Embedded Selforganizing Systems

First-Year Students' Satisfaction by E-Learning

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Abstract *- Universities around the world have been using electronic learning systems more and more in recent years. Due to the Covid-19 pandemic, Mongolian universities are changing the way of teaching online and thus starting from the second semester of the 2019-2020 academic year. The purpose of this study is to investigate the satisfaction of students towards e-learning and the factors affecting it.*

321 first-year students of the School of Nursing of NUMS participated in this survey, the survey questionnaire filled in Google form, and received by electronically. The relationship between satisfaction and its influencing factors was evaluated by using the Pearson test (correlation coefficient). According to the indicators of the research results, students' satisfaction is the most satisfied with learning materials (4.16), student engagement (4.15), and the lowest with e-educational technology (3.25). Due to this, there is a didactic need to improve the quality of e-learning and to update the lesson technology. Students' satisfaction level had a direct strong positive correlation (r=0.65) with grade (r=0.65) and a weak direct positive correlation (r=0.38) with lesson access (p<0.001), and e-learning satisfaction scores had a direct correlation (p<0.001) to the quality of teaching, supply of learning materials, assessment, and student engagement.

Keywords— E-learning, satisfaction, learning materials, evaluation.

I. INTRODUCTION

Due to the spread of the corona virus, traditional courses in universities around the world are rapidly being transferred to electronic format. Along with the transition to e-learning, the change in teaching style may directly affect the quality of teaching in higher education.

The foundation of e-learning was laid in England in the 1800s, where teachers and students participated in learning activities through regular mail. By using the Internet and information and communication technology, e-learning imparts knowledge and education to students who cannot physically attend the classroom. However, in Mongolia, the development of distance learning and the development of a complete system have begun [1].

E-education is not a new thing, and in the field of higher education, e-education started in 2002. But in our country, according to the decision of the State Special Commission related to the infection of Covid-19, the second half of the 2019-2020 academic year was studied 100% by online [2-4]. In 2013, researcher N.Munkhtsetseg et al. studied the selection of e-learning systems and the modules that allow the e-library to exchange information between them as one of the infrastructure components of e-learning software [5]. A survey was conducted on satisfaction and content quality of e-courses. Thus, 82.5 percent of the respondents expressed their satisfaction with the online course. Also, 82 percent of them rated the content quality of the e-course as good. In addition, G. Batnemekh emphasized in his speech that by transferring lessons by Internet, the students' self-learning activity has increased by reinforcing the content they have seen and studying it by reference [2].

In the education sector of our country, e-learning satisfaction research is being conducted, but medical students' e-learning satisfaction research was lacking. Therefore, the purpose of our study was to investigate the e-learning satisfaction and its influencing factors among students studying in the 1st semester of the School of Nursing in 2021.

E-learning satisfaction and its influencing factors

International studies evaluating e-learning satisfaction are ongoing. The use of e-learning, a type of distance education, has increased dramatically over the past two decades, attributed to technological advances [6].

E-learning provides opportunities for flexible learning and independent learning regardless of time and location. Also, students learning through e-learning described the advantages of learning as the opportunity to study from anywhere, flexible schedule, and low cost [7]. Access from anywhere, regardless of location, allows students to work at their own pace, read the material before answering the teacher's questions, and reflect on their answers [8].

Instead, students manage their own assignments, thereby increasing the opportunity to learn in a way that is more convenient and consistent for them [9-10].

Research has found that during e-learning, students have limited opportunities to immediately ask questions and interact with the instructor [11].

Some researchers have studied the effectiveness of e-

learning in students aged 35-55. However, during e-learning, female students found the teacher's teaching style are very important, while male students found the teachers' organizational skills are very important [12].

According to the research results of other researchers, the majority of e-learning participants were around 25 and 30 years old [13-15]. Also, the comparative results of online and classroom learning and some demographic characteristics of students (age, gender, and ethnicity) were investigated and determined [16].

However, some studies have found that the age and gender of students in e-learning did not affect their satisfaction with e-learning [17].

Student satisfaction survey results are an excellent indicator of the quality of an e-learning program. Research studies on student satisfaction with e-learning programs continue to be conducted [18-19].

