Exploration of Senior High School Students' Level of Engagement, Excitement, and Academic Performance in the Utilization of Educational Technology in the Classroom

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ABSTRACT

This descriptive-correlational study investigated the levels of engagement, excitement, and academic performance of 32 Grade 12 STEM students in a mathematics classroom utilizing educational technology. Using a researcher-developed 5-point Likert scale and students' final mathematics grades, both descriptive and inferential statistical analyses were conducted. Results showed that students demonstrated high emotional and behavioral involvement, with mean scores of 3.65 for excitement (Enthusiastic) and 3.78 for engagement (Invested). Their average academic performance was 90.73, classified as Outstanding. Spearman's rank-order correlation analysis revealed a weak and statistically non-significant relationship between engagement and academic performance. In contrast, excitement showed a moderate, statistically significant positive correlation with academic performance, suggesting that emotional enthusiasm is more strongly associated with achievement in technology-enhanced learning environments than behavioral engagement alone. These findings highlight that while students may be actively involved, their emotional experiences—such as curiosity and enjoyment—may be more predictive of academic outcomes. The results support Flow Theory and align with prior research emphasizing the importance of emotional engagement in fostering focus and motivation. Based on these insights, the study recommends designing emotionally engaging digital learning experiences, training teachers to foster excitement in classrooms, and utilizing emotional indicators like excitement as markers of learning readiness. Additionally, it suggests further research on other factors affecting academic performance beyond behavioral engagement. Overall, the study underscores the pivotal role of emotional engagement in maximizing the academic benefits of educational technology in mathematics instruction.

Keywords: Emotional Engagement; Educational Technology; Academic Performance; Student Excitement; and STEM Education

INTRODUCTION

The integration of educational technology in contemporary classrooms has significantly reshaped the dynamics of teaching and learning. With the advent of digital tools, interactive platforms, and multimedia resources, educators are now equipped with innovative means to deliver content, enhance student participation, and facilitate collaborative learning environments (Noori, 2018). These technological advancements have been shown to support active learning by increasing student engagement, fostering motivation, and enabling more personalized and meaningful educational experiences (Ebrahimzadeh & Alavi, 2017; Wright & Akgunduz, 2018).

This shift is especially critical in subjects like mathematics, which is frequently regarded by students as abstract, challenging, and at times, disengaging. Such perceptions often lead to low levels of interest, reduced motivation, and poor academic performance (Yeh et al., 2019). The integration of educational technology in

mathematics instruction offers promising solutions to these challenges. Through tools such as dynamic visualizations, gamified learning applications, and interactive simulations, mathematical concepts can be presented in more concrete and engaging ways, making the learning process both accessible and enjoyable (Ali, Munawar, & Yasmeen 2023).

Key psychological and academic variables—such as student engagement, excitement, and academic performance—play vital roles in determining learning success. Student engagement encompasses behavioral, emotional, and cognitive involvement in learning activities and is strongly linked to academic success (Fredricks et al., 2004). Student excitement, