ⓐ OPEN ACCESS

Impact of E-learning on Learning Outcomes among Higher Education Students – An Integrated Review

Ms. Blessy Jayaron Jose[1*], Dr. Jayaron Jose[1]

[1]Faculty, IT, University of Technology and Applied Sciences, AL Musannah, Sultanate of Oman

*Corresponding author: Ms. Blessy Jayaron Jose
Faculty, IT, University of Technology and Applied Sciences, AL Musannah, Sultanate of Oman

Abstract		Original Research Article

Much of the exploratory research has been carried out to evaluate the success and failures of eLearning. The integrated review aims to understand the impact of eLearning on student learning outcomes in higher education. Understanding the student learning outcomes from their perspectives is crucial to improve the quality of eLearning platform to improve their satisfaction. With COVID-19 affecting every country and region leading to lockdown, each one has been making every effort to avoid interfering with the quality of education being imparted by integrating different e-learning platforms, and stakeholders' need for improved understanding of e-learning for meeting students' learning needs has become paramount. This paper attempts to summarize findings of the impact of e-Learning on students' learning outcomes based on selected articles analysed by researchers while educational institution across the globe hurrying to switch to online /electronic mode of learning. From among 100 articles searched using different databases, 10 articles were selected for analysis, conclusion, and recommendations. Overall, e-learning is found to be impacting learners positively despite its challenges, and it is inevitable in higher education students to effectively achieve their learning outcomes as it provides immense opportunities to better their learning performance.
Keywords: E-learning, integrated review, higher education, learning outcomes.

INTRODUCTION

Learning through Internet has become a standard way to support teaching and learning. E-learning platforms are extensively used by universities in Europe, Oman, Canada, USA, Australia and other developed countries. This platform was developed in almost all countries, and stakeholders feel it is inevitable when online teaching and learning are imperative. Among students, Moodle has been considered an impeccable and most accessible e-learning tool, thereby facilitating collaborative projects (Jose & Jafre, 2015).

LITERATURE REVIEW

The research involves the review of 10 papers as mentioned in the references to study about the impact of eLearning in student learning outcomes around the world. The researchers have made use of different themes from a number of studies such as impact of elearning in education on students learning outcomes at University of Medan (Ritonga, Azmi, & Sunarno, 2020), student perspectives on uses and impact of eLearning technologies in higher education system (Sharp & O'Donnel, 2012), familiarity with web based technology (Kumar & Popal, 2020), impact of online education in adults (Subramaniam, Suhaimi, Latif, Abu Kassim & Fadzil, 2019), perceived compatibility between elearning and its outcomes (Islam, 2016), and so on (Table 1). The research, therefore, collaborates themes from all these papers to measure how various eLearning systems are used, and how effective they are at educating students.

METHODOLOGY

The search included the databases like MEDLINE, PubMed, Google-Scholar, Allied Health Literature (CINAHL), Journal of e-learning and Knowledge Society (JEKS), and Scopus with MesH (Medical Subject Headings) and key words like e learning, student learning outcomes, higher education from 2015 to 2020 and around. The search yielded a total of 100 articles, and 10 of them met the inclusion criteria for the review. Articles were included if they were examining the student learning outcomes of higher education students who had experienced e-learning teaching method and published in peer-reviewed

journals in English. In this review, authors independently selected the papers that were reviewed. Data was extracted by the researchers and discrepancies were resolved by discussion. Figure 1 illustrates important elements that have been found in the search in terms of different e-learning platforms and implications.

E-learning Elements of the Study
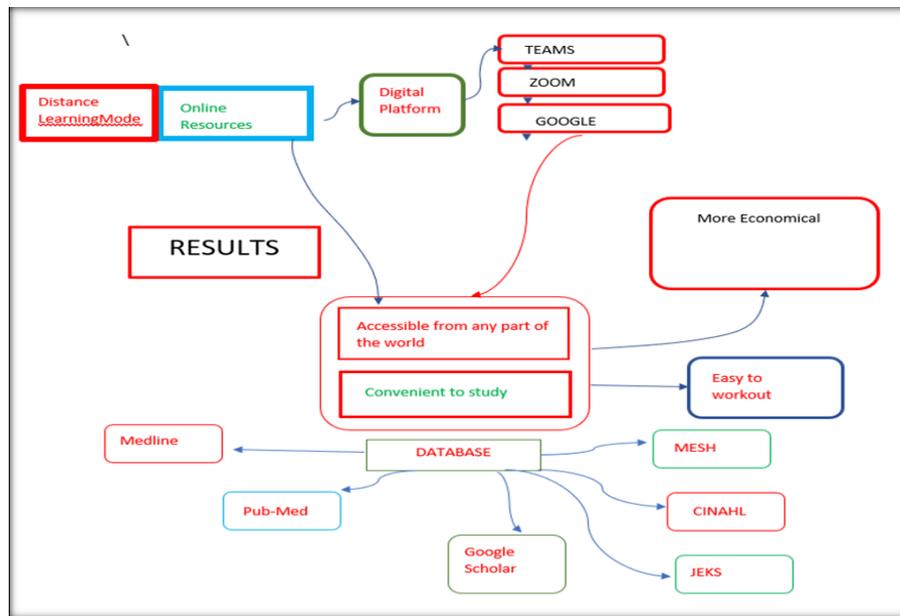
Figure 1: Important e-learning elements in the study

