examined data. They are accompanied by the limitations of the presented study and the plans for our future research.

Empirical study

Data and methodology

The research was carried out amongst students from the University of Ljubljana, Faculty of Public Administration. Based on empirical findings from recent literature (e.g. Liaw, 2008; Sun *et al.*, 2008; Upadhyaya and Mallik, 2013), we developed a questionnaire, which suits to the blended learning implemented at the Faculty, where LMS Moodle is used (Umek *et al.*, 2015). We limited our survey to obligatory e-courses for undergraduate students, where blended learning is mandatory. Students were invited to participate voluntarily in the e-survey implemented in Moodle. Each student evaluated all the e-courses in which he or she was enrolled in Spring semester of an academic year 2014/2015.

The survey consisted of 13 statements (Table I) describing the virtual classroom of the corresponding course. For each course, the statements were divided into two parts: evaluation of e-course (statements EC1-EC6) and students' personal (general) impressions about e-course (statements GI1-GI7). Students expressed their opinions regarding the statements on a seven-point scale from "totally disagree" (value 1) to "totally agree" (value 7), with an additional possibility of "I do not want to answer/no experience".

Our survey was participated by 315 students, with each student evaluating three to five different e-courses depending on schedule in the observing semester. In the survey, we also asked them whether they are occupied with any other activities besides their study. Altogether, we recorded 1,456 e-course evaluations (data instances). Due to missing values, we removed 373 instances from our initial data set and reduced the sample size to 1,083.

Abb.	Statement about e-course
EC1	The virtual classroom of the course is organized transparently
EC2	The goals (workload demands and grading) of this e-course were clearly stated at the beginning of the semester
EC3	This e-course offers a variety of ways for assessing my learning (quizzes, written work, forums, files, [...])
EC4	I receive teacher's comment/feedback on an assignment within 7 days
EC5	I prefer fewer lectures in the traditional way (face-to-face) and more learning material processed in the e-course
EC6	More course exercises could be carried out in the e-course instead of in the classroom
GI1	The general impression of the e-course is good
GI2	Study material and tasks of the e-course are presented in a clear and understandable way
GI3	Finding certain activities in the e-course is simple
GI4	The prepared learning material and tasks are consistent with the lectures in the classroom and supplement them
GI5	The prepared material and assignments supplement the tutorial in the classroom
GI6	Learning materials and activities in the e-course helped me to effectively study this subject matter
GI7	The teacher gives me feedback/response on my submissions (assignment and forum posts)

Table I.
Statements from
the questionnaire

Source: Survey (2016)

Each instance in the final data set represents a student evaluating one e-course. We upgraded the analysis with data on the students' demographic characteristics, obtained from the students' information database maintained by the faculty, namely gender, high school final grade, region of Slovenia where the student lives, year of study and study programme. In the paper, we treat the demographic variables as factors, which determine the different subgroups of students.

Table II describes all demographic factors we used in our survey. For each factor, the values correspond to the subgroups we included in our analysis. Table II also contains the information about the sizes of all the subgroups we analysed.

The main goal of the study was to compare how the means of the variables, i.e. EC1-GI7, vary between the subgroups of students. For each variable from Table I and for each demographic factor (Table II), we tested whether the means differ significantly among the subgroups defined by the factor. We computed *p*-values using a *t*-test (for factors with two distinct values, such as gender) or an analysis of variance ANOVA (for factors with several values, such as year of study: first, second and third). Since we tested 78 hypotheses (13 statements × 6 factors), we adjusted the *p*-values using a Bonferroni correction.

Empirical results

Table III presents the computed *p*-values for each pair of demographic factors and a statement from the questionnaire (EC1-GI7). For clarity, we do not show the original *p*-values. Moreover, we do not report the mean values for the subgroups since several factors have many possible values. The content in the cells indicates the magnitude of the *p*-value, classified into three categories presented with a different number of stars.

The results in Table III indicate that there is just one aspect of blended learning where male and female students differ significantly. It is the aspect GI3 ("simplicity of finding certain activities in the e-course"). Female students evaluated it on average with 4.55, which is significantly more than 4.04 evaluated by their male university colleagues.

