International Journal For Research In Educational Studies

GREEN PUBLICATION

ISSN (Online): 2208-2115
Volume 11 Issue 04 December 2025
Available on-line at: https://ijfres.com/index.php/es/issue/view/560

DOI:*https://doi.org/10.53555/es.v11i4.2489* *Received: 24-Sept-2025 Accepted: 26-Nov-2025*

STUDENTS' PERCEPTIONS OF DIGITAL LEARNING TOOLS AND THEIR IMPACT ON ACADEMIC ENGAGEMENT IN HIGHER EDUCATION

Maria Lourdes Santos[1]*

*[1]*Department of Education, Polytechnic University of the Philippines, Manila, Philippines*

***Corresponding Author:** Maria Lourdes Santos*
Email: mlsantos.edu@gmail.com

Abstract
The integration of digital learning technologies has transformed higher education by enabling flexible and technology-supported learning environments. However, the extent to which these tools influence students' academic engagement remains unclear. This study aimed to examine students' perceptions of digital learning tools and analyze their relationship with academic engagement in higher education institutions. A quantitative cross-sectional research design was employed using a structured questionnaire. Data were collected from 80 university students representing different academic levels and disciplines. The questionnaire included demographic questions and Likert-scale items measuring digital tool usage, students' perceptions, academic engagement, and satisfaction. Data were analyzed using descriptive statistics, including frequency, percentage, mean, and standard deviation. Inferential statistical techniques such as Chi-square analysis, Pearson correlation, and multiple regression analysis were applied to examine relationships among the variables. The results indicated that students reported moderate perceptions of digital learning technologies. The mean scores for digital tool usage, perception, and academic engagement suggested that digital platforms were viewed as useful learning resources but not strongly transformative educational tools. Chi-square analysis showed no significant association between gender and digital tool usage. Additionally, correlation and regression analyses revealed weak relationships between digital tool usage, students' perceptions, and academic engagement, indicating limited predictive influence of these variables. The findings highlight the importance of integrating digital technologies with effective pedagogical strategies to enhance student engagement in higher education.

Keywords: *Digital learning tools, academic engagement, higher education, student perceptions, technology-enhanced learning*

1. Introduction

The adoption of digital technologies has greatly revolutionized instruction and learning in the higher education institutions. Learning management systems (LMS), mobile learning applications, and virtual classroom are digital learning technologies that have been embraced more in universities to facilitate teaching as well as to help students to enjoy the learning process. The technologies enable instructors to share course materials, provide discussions and keep track of student progress in an online platform. Consequently, online learning platforms have become part and parcel of the contemporary higher education system (Dumford and Miller, 2018). The implementation of digital learning technologies expanded at a fast pace during the COVID-19 crisis when universities all over the world had to switch to the models of online and blended learning to provide continuity to the educational process. Moodle, Blackboard, Zoom, and Google Meets are some of the digital tools that allowed institutions to provide lectures, assessments, and communicate between instructors and students in their remote locations. The studies show that with the help of the appropriate instructional strategies, online learning environments may enhance accessibility, flexibility, and student engagement (Eom and Ashill, 2016).

Besides removing the barrier of distance learning, digital technologies have presented new methods of teaching that promote active engagement and group-learning activities. Gamification platforms, interactive quizzes, and digital collaboration systems are some of the most commonly used tools that aimed to make students more motivated and interested in studying. Researchers have found that gamification of learning environments could increase the interest and engagement of students in higher education courses (Ab Rahman et al., 2018; Buckley et al., 2017). Likewise, online tools (like Kahoot and other interactive programs) have been discovered to help students change their view of the teaching and learning processes positively (Licorish et al., 2018). Moreover, digital technologies facilitate various approaches to learning including mobile learning and application-based learning space that enable students to get access to educational information at any time and at any place. The use of mobile learning technologies has been identified as one of the potentials to enhance the flexibility and accessibility of learning in institutions of higher learning (Kaliisa and Picard, 2017). Mobile applications in education have also proved to be useful in facilitating the learning process of complex topics through visual and interactive learning (Morris et al., 2016). These trends demonstrate the growing significance of digital technologies in transforming the modern educational practice.

Academic engagement is generally accepted as one of the major predictors of academic performance and learning of students. It is the extent to which students will be involved in their education activities, show interest in the course material and put efforts in learning processes. Engaged students tend to be more active in course materials, peers, and motivated to work toward the accomplishment of academic goals (Mandernach, 2015). The concept of academic engagement is usually viewed by scholars as a multidimensional construct comprising of behavioral, emotional, and cognitive elements. Behavioral engagement is the procedure in which students participate in the learning activities such as attending classes, completion of assignments, and academic discussions. Emotional engagement is a feeling and attitude of the students towards learning like interest, enjoyment and motivation. Cognitive engagement denotes how students put effort into learning complicated concepts, critical thinking, and academic problems (Kim et al., 2019).

Student engagement in the context of online learning is a very important factor which determines the success of digital learning. Since virtual learning environments usually leave students to learn on their own, it is important to keep things interesting in order to make learning meaningful. Scholars have come up with diverse tools to measure student engagement in online education, such as the Online Student Engagement (OSE) scale that assesses participation, emotional engagement, and interaction in online education (Dixson, 2015). It has also been previously established that an increased degree of engagement in the online learning setting is correlated with a higher student satisfaction rate and perceived learning outcomes (Gray and DiLoreto, 2016).

The category of digital learning tools includes a remarkable number of technologies that are aimed at facilitating teaching, learning, and academic communication in higher educational establishments. Learning Management Systems include Moodle, Blackboard and Canvas, which allow instructors to organize course materials, provide assignments and facilitate student-teacher interaction. They have become components and constituents of the manner education is delivered in the current world as they give orderly and convenient online learning spaces (Martínez et al., 2015). The video conferencing technologies that have become popular and have played a considerable role in providing online lectures and virtual classes include Zoom, Google Meet, and Microsoft Teams. Through these platforms, instructors and students can interact instantly, and this enables them to discuss, make presentations, and collaborate in learning. Also, collaborative tools like Google Classroom, Padlet, and Mentimeter can assist students in the group work, interaction with peers, and sharing of knowledge (Martin and Bolliger, 2018).

New technology developments have also come with artificial intelligence and data-driven educational platforms that customize the learning process of learners. These systems not only examine the performance of learners but also give specific feedbacks meaning that students can work on their academic results. Studies indicate that these technologies have a high potential to improve the level of engagement and learning results in online classrooms (Hussain et al., 2018). Also, digital learning technologies have been used to enhance the perception of students towards the quality of education and organizational services. The research has established that digital learning environments and services affect the satisfaction, motivation, and loyalty of the students to educational institutions (Annamdevula and Bellamkonda, 2016). On the same note, perception of digital technologies among students in university learning settings has been demonstrated to affect their experiences and level of engagement in learning (Henderson et al., 2017). The perspectives of students in various

contexts of the university (including those that focus on sustainability and innovation in educational practices) have also been investigated (Dagiliūtė et al., 2018).

Although digital learning technologies have become widely integrated in higher learning, the connection between digital learning and student academic interest is not well-known. Although the digital platforms offer flexibility learning and interactive communication, their success greatly depends on how the students perceive and use the technologies. Research indicates that online classrooms can stimulate learners and improve their academic success, but some studies also indicate the possible risk, including a lack of interaction, demotivation, and technology (Baleni, 2015). Also, the involvement of students in the digital learning setting could be affected by different factors, such as technological preparedness, design, and quality of the digital services offered by learning institutions. These factors can be understood to enhance the digital learning strategies and make sure that the technological innovations can be utilized to enhance communication with the students. Thus, empirical research is needed to learn the views students have towards digital learning tools and to analyze the connection between them and academic engagement in the realms of higher education.

Objectives of the Study

1. To examine students' perceptions of digital learning tools in higher education institutions.
2. To analyze the relationship between digital learning tool usage and students' academic engagement in digital learning environments.

2. Methodology

2.1 Research Design

The research design adopted in this study was a quantitative cross-sectional study, which was used to analyze the perceptions of the students towards the digital learning tools and how these tools affect the academic engagement in higher education. The design could help the researchers to obtain organized data of the participants at a given point in time. The survey methodology was selected because it implies the exploitation of a questionnaire, as it was the means of systematizing the way the perceptions of engagement and use trends of the digital learning technologies could be measured among the university students.