Data Collection

The following table shows the evidence of reviewed articles on student learning outcomes with e learning in higher education.

Table 1: Articles Reviewed

Evidence of reviewed articles on Student Learning Outcomes with E-learning in Higher Education				
Author, year, country	Purpose of the study and setting and sample size	Study design and instruments used	Specific learning outcomes assessed	Results
Ritonga, D. A., Azmi, C., & Sunarno, A., 2020. Indonesia	This study seeks to determine the impact of elearning in education on students' learning outcome. The subject of this study consisted of students of Sport Science Faculty at State University of Medan. Control group - Conventional learning -32 students and experimental group - Edmodo learning - 32 students	Quasi-experimental design	Academic scores	The results indicate that the learning outcomes of control class scored mean and SD of 74.31 ±9.47 and that the learning outcomes of experimental class scored mean and SD of 83.56 ± 8.26.
Sharp, M., & O'Donnell, E., 2012. Ireland	This study was undertaken to obtain students perspectives on the uses of technologies in higher education such as learning management systems. This study was conducted among 320 students in the Faculty of Business, Dublin Institute of Technology and in the school of Computer Science & Statistics, Faculty of Engineering, Mathematics and Science, Trinity College Dublin.	Cross-sectional descriptive study, researcher developed questionnaire	Learning experiences, attendance, teacher-student relationships, access to information, learning outcomes and skill development	Overall the outcome of this research was that students' perspectives on the use of technologies in higher education were quite positive.
Shahzad, A., Hassan, R., Aremu, A. Y., Hussain, A., & Lodhi, R. N.,	The study objective is to check the difference between male and female E-learning portals' accessibility among the students' perspective. The empirical data of 280 students	Cross-sectional descriptive study, the questionnaire items were adopted from McGill, Hobbs and	The study included service quality, system quality, information quality, user satisfaction,	The study further implies that female students at Malaysian universities are more focused on the E-

2021. Malaysia	participated from the different universities of Malaysia	Klobas, 2003; Rai, Lang and Welker, 2002; and Freeze, Alshare, Lane & Wen, 2010.	system use, and E-learning portal success using Partial Least Squares Structural Equation Modelling.	learning portal as compared to male students
Kumar, S. & Popal, F.F., 2020, India	This research paper aims to study the E-learning process among undergraduate students who are familiar with web-based technology. The stratified sampling method has been adopted in this study and the sample size is 175 across the world.	Cross-sectional descriptive study, researcher developed questionnaire	Students' interest in using E-learning resources, and their performance.	Positive willingness towards e learning - 82%, improvement in self-study skills -83%, higher satisfaction-73%, useful during quarantine time - 80%. And 78% preferred this e learning approach when compared with traditional approach.
Subramaniam, et. al., 2019. Malaysia	This exploratory research looks into how adult students in an open and distance learning who are taking fully online courses evaluate the extent the online learning dimensions influence their achievement of the expected learning outcomes.	Survey method was adopted. Adapted survey questionnaire was introduced and developed from the instrument by Tucker, Halloran and Price (2013). Descriptive study and Course Evaluation was also done.	The study included implementation of ICT towards a learning environment, designing an eLearning course and effectiveness of learning experience in achieving the expected learning outcomes.	The results of this research showed the students rate their cognitive involvement and motivation high. However, in some areas depending on the nature of their courses, their overall satisfaction in fully online course was relatively low.
Islam, A. N., 2016. Finland	This paper explicitly cites the perceived compatibility on the relationship between e-learning system use and its outcomes.	Questionnaire development and Survey method was used. Smart PLS was used to analyze the quantitative data.	The study included demographic and open-ended questions asking the students to report their satisfaction or dissatisfaction with the target system.	The results of this research showed that the interaction term of eLearning use, and compatibility is significant in predicting academic performance.
Yurdugül, H., & Cetin, N. M., 2015. Turkey	This paper probes into the relationship between learners' perception of learning and performance of learning.	Relational scanning method based on the 3P model.	The study included Process Questionnaire, Online Learning Perception scale and performance test used to identify student learning processes and outcomes.	The results showed that autonomous learners with deep strategy and motivation have perceived learning outcomes.
Ghaderizefreh, S., & Hoover, M.L., 2018., - Canada	This paper is based on a descriptive study on online and blended learning	Perkun's (2006) control value theory of achievement emotions	Questionnaires on online learning	high levels of understandability and illustration.
Kintu, M. J., Zhu, C., & Kagambe, E., 2017. Uganda	This paper investigates the effectiveness of a blended learning environment through analyzing the relationship between student characterstics and learning outcomes.	Survey to 238 respondents administered to gather data.	online self-regulatory questionnaire	Multiple regression analysis results and student characteristics predicting student satisfaction as an outcome.
Dziuban, C., Graham, C. R., Moskal, P. D., Norberg, A., & Sicilia, N., 2018. USA	This paper explores the possible relationship between student satisfaction with online learning and theory of psychological contacts.	Image analysis procedure, reliability and domain sampling, student responses	Engaged learning and assessment.	These dimensions are highly and positively related in a generally satisfied population.