Researchers have studied students' satisfaction with e-learning from many aspects [20-21]. When studying student satisfaction, five factors were considered: 1) e-learning outcomes, 2) evaluation, 3) course/learning materials, 4) student engagement, and 5) educational technology. He measured student satisfaction on a 1-5 Likert scale, and the mean score for overall satisfaction with e-learning was 4.21 (standard deviation = 0.96).

Researchers have explored other important factors in e-learning that influence student satisfaction. Students' satisfaction with e-learning is said to have a positive effect on student satisfaction with e-learning if 1) the school responds to student feedback and questions, 2) educational resources, 3) good software, 4) technical support, etc. According to the research results of some researchers, 1) teacher involvement, 2) curriculum, 3) student involvement, 4) flexibility and technology were factors in student satisfaction.

More than half of the students surveyed (54%) believe that good student-teacher relationships are an important factor in increasing student satisfaction [22]. This study was similar to the results of other researchers. The majority of students' satisfaction with e-learning was attributed to flexible scheduling [23].

Quantitative Partial Least Squares Structural Equation Modeling (PLS-SEM) analyzed data collected from 563 students enrolled in e-learning systems at UK universities. The percentage of respondents' satisfaction with e-learning was 71.4%, and the main factors affecting it were the quality of the technical system, the quality of information, the quality of services, the quality of students, and the teaching skills of teachers [24].

E-learning satisfaction survey was conducted with 611 business management students. As a result of the research, there were differences in the satisfaction of students of X, Y, and Z generation regarding the form of e-learning, course, and delivery of e-learning. According to the results of the study, the satisfaction of e-learning in the above generations were high [25].

II. RESEARCH SAMPLES

The survey included 321 participants who are studying in the 1st semester of the 2020-2021 academic year of the 1st year of the School of Nursing of NUMS using a targeted sampling method. 124 participants of the nursing class and 197 participants of special professions participated in this research. The majority of students surveyed, 76.6 percent, took a combination of classroom and e-learning, 21.5 percent took e-learning alone, and only 1.9 percent took just classroom learning.

Table I shows the general information of the participants, 88.5% of them were female students and 11.5% were male students. In terms of residence, 42.1 percent of the participants were from rural areas and 57.9 percent were from urban areas. Considering the professional fields of the students, 38.6 percent were nurses and 61.4 percent were special specialists.

TABLE I. GENERAL INFORMATION OF THE PARTICIPANTS

Gender	**Amount (percent)**
Female	284 (88.5)
Male	37 (11.5)
Place of Residence	
Urban areas	186 (57.9)
Rural areas	135 (42.1)
Profession	
Nurse	124 (38.6)
Special	197 (61.4)

A. Research data collection method

We used Aman's classification to conduct an e-Learning satisfaction survey from our participants. These include e-learning outcomes, assessment, learning materials, student engagement, and educational technology. Factors regarding participants' satisfaction with e-learning were assessed on a 5-point Likert scale (1-very poor, 2-poor, 3-moderate, 4-good, 5-very good).

Cronbach's alpha value was determined by conducting a reliability analysis for each group of questionnaires to verify the validity and reliability of the survey questionnaire. Cronbach's alpha measures internal reliability, which shows how close groups of data are. Alpha coefficient has a value of 0-1, and if $\alpha \geq 0.70$, it is considered that the true standard of probability has been reached [26].

B. Statistical processing of research

Statistical processing was carried out on the results of the electronic survey of the participants, and the statistical probability difference between the mean values was confirmed with a confidence limit of 95 percent. The correlation coefficient between participants' satisfaction with e-learning was studied. In addition, the survey of the respondents about the form of e-learning and teaching equipment was calculated as a percentage.

C. Research result

E-Learning Satisfaction of First Year Nursing Students:

21.5 percent of the first-year students of the nursing school studied their courses by online, and most of them, 87.2 percent, used mobile phones. According to this study, e-learning student satisfaction is similar to the results of other studies, with an average value of 3.89. Looking at the mean values, students were most satisfied with learning materials (4.16) and student engagement (4.15), while less satisfaction with e-educational technology (3.25) (Table II). The results

lead to the conclusion that it is necessary to update the educational technology to improve the quality of e-learning.