2.2 Study Population and Sample

The students in the higher institutions of learning formed the target population. The respondents that participated in the study were 80. The respondents also had different backgrounds in respect of age, gender, academic level and the field of study. The sample was representative of undergraduates, postgraduates, and doctorate learners and provided an adequate representation of the learners of higher educational institutions and allowed the research to address the perceptions regarding the digital learning tools within the environment of various academic backgrounds.

2.3 Sampling Technique

The participants in the study were chosen by a convenience sampling method. Accessible and willing students were invited to fill the questionnaire. This type of sampling was deemed as suitable since it facilitated effective data gathering within the time limit. The researchers could not be sure that the technique was fully random but could collect the appropriate responses because the students who used digital learning technologies actively took part in the technique.

2.4 Data Collection Instrument

The questionnaire was designed in such a way that it assisted in gathering information related to the use of digital learning tools, the students perceptions of the latter, as well as their involvement in the academic process and their satisfaction. The questionnaire was banged into two sections. The first part entailed demographic information that included age, gender, level of study, field of study and frequency of the use of digital learning tool. The second section involved Likert-scale questions to find out the perception and the engagement with regard to digital learning environments.

2.5 Measurement Scale

To determine the attitudes of the respondents towards digital learning tools, the questionnaire was made on the five point Likert scale. The respondents were to declare the extent to which they agreed with each statement out of seen as 1 (Strongly Disagree) to 5 (Strongly Agree). This type of scaling gave the researchers a chance to estimate the subjective perceptions and to compare the tendencies of agreement in the different variables including the application of digital tools, student perception, academic engagement, and customer satisfaction with the digital learning experiences.

2.6 Data Collection Procedure

The questionnaire was distributed through the Internet among the students using electronic media and communication channels. The participants of the study were informed about the aim of the research and assured that their responses would not be made known to anyone and would be utilized in the process of carrying out academic research. The respondents were completed independently to fill in the questioned form and all the responses were combined to a dataset to be analysed. The final sample of 80 valid replies was utilized in the statistics analysis.

2.7 Data Analysis Techniques

Statistical methods were applied to the data collected in order to test the interrelation between the study variables. Frequency, percentage, mean and SD were used to summarize demographic data and key variables by using descriptive statistics. Correlation tests, regression tests and Chi-square tests are among the inferential statistical tests that were used to investigate the relationships between the use of the digital learning tools, the perception of the students, and academic engagement.

3. Results

3.1 Demographic Characteristics of Respondents

Table 1 shows the demographic characteristics of the respondents. Eighty students were involved in the study. Most of the people interviewed were aged between 27 and 30 years (28.7%), then 21 and 23 years (27.5 and 25.0) respectively. The percentage of female respondents was 35.0, and the percentage of male was 27.5 and 37.5 percent of respondents chose not to state their gender. A majority of the respondents were postgraduates (38.8%), then undergraduates (35.0) and doctoral students (26.2).

Table 1. Demographic Characteristics of Respondents (N = 80)

Variable	Category	Frequency	Percentage (%)
Age (years)	18–20	15	18.8
	21–23	22	27.5
	24–26	20	25.0
	27–30	23	28.7
Gender	Male	22	27.5
	Female	28	35.0
	Prefer not to say	30	37.5
Level of Study	Undergraduate	28	35.0
	Postgraduate	31	38.8
	Doctoral	21	26.2
Field of Study	Science	11	13.8
	Engineering	11	13.8
	Business/Management	8	10.0
	Arts/Humanities	16	20.0
	Social Sciences	15	18.8
	Other	19	23.8
Frequency of Digital Tool Use	Daily	21	26.2
	Several times/week	19	23.8
	Occasionally	19	23.8
	Rarely	21	26.2