Data Analysis

It was reported in the evidence table that according to Ritonga *et al*., (2020) Indonesia, the study

was conducted among students of Sport Science Faculty at State University of Medan. The research was conducted through quasi-experimental design. Based on the their findings, the experimental class scored mean, and SD (standard deviation) of learning outcomes was higher than the control class. This clearly demonstrates that students embraced technology education, which, as a result, led to improved performance.

Moreover, students' perceptions of using technologies in higher education, such as learning management systems, were much more positive in Sharp's and O'Donnell's (2012) study, which mentioned that students were quite comfortable and achieved high results because of the integration of electronic platforms. Regarding the use of technological education based on gender, Shahzad *et al.*, (2021) conducted a thorough research in Malaysia. Study findings show that female students gained more knowledge and benefits from eLearning methods of teaching and learning. In addition, the research conducted by Kumar & Popal (2020) from India gave a positive response to eLearning methods of teaching and learning with 78 % of people preferring eLearning approach when compared to traditional methods.

In contrast to learners' positive perception about e-learning, researchers (Subramaniam, Suhaimi, Latif, Abu Kassim, & Fadzil, 2019) from Malaysia conducted a study in which they found that overall student satisfaction in fully online classes was low in some areas of courses depending on the course content. This however could be solved by making the online classes more interesting with the introduction of online class activities. There are several ways to learn online, such as synchronous and asynchronous discussions, online self-assessments, blogs, wikis, virtual field trips, virtual labs, case studies, simulations, problem solving, concept mapping, and interactive learning objects. Dziuban, et.al. (2018) in their study concluded that e-learning implement through blended learning posed both challenges and opportunities for learners, and they suggested that e-learning would bring about substantial changes in higher education because of its flexibility.

The study by Islam (2016) revealed that learners' perceived compatibility impacts the relationship between academic performance and e-learning system. In contrast, the relationship between perceived learning assistance and e-learning system, and relationship between the e-system and the perceived community building assistance were not significant. Meanwhile, another investigation by Yurdugül & Cetin (2015) concluded that there was no statistical significance between learners' actual learning performance and perceived learning in e-learning environments. In addition, Ghaderizefreh & Hoover (2018) stated that students positive or negative emotions affect their level of understandability, satisfaction, course expectation and boredom in e-

learning, and thus they wrote that a well-designed online course can positively deal with students' negative feelings such as anxiety, boredom and anger, and learners academic emotions impact their satisfaction with e-learning. Kintu, Zhu & Kagambe (2017) found that e-learning strategies such as blended learning are essential in promoting innovative pedagogical approaches; however, it should consider the interplay of learners' characteristics, design features and learning outcomes while planning and implementing e-learning.

CONCLUSION
Having analyzed different studies on the impact of e-learning on learning outcomes of higher education learners from varied backgrounds, it can be concluded that educators should consider its merits and demerits while implementing e-learning. For example, the study (Ritonga *et al.*, 2020) where the experimental class scored mean and SD (standard deviation) of learning outcomes are higher than the control class demonstrates that students embraced technology in education, which, as a result, led to improved performance.