TABLE II. SURVEY OF STUDENTS' SATISFACTION WITH E-LEARNING

Factor	min	max	average	SD
Educational technology	3.13	3.36	3.2523	1.05558
Student engagement	4.08	4.22	4.1558	0.65243
e-learning outcomes	3.93	4.1	4.0218	0.78032
Assessment	3.77	3.94	3.8598	0.81527
Learning material	4.08	4.24	4.1651	0.69428
Mean	3.79	3.97	3.89086	0.799576

SD–Standard deviation

Table III shows the correlations of e-learning satisfaction variables. According to the research, there was a direct strong positive correlation (r=0.65) with students' satisfaction level with grades, and a weak direct correlation with access to technology (r=0.38). Besides, e-learning satisfaction scores was observed (p<0.001) that directly related with the quality of teaching, supply of learning materials, assessment, and student engagement.

TABIE III. RELATIONSHIP BETWEEN E-LEARNING AND STUDENTS' SATISFACTION

Dependence of variables	1	2	3	4	5	6
E-Learning Satisfaction	1					
Educational technology	.386**	1				
Student engagement	.590**	0.065	1			
E-Learning Outcomes	.619**	-0.045	.398**	1		
Evaluation	.654**	0.034	.482**	.486**	1	
learning materials	.648**	0.041	.419**	.587**	.527**	1
Reliability of electronic questionnaires					Cronbach α 0.7	

Significance at the 0.01** level (p<0.001)

Cronbach's α value was 0.7 for each question of the e-questionnaire, so it is considered that the questionnaire was reliable, interrelated, and satisfied, or reached the standard of true probability.

III. CONCLUSION

According to the indicators of the research results, students' satisfaction is the most satisfied with learning materials (4.16), student engagement (4.15), and the lowest with e-educational technology (3.25). Due to this, there is a didactic need to improve the quality of e-learning and to update the educational technology.

Furthermore, we analyzed and concluded on the basis of the summary for the study and research results taken from the students about how to improve and use the information technology knowledge, training on the use of electronic devices and equipment with greater results. As a result, we reached the conclusion that it would be appropriate to make change to the subject program at the university for information technology & science subject.

It could be also possible student's financial difficulties one of the major problems and other factors in daily use. Smart phones have limited software's, in other words does not appropriate for academics.

In the data era, when students want to study successfully, it is essential to find the information that is necessary for them as well as it is important to be able to use and organize it, to build-up

REFERENCES

[1] G. Dogsom, "Montsame. Distance learning is more important for preparing quality specialists than saving costs", May 21, 2018. [Online]. Available: https://montsame.mn/en/read/90502 .

[2] G. Muren, G. Batnemeh "82.5% of survey participants expressed their satisfaction with online courses at universities and colleges", August 11, 2020. [Online]. Available: https://ikon.mn/n/1yh3 .

[3] Uranchimeg Tudevdagva and Enkhtsetseg Luvsandagva and Altantsetseg Surenjav, "The Evaluation of Adult Training Courses During the COVID-19 Quarantine" , International Symposium on Computer Science, Computer Engineering and Educational Technologies" (ISCSET-2021), page 118 – 121, TUDpress, Verlag der Wissenschaften GmbH, Bergstr. 70, 01069 Dresden, Germany, December 2021. ISBN: 978-3-95908-238-9

[4] Bazarragchaa Sodnom, Uranchimeg Tudevdagva, Tserendulam Luvsandorj, Selenge Erdenechimeg, (2021), "Comparison of E-learning and Classroom Training for Bachelor Students of Traditional Medicine", in International Journal on Integrating Technology in Education (IJITE), June 2021, Vol. 10, Iss.2, pp.55-64, DOI: 10.5121/ijite.2021.10205

[5] N. Munkhtsetseg, "E-learning environment", *Journal of Information Technology*, Ulaanbaatar, Mongolia, pp.14-18. 2013.

[4] M. S. Beqiri, N. M. Chase, and A.Bishka, "Online course delivery": An empirical investigation of factors affecting student satisfaction. *Journal of Education for Business*, United States. University of Memphis, vol. 85, no. 2, pp. 95-100.2009.

[5] J. Leonard, S. Guha, "Education at the crossroads: Online teaching and students' perspectives on distance learning". *Journal of Research on Technology in Education*, United States: University of Israel, vol. 34, no. 1, pp. 51-58. 2001.