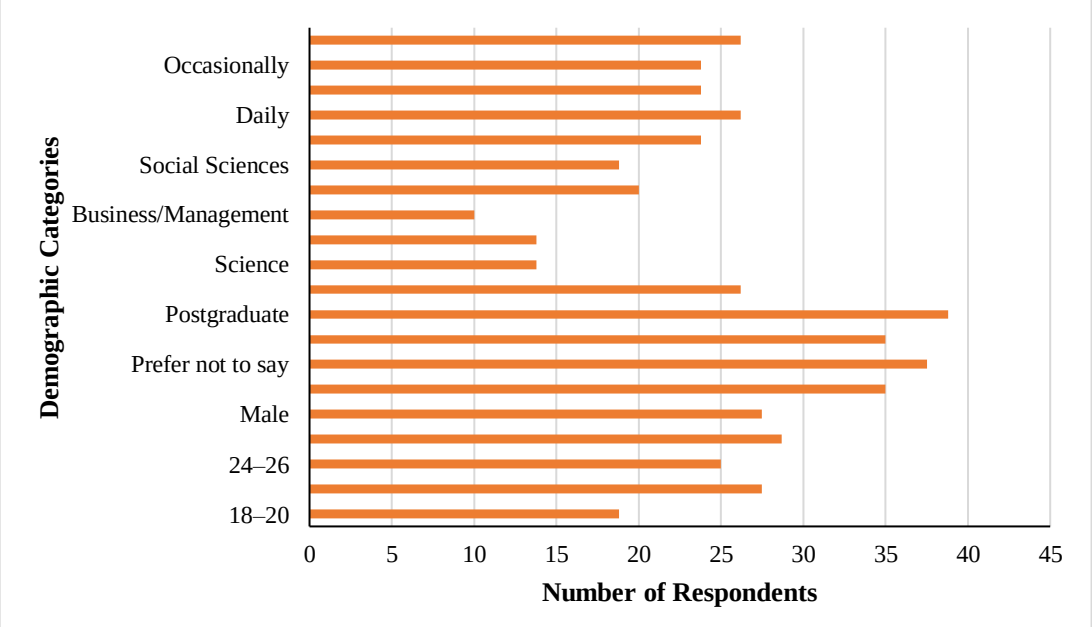

Figure 1. Distribution of Respondents by Demographic Characteristics

As shown in figure 1, the demographical distribution of the participants of the study is provided in terms of age group, gender, educational level, academic discipline, and frequency of using digital learning tools. The distribution shows the variation of the respondents regarding the academic background and engagement with technology that gives a contextual understanding of the sample characteristics to be involved in the study.

3.2 Students' Perceptions of Digital Learning Tools

The demographic profile of the study participants provided by different categories, such as age group, gender, education level, academic discipline, and the frequency of using digital learning tools is presented in Figure 1. The dissemination is a representation of the variety between the respondents in terms of their academic background and use of technology, which has a contextual interpretation of the sample characteristics considered to the study.

Table 2. Mean and SD of variables

Variable	Mean	SD
Digital Tool Use	3.06	0.64
Students' Perception	3.03	0.51
Academic Engagement	3.08	0.43
Overall Satisfaction	2.89	1.46

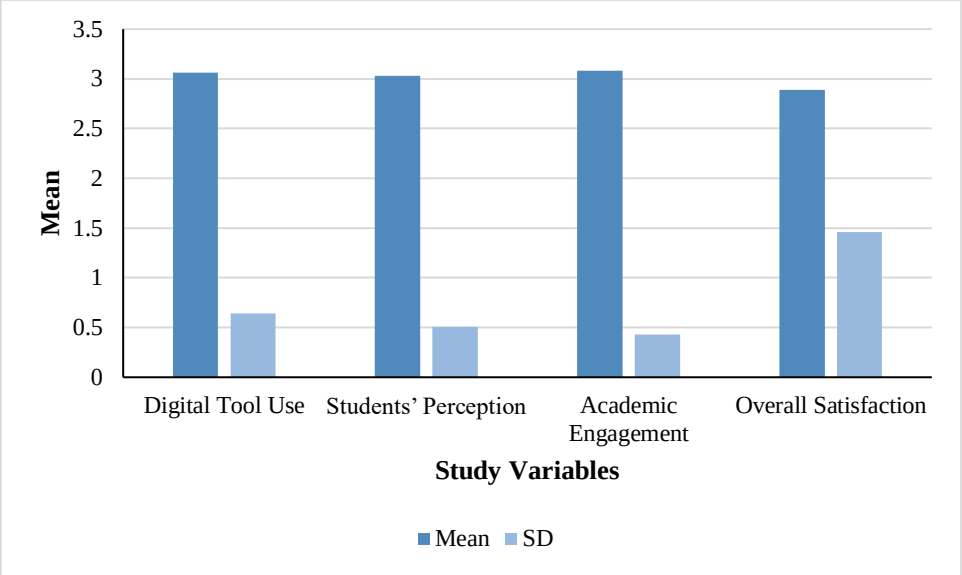

Figure 2. Mean and SD of Variables

A comparative representation of the mean and sd of the primary study variables, such as use of digital tools, perception of students, academic engagement, and overall student satisfaction is provided in figure 2. The graphical presentation emphasizes the general tendencies of the assessment of the respondents of the digital learning experiences and gives a graphic idea about the dispersion of these constructs.