Factor	Subgroup	<i>n</i>
Gender	Whole sample	1,083
	Male	284
High school final grade	Female	799
	Sufficient (2)	442
	Good (3)	318
	Very good (4)	205
	Excellent (5)	113
Year of study	1st	698
	2nd	161
	3rd	224
Programme	University	436
	Professional	647
Region	Outside Ljubljana	473
	Ljubljana	610
Other activities ^a	No activities	71
	Less than 2 hours per week	92
	Between 2 and 6 hours per week	241
	Up to 2 hours per day	190
	Between 2 and 6 hours per day	200
More than 6 hours per day	289	

Note: ^awe included only two subgroups in the analysis: students with "no activities" and students with "more than six hours of activities per day" besides study

Table II.
Factors, subgroups
and their sizes

On the other hand, we found no significant differences for the factor “high school final grade”. This means that the students’ background does not play an important role when assessing aspects of blended learning.

Our study revealed two aspects, namely EC6 and GI1 (“e-course instead of a face-to-face tutorial” and “general impression”), with significant differences between the regions of Slovenia in which the students live. The results showed that students who live further away from the university campus evaluated aspects EC6 and GI1 significantly higher compared to students from the Ljubljana region (where the faculty is located). This fact is not surprising since it can be expected that those who live farther away prefer to complete their duties in the e-course rather than having to commute to the Faculty.

The assessment of aspects GI4 and GI5 (supplemental aspect of face-to-face lectures and tutorials) differs significantly between the groups of students with different time spent for other activities besides their study (students’ work, sports training, etc.). The results of our study showed that the supplemental aspect of face-to-face lectures on average decreases with time spent on other activities – from 6.39 for students with no activities to 5.67 for students with more than six hours of other activities per day. We found a similar decrease for supplementing face-to-face tutorial (a drop from 6.28 to 5.71).

The factor “year of study” is associated with the most significant findings. We found significant differences in 10 out of 13 aspects analysed. In all cases, students in the first year of study gave on average the lowest scores to each aspect while in the third year the scores were the highest. The aspect with the lowest p -value ($4.9E-12$) is EC1 (structure of the e-course) where the mean value rose from 5.52 (first year) to 6.02 (second year) to 6.17 (third year). This means that from the students’ perspective, the e-courses in higher years of study are better organized and structured.

The last row in Table III indicates four aspects EC3 and GI1 (for adjusted $\alpha < 0.1$), GI4 and GI5 (variety of different contents, the general impression, supplement to lectures and tutorials) with significant differences between students of the professional study programme (PS) and the university programme (UN). In all cases, the mean value was higher for the PS students.

Looking at the results from a different perspective, we found two aspects with no significant differences in the assessment by various subgroups of students. These aspects are EC4 (teachers’ feedback) and EC5 (preference for e-courses over face-to-face lectures). If we ignored the most influential factor (year of study), we could also treat aspects EC1, EC2, GI2, GI6 and GI7 as non-significant.

Conclusion

The main goal of the paper was to present an analysis of the factors influencing the assessment of various aspects of blended learning. We examined the results received from students of University of Ljubljana, Faculty of Public Administration, where LMS Moodle is

Factor	Statement												
	EC1	EC2	EC3	EC4	EC5	EC6	GI1	GI2	GI3	GI4	GI5	GI6	GI7
Gender									**				
High school final grade													
Region						**	**						
Other activities										**	**		
Year of study	**	**	**				**	**	**	**	**	**	**
Study programme			**				*			**	**		

Notes: Empty cells are Bonferroni adjusted $\alpha > 0.1$; $*0.05 < \alpha \leq 0.1$; $**0.01 < \alpha \leq 0.05$

Source: Survey (2016)

Table III.
Significant
differences between
the Subgroups

used for e-learning. The paper's primary contribution was to identify differences in the assessment of the aspects between various subgroups of students.

Our study revealed that students' attitudes to blended learning significantly increases with the year of study and decreases by the amount of other activities (e.g. students' work and sports – training). We found some other specific significant differences. Female students found certain activities in an e-course easier than their male university colleagues. Students who live farther away from the university centre evaluated e-courses higher than students from the region of Ljubljana. Their opinions also differed regarding the impression of an e-course. We compared the professional study programme and the university programme and discovered several aspects with significant differences. The averages of these aspects always related to higher evaluation for the professional study programme. These aspects are as follows: a variety of different contents, the general impression, and being supplemented with lectures and tutorials. Although our study revealed several interesting subgroups, we failed to find any significant differences between the subgroups of students based on their high school final grade.