[6] Z. L. Berge, "Computer conferencing and the on-line classroom". *International Journal of Educational Telecommunications*, United States: University of Michigan, vol. 3, no.1, pp.3-21. 1997.

[7] P. Navarro, J. Shoemaker, "Performance and perceptions of distance learners in cyberspace". *American journal of distance education*, United States: Routledge, vol. 14, no. 2, pp.15-35. 2000.

[8] M. Ortiz-Rodriquez, R.Teig, T.Irani, T.G. Roberts, and E.Rhoades, "College students' perceptions of quality in distance learning*". The Quarterly Review of Distance Education, Israel:* Center of Educational Technology, vol. 6, no. 2, pp. 97-105. 2005.

[9] M. G. Moore, "Distance education theory". *The American Journal of Distance Education*, United States: Routledge, vol. 5, no. 3, pp. 1-6. 1996.

[10] A. G. Abdulla, "Distance learning students' perceptions of the online instructor roles and competencies". Dissertation. United States, 2004, pp.167.

[11] S. P. Schneider, C. G. Germann, "Technical communication on the Web": *A profile of learners and learning environments. Technical communication quarterly*, United States: University of Nevada, vol. 8, no. 1, pp. 37-48. 1999.

[12] M. K. Tallent-Runnels, J. A. Thomas, W. Y. Lan, S. Cooper, T.C. Ahern, S. M. Shaw, and X. Liu, "Teaching courses online": A review of the research. *Review of educational research, Sage Journals*, vol. 76, no. 1, pp. 93-135. 2006.

[13] W. Wang, "How university students view online study": A PCP perspective. *Campus-Wide Information Systems*, United Sates: University of Georgia, vol. 21, no. 3, pp.108-117. 2004.

[14] S. L. Baglione, M. Nastanski, "The superiority of online discussion": Faculty perceptions. *Quarterly Review of Distance Education*, United States: Education Resources Information center, vol. 8, no. 2, pp. 139-150. 2007.

[15] C. E. Walker, E. Kelly,"Online instruction: Student satisfaction, kudos, and pet peeves". *Quarterly Review of Distance Education*, United States: Information Age Publishing, vol. 8, no. 4, pp. 309-319. 2007.

[16] A. C. Banks, A. C. Faul, "Reduction of Face‐to‐Face Contact Hours in Foundation Research Courses": Impact on Students' Knowledge Gained and Course Satisfaction. *Social Work Education, Journal of Education for Social work*, vol. 26, no. 8, pp. 780-793. 2007.

[17] D. Dibiase, H. J. Rademacher, "Scaling up: Faculty workload, class size, and student satisfaction in a distance learning course on geographic information science". *Journal of Geography in Higher Education*, United States: University of Gloucestershire, vol. 29, no. 1, pp. 139-158. 2005.

[18] R. R. Aman, "Improving student satisfaction and retention with online instruction through systematic faculty peer review of courses". Dissertation. United States, 2009, pp.11-13.

[19] T. Evans, "An investigative study of factors that influence the retention rates in online programs at selected state, state-affiliated, and private universities". Dissertation. United States, 2009, pp.13.

[20] B. J.Mandernach, E. Donnelli, A. Dailey, and M. Schulte, "A faculty evaluation model for online instructors": *Mentoring and evaluation in the online classroom. Online Journal of Distance Learning Administration*, United States: Park University, vol. 8, no. 3, pp. 1-10. 2005.

[21] B. J. Seaberry, "A case study of student and faculty satisfaction with online courses at a community college". Dissertation. United States, 2008, pp.8.

[22] D. Al-Fraihat, M Joy, and J. Sinclair, "Evaluating E-learning systems success: An empirical study". Computers in Human Behavior. United Kingdom: University of Warwick, 2020, pp. 102, 67-86.

[23] D. E. Yawson, F.A. Yamoah, "Understanding satisfaction essentials of E-learning in higher education": A multi-generational cohort perspective. Dissertation. United Status, 2020.

[24] K. Kane, "Quality matters: Inter-institutional quality assurance in online learning". Sloan-C View: *Perspectives in Quality Online Education*, United States: University of Nevada, vol. 3, no. 11, pp. 136-146. 2004.