3.3 Association Between Gender and Digital Tool Usage

A Chi-square test was conducted to test whether there is a relationship between gender and the frequency of using digital learning tools. Table 3 represents the contingency table. It was found that the relationship was not significant (2 = 2.84, p = 0.829). This implies that the intensity of the usage of digital learning tools between the gender groups among the surveyed students was not too different (Table 3).

Table 3. Chi-Square Test: Gender × Digital Tool Usage

Gender	Daily	Several times/week	Occasionally	Rarely	Total
Male	5	6	4	7	22
Female	8	7	6	7	28
Prefer not to say	8	6	9	7	30
Total	21	19	19	21	80

3.4 Relationship Among Digital Learning Tools, Students' Perceptions, and Academic Engagement

The Pearson correlation analysis was done to analyse the correlations between the digital tool use, the perception of students, academic engagement, student satisfaction and age. In Table 4, the results demonstrate that the variables have quite weak relationships. To illustrate, the correlation between academic engagement and use of digital tools was r = -

0.099, and between perception and engagement was r = -0.107, meaning that there are weak associations of the study variables (Table 4).

Table 4. Correlation Coefficients Among Digital Learning Tool Use

Variable	Digital Tool Use	Perception	Engagement	Satisfaction	Age
Digital Tool Use	1.000	0.169	-0.099	0.077	0.225
Perception	0.169	1.000	-0.107	-0.077	0.081
Engagement	-0.099	-0.107	1.000	-0.018	0.037
Satisfaction	0.077	-0.077	-0.018	1.000	-0.179
Age	0.225	0.081	0.037	-0.179	1.000

3.5 Predictors of Academic Engagement in Digital Learning Environments

The regression analysis was performed to show whether the use, perception, and age of the digital tools significantly predicted academic engagement. Table 5 demonstrates that the regression model contributed to the explanation of 2.3% (R 2 = 0.023) of the academic engagement. All the predictors were not statistically significant, indicating that academic engagement among digital learning tools and perception of students were both poor predictors of academic engagement in this sample (Table 5).

Table 5. Regression Results Predicting Academic Engagement

Predictor	B	SE	t	p-value
Intercept	3.326	0.438	7.585	0.000
Digital Tool Use	-0.065	0.078	-0.833	0.407
Perception	-0.080	0.096	-0.833	0.407
Age	0.008	0.014	0.574	0.568

4. Discussion

The study involved the investigation of the attitude of students towards digital learning devices and how they were connected to academic engagement in higher education institutions. The descriptive findings showed that the students often had moderate perception of digital learning technologies. The mean data of utilizing digital tools, perception, and academic engagement showed that the students thought of digital platforms as beneficial learning tools, but not highly-transformative educational instruments. It implies that the digital learning technologies are welcomed yet may not exploit student engagement in academic practice to the full extent.

The demographic report also showed that students of different academic levels and disciplines were utilized in the research. The sample size acts as a diffusion of digital learning technologies in higher education because it is apparent that the respondents have been diffused across the fields. However, the usage of the digital tools was not common among all students and this proves that the usage of technology may depend on the course requirement, the academic condition or the preferences of students. The Chi-square test revealed that the correlation between the use of digital tools by the gender and the frequency was not significant. This observation suggests that digital learning technologies are equally used by the genders. The lack of significant gender difference does not imply that digital learning platform access and utilization has become relatively homogenous among learners in the contemporary advanced education sector.

The correlation findings revealed a weak relationship between the use of digital tools and the perceptions of students and academic engagement. This is an indication that student engagement may not be largely determined by the availability of digital learning technologies. On the same note, the regression analysis showed that the digital tool use, perception, and age possessed a limited predictive ability of academic engagement. The regression model represented a minor proportion of the variation in engagement, suggesting that other variables might be more important in defining the engagement of the students in the digital learning settings.