Q2 Many studies (e.g. Padilla-Melendez *et al.*, 2013; Pekkarinen, 2012; Severiens and Ten Dam, 1994; Wehrwein *et al.*, 2007) have shown the differences in perceptions and learning styles between male and female students. Our research revealed only one aspect with major difference between male and female students, namely in the claim G13 ("Finding Certain Activities in an e-course is simple"). Based on the research, the reason of this result could not be explained. Of course, there are possible quick solutions to facilitate the search activity in the e-course. Teacher should try to use icons and colours to increase transparency in the e-course, and even more so regarding the new activities, which may occur on the entry page of the e-course, with at least a link to the new activity.

Q3 On the other hand, the most influential factor "year of study" has to be studied in more detail in the future. While the averages of multiple aspects increased with the year of study, the faculty staff should precisely evaluate the courses in the first year. It is possible that these courses indeed have unintuitive structure, worse teachers' feedback, etc. Thorough evaluation of the courses in the first year could therefore eliminate the possibility that students' in the third year got more used to the e-courses in Moodle and therefore gave better scores on most aspects.

Q4 The students' satisfaction with blended learning is expressed in high evaluation of all aspects. This is an important message to the faculty management to continue good practices. It is also important to the teachers to proceed with the evaluation survey each year. However, in this study, we focussed on students' perspectives of blended learning, while the teachers' perspectives were ignored (Boling *et al.*, 2012; Friesen, 2012). To overcome this limitation, we plan to develop a new survey. We will ask teachers about their views on blended learning (time spent on preparation of an e-course, time spent in the e-course, communication with students, preferences (e-courses vs face-to-face courses), etc.). After receiving such data, we will compare the results of the present study with the results of our new survey. Moreover, one of our recent studies showed a significant increase in students' performance in the period in which Moodle LMS was introduced. Therefore, in our future research, we plan to acquire the data on student's performance and identify how selected aspects relate to a better performance.

References

- Al-Adwan, A., Al-Adwan, A. and Smedley, J. (2013), "Exploring students' acceptance of e-learning using technology acceptance model in Jordanian universities", *International Journal of Education and Development using Information and Communication Technology*, Vol. 9 No. 2, pp. 4-18.
- Boling, E.C., Hough, M., Krinsky, H., Saleem, H. and Stevens, M. (2012), "Cutting the distance in distance education: perspectives on what promotes positive, online learning experiences", *Internet in Higher Education*, Vol. 15 No. 2, pp. 118-126.