The preliminary findings because of the review have revealed positive results of the students' perspective on their learning outcomes with e-learning. However, some studies found negative perception of e-learning on the reason of the content and learners' background or characteristics. Learners' disinterest or low satisfaction can be addressed through varying activities and lesson delivery through carefully designed e-learning courses. Consequently, policymakers and stakeholders of the higher educational institutions should consider all these aspects in administering e-learning and improving the quality of e learning strategy for promoting students' learning.

RECOMMENDATIONS
Based on the analysis of the articles reviewed prior to the full impact of Covid-lockdown and online mode of studies, and the conclusion drawn, the following recommendations are made.

- Stake holders – management, teachers, and students – should be made aware of the importance and benefits of e-learning.
- Appropriate e-learning platforms should be carefully selected for designing learner-friendly courses to impart learning.
- Classroom actions researchers should be carried out to evaluate impacts of specific e-learning platforms and tools on learners' learning and perception.
- Further detailed reviews should be carried out to get better insights into e-learning, which are not dealt with in this article.
- By the completion and publishing of this review, many more studies must have been

published focused on e-learning with a focus on online teaching learning, and researchers should continue to review the new findings to enlarge their knowledge and insights about e-learning aspects that are not included in this brief study.
- Varying techniques of lesson delivery should be implemented and practiced in e-learning to maintain learners' active participation and motivation level.

ACKNOWLEDGMENT

REFERENCES

- Dziuban, C., Graham, C. R., Moskal, P. D., Norberg, A., & Sicilia, N. (2018). Blended learning: the new normal and emerging technologies. *International journal of educational technology in Higher education,* 15(1), 1-16.
- Freeze, R. D., Alshare, K. A., Lane, P. L., & Wen, H. J. (2010). IS success model in e-learning context based on students' perceptions. *Journal of Information systems education, 21(2)*, 173-184.
- Ghaderizefreh, S., & Hoover, M. L. (2018). Student Satisfaction with Online Learning in a Blended Course. *International Journal of Digital Society (IJDS), 9(3).*
- Kintu, M. J., Zhu, C., & Kagambe, E. (2017). Blended learning effectiveness: the relationship between student characteristics, design features and outcomes. *International Journal of Educational Technology in Higher Education, 14(1),* 1-20.
- Kumar, S., & Popal, F. F. (2020). Difference of perception towards e-learning technologies among male and female university students. *Studies in Indian Place Names 40(50). ISSN: 2394-3114.* (UGC Care Journal).
- Islam, A. N. (2016). E-learning system use and its outcomes: Moderating role of perceived compatibility. *Telematics and Informatics, 33(1), 48-55.*
- Jose, J., & JafreZainolAbidin, M. (2015). Moodle e-learning in English as a Foreign Language programs (EFLP) at English Language Centres (ELCs) in colleges of technology in e-Oman. *International Journal of English Language, Literature and Humanities, 3(1),* 14-32.
- McGill, T., Hobbs, V., & Klobas, J. (2003). User developed applications and information systems success: A test of DeLone and McLean's model. *Information Resources Management Journal (IRMJ), 16(1)*, 24-45.
- Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational psychology review, 18(4),* 315-341.
- Rai, A., Lang, S. S., & Welker, R. B. (2002). Assessing the validity of IS success models: An empirical test and theoretical analysis. *Information systems research, 13(1),* 50-69.
- Ritonga, D. A., Azmi, C., & Sunarno, A. (2020, March). *The Effect of E-Learning Toward Student Learning Outcomes.* In 1st Unimed International Conference on Sport Science (UnICoSS 2019) (pp. 29-30). Atlantis Press.
- Shahzad, A., Hassan, R., Aremu, A. Y., Hussain, A., & Lodhi, R. N. (2021). Effects of COVID-19 in E-learning on higher education institution students: the group comparison between male and female. *Quality & quantity, 55(3),* 805-826.
- Sharp, M., & O'Donnell, E. (2012). *Students' views of E-Learning: The impact of technology on learning in higher education in Ireland.* In: Student Reactions to Learning with Technologies: Perceptions and Outcomes. Information Science Reference (an imprint of IGI Global).
- Subramaniam, T., Suhaimi, N. A. D., Latif, L. A., Abu Kassim, Z., & Fadzil, M. (2019). MOOCs readiness: The scenario in Malaysia. *International Review of Research in Open and Distributed Learning, 20(3).*
- Tucker, B., Halloran, P., & Price, C. (2013). Student perceptions of the teaching in online learning: and Australian university case study. *Research and development in Higher Education: The place of learning and teaching,* 470-484.
- Yurdugül, H., & Cetin, N. M. (2015). Investigation of the relationship between learning process and learning outcomes in e-learning environments. *Eurasian Journal of Educational Research, 15(59)*, 57-74