The results of this study are consistent with the findings of the earlier studies that digital technologies may be used to facilitate the learning process but do not necessarily ensure the high student engagement rates. Researchers have also proposed that the success of digital learning tools is heavily reliant on their incorporation into the instructional practice and course design (Schindler et al., 2017). Equally, in other research endeavors on technology-based learning settings, meaningful interaction and collaborative learning practices have been noted as necessary tools to enhance engagement in online classrooms (Serrano et al., 2019). The intermediate levels of perception in the current case also align with the previous research studies that have reported equal student attitudes towards technology-based learning environment. Indicatively, a study on the use of asynchronous learning methods has demonstrated that the digital platform can improve participation in case of effective instructional strategies (Northey et al., 2015). Similarly, research on the idea of flipped classroom has concluded that students tend to have a positive attitude towards technology-based learning when it promotes participation and interaction (Zainuddin et al., 2017).

Other works of literature have shown that gamification of learning and interactive digital applications can enhance interaction provided that they are designed in a proper manner. Researchers have also demonstrated that gamification interventions in post-secondary education could have a beneficial impact on motivation and engagement through more interactive learning settings (Subhash and Cudney, 2018). There are also studies investigating the perceptions of students

regarding the use of technology in the learning settings and it has been noted that digital tools are seen as effective in facilitating the learning activities, only that they need to be effectively integrated into the pedagogies to have a significant impact (Zogheib et al., 2015).

The outcomes of this research demonstrate the fact that the process of incorporating digital learning technologies and effective pedagogical strategies is essential. Universities must not concentrate on technological infrastructure provision, but also seek to have interactive and collaborative learning activities that can make students engage. Blended learning, gamified learning, and flipped classroom models, as such instructional methods, can prove to be effective to enhance the efficiency of digital learning tools and engagement of students in higher education. The study has several shortcomings. Firstly, the sample size was not that big and this may not be sufficient to extrapolate the findings. Second, the data were collected with the help of self-reported questionnaires, which is likely to create response bias. Third, the cross-sectional design merely captured the perceptions of the students at a given time hence not capturing changes in engagement that take place with time.

It is also advisable that further research should be undertaken to use larger samples in various universities in order to make the results generalized. They would also be able to conduct longitudinal studies on how the interaction of the students with the digital learning tools would evolve over time. Moreover, additional studies can be carried out to identify other parameters such as digital literacy, quality of instruction design, and collaborative learning practices that could influence the researcher when working in the technology-enhanced learning environment.

5. Conclusion

This study has looked at the perception of the students concerning the digital learning tools as well as the relevance of these tools to the engagement of the students in higher education. The findings revealed that the general perception of digital learning technologies in the mind of the students was moderate. The descriptive results showed that the average digital tool use, perception of the students, and academic engagement were moderate, which means that the digital tools were believed to assist in the learning tools, but not significantly transforming tools. The results also indicated that students have inconsistency in using digital learning tools. Besides, in the correlation and regression studies, weak correlations among the use of the digital learning tools, perceptions of the students, and academic engagement were observed. The results of the regression showed that these variables were low predictors of the variation of the academic engagement. These findings suggest that the mere availability of digital learning technologies may not have a significant effect on ensuring that students are engaged in learning when implemented without proper pedagogy. Overall, the research indicates that digital learning technologies are to be employed with adequate instructional methods in order to enhance the student engagement in the higher education. The institutions need to focus on implementing interactive and student-centered techniques of online learning within the institutions that encourage participation and cooperation. Such efforts will possibly contribute to improving the level of the digital learning environment and support the students to attain high academic standards.