- Bostrom, C. (2012), "Educational leadership and the e-learning paradigm", *Global Partners in Education Journal*, Vol. 2 No. 1, pp. 42-56.
- Clark, R.C. and Meyer, R.E. (2011), *E-Learning and The Science Of Instruction: Proven Guidelines For Consumers And Designers Of Multimedia Learning*, Pfeiffer, New York, NY.
- Friesen, N. (2012), "Report: defining blended learning", available at: http://learningspaces.org/papers/Defining_Blended_Learning_NF.pdf (accessed 12 February 2016).
- Hart, C. (2012), "Factors associated with student persistence in an online program of study: a review of literature", *Journal of Interactive Online Learning*, Vol. 11 No. 1, pp. 19-42.
- Hassanzadeh, A., Kanaani, F. and Elahi, S. (2012), "A model for measuring e-learning systems success in universities", *Expert Systems with Applications*, Vol. 39 No. 12, pp. 10959-10966.
- Islam, A., Rahim, N.A.A., Liang, T.C. and Momtaz, H. (2011), "Effect of demographic factors on e-learning effectiveness in a higher learning institution in Malaysia", *International Education Studies*, Vol. 4 No. 1, pp. 112-121.
- Islam, A.K.M.N. (2013), "Investigating e-learning system usage outcomes in the university context", *Computers & Education*, Vol. 69, pp. 387-399.
- Joo, Y.J., Joung, S. and Son, H.S. (2014), "Structural relationships among effective factors on e-learners' motivation for skill transfer", *Computers in Human Behavior*, Vol. 32, pp. 335-342.
- Kassab, S.E., Al-Shafei, A.I., Salem, A.H. and Otoom, S. (2015), "Relationship between the quality of blended learning experience, self-regulated learning, and academic achievement of medical students: a path analysis", *Advances in Medical Education in Practice*, Vol. 6, pp. 27-34.
- Liaw, S.-S. (2008), "Investigating students' perceived satisfaction, behavioural intention, and effectiveness of e-learning: a case study of the blackboard system", *Computers & Education*, Vol. 51 No. 2, pp. 864-873.
- Lim, Y.M., Ayesh, A. and Chee, K.N. (2013), "Socio-demographic differences in the perceptions of learning management system (LMS) design", *International Journal of Software Engineering & Applications*, Vol. 4 No. 5, pp. 15-35.
- Loveland, K.A. (2007), "Student evaluation of teaching (SET) in web-based classes: preliminary findings and a call for further research", *The Journal of Educators Online*, Vol. 4 No. 2, pp. 1-18.
- Mbarek, R. and Zaddem, F. (2013), "The examination of factors affecting e-learning effectiveness", *International Journal of Innovation and Applied Studies*, Vol. 2 No. 4, pp. 423-435.
- Ozkan, S. and Koseler, R. (2009), "Multi-dimensional students' evaluation of e-learning system in the higher education context: an empirical investigation", *Computers & Education*, Vol. 53 No. 4, pp. 1285-1296.
- Padilla-Melendez, A., Aguilla-Obra, A.R. and Garrido-Moreno, A. (2013), "Perceived playfulness, gender differences and technology acceptance model in a blended learning scenario", *Computers & Education*, Vol. 63, pp. 306-317.
- Park, S.Y. (2009), "An analysis of the technology acceptance model in understanding university students' behavioural intention to use e-learning", *Education at Technology and Society*, Vol. 12 No. 3, pp. 150-162.
- Pekkarinen, T. (2012), "Gender differences in education", Discussion Paper No. 6390, IZA, available at: <ftp.iza.org/dp6390.pdf> (accessed 6 October 2016).
- Saba, T. (2012), "Implications of e-learning systems and self-efficiency on students' outcomes: a model approach", *Human-centric Computing and Information Sciences*.
- Severiens, S.E. and Ten Dam, G.T.M. (1994), "Gender differences in learning styles: a narrative review and quantitative meta-analysis", *Higher Education*, Vol. 27 No. 4, pp. 487-501, doi: 10.1007/BF01384906.
- Sheehan, E.P. and DuPrey, T. (1999), "Student evaluations of university teaching", *Journal of Instructional Psychology*, Vol. 26 No. 3, pp. 188-194.

-
- Tarhini, A., Hone, K. and Liu, X. (2013), "Factors affecting students' acceptance of e-learning environments in developing countries: a structural equation modelling approach", *International Journal of Information and Education Technology*, Vol. 3 No. 1, pp. 54-59.
- Teo, T. (2011), "Assessing the cross-cultural validity study of the e-learning acceptance measure (ElAM): a structural equation modelling approach", *International Journal of Educational and Psychological Assessment*, Vol. 8 No. 2, pp. 43-53.
- Umek, L., Aristovnik, A., Tomažević, N. and Keržič, D. (2015), "Analysis of selected aspects of students' performance and satisfaction in a Moodle-based e-learning system environment", *Eurasia Journal of Mathematics, Science and Technology Education*, Vol. 11 No. 6, pp. 1495-1505, doi: 10.12973/eurasia.2015.1408a.
- Upadhyaya, K.T. and Mallik, D. (2013), "E-learning as a socio-technical system: an insight into factors influencing its effectiveness", *Business Perspectives and Research*, Vol. 2 No. 1, pp. 1-12.
- Wehrwein, E.A., Lujan, H.L. and DiCarlo, S.E. (2007), "Gender differences in learning style preferences among undergraduate physiology students", *Advances in Physiology Education*, Vol. 31 No. 2, pp. 153-157, doi: 10.1152/advan.00060.2006.

Further reading

- Johnson, R.D., Hornik, S. and Salas, E. (2007), "An empirical examination of factors contributing to the creation of successful e-learning environments", *International Journal of Human-Computer Studies*, Vol. 66 No. 5, pp. 356-369.

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