References

1. Ab Rahman, R., Ahmad, S., & Hashim, U. R. (2018). The effectiveness of gamification technique for higher education students engagement in polytechnic Muadzam Shah Pahang, Malaysia. *International Journal of Educational Technology in Higher Education*, *15*(1), 1-16.
2. Annamdevula, S., & Bellamkonda, R. S. (2016). Effect of student perceived service quality on student satisfaction, loyalty and motivation in Indian universities: Development of HiEduQual. *Journal of Modelling in Management*, *11*(2), 488-517.
3. Baleni, Z. G. (2015). Online formative assessment in higher education: Its pros and cons. *Electronic Journal of e-Learning*, *13*(4), pp228-236.
4. Buckley, P., Doyle, E., & Doyle, S. (2017). Game on! Students' perceptions of gamified learning. *Journal of Educational Technology & Society*, *20*(3), 1-10.
5. Dagiliūtė, R., Liobikienė, G., & Minelgaitė, A. (2018). Sustainability at universities: Students' perceptions from Green and Non-Green universities. *Journal of Cleaner Production*, *181*, 473-482.
6. Dixson, M. D. (2015). Measuring student engagement in the online course: The Online Student Engagement scale (OSE). *Online Learning*, *19*(4), n4.
7. Dumford, A. D., & Miller, A. L. (2018). Online learning in higher education: exploring advantages and disadvantages for engagement. *Journal of computing in higher education*, *30*(3), 452-465.
8. Eom, S. B., & Ashill, N. (2016). The determinants of students' perceived learning outcomes and satisfaction in university online education: An update. *Decision sciences journal of innovative education*, *14*(2), 185-215.
9. Gray, J. A., & DiLoreto, M. (2016). The effects of student engagement, student satisfaction, and perceived learning in online learning environments. *International Journal of Educational Leadership Preparation*, *11*(1), n1.
10. Henderson, M., Selwyn, N., & Aston, R. (2017). What works and why? Student perceptions of 'useful'digital technology in university teaching and learning. *Studies in higher education*, *42*(8), 1567-1579.

11. Hussain, M., Zhu, W., Zhang, W., & Abidi, S. M. R. (2018). Student engagement predictions in an e-learning System and their impact on student course assessment scores. *Computational intelligence and neuroscience*, *2018*(1), 6347186.
12. Kaliisa, R., & Picard, M. (2017). A systematic review on mobile learning in higher education: The African perspective. *TOJET: The Turkish Online Journal of Educational Technology*, *16*(1).
13. Kim, H. J., Hong, A. J., & Song, H. D. (2019). The roles of academic engagement and digital readiness in students' achievements in university e-learning environments. *International Journal of Educational Technology in Higher Education*, *16*(1), 1-18.
14. Licorish, S. A., Owen, H. E., Daniel, B., & George, J. L. (2018). Students' perception of Kahoot!'s influence on teaching and learning. *Research and Practice in Technology Enhanced Learning*, *13*(1), 9.
15. Mandernach, B. J. (2015). Assessment of student engagement in higher education: A synthesis of literature and assessment tools. *International Journal of Learning, Teaching and Educational Research*, *12*(2), 1-14.
16. Martin, F., & Bolliger, D. U. (2018). Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment. *Online learning*, *22*(1), 205-222.
17. Martínez-Caro, E., Cegarra-Navarro, J. G., & Cepeda-Carrión, G. (2015). An application of the performance-evaluation model for e-learning quality in higher education. *Total Quality Management & Business Excellence*, *26*(5-6), 632-647.
18. Morris, N. P., Lambe, J., Ciccone, J., & Swinnerton, B. (2016). Mobile technology: students perceived benefits of apps for learning neuroanatomy. *Journal of Computer Assisted Learning*, *32*(5), 430-442.
19. Northey, G., Bucic, T., Chylinski, M., & Govind, R. (2015). Increasing student engagement using asynchronous learning. *Journal of Marketing Education*, *37*(3), 171-180.
20. Ramnanan, C. J., & Pound, L. D. (2017). Advances in medical education and practice: student perceptions of the flipped classroom. *Advances in medical education and practice*, 63-73.
21. Schindler, L. A., Burkholder, G. J., Morad, O. A., & Marsh, C. (2017). Computer-based technology and student engagement: a critical review of the literature. *International journal of educational technology in higher education*, *14*(1), 25.
22. Serrano, D. R., Dea-Ayuela, M. A., Gonzalez-Burgos, E., Serrano-Gil, A., & Lalatsa, A. (2019). Technology-enhanced learning in higher education: How to enhance student engagement through blended learning. *European journal of education*, *54*(2), 273-286.
23. Subhash, S., & Cudney, E. A. (2018). Gamified learning in higher education: A systematic review of the literature. *Computers in human behavior*, *87*, 192-206.
24. Zainuddin, Z., & Attaran, M. (2016). Malaysian students' perceptions of flipped classroom: A case study. *Innovations in Education and Teaching International*, *53*(6), 660-670.
25. Zogheib, B., Rabaa'i, A., Zogheib, S., & Elsaheli, A. (2015). University student perceptions of technology use in mathematics learning. *Journal of information technology education: Research*, *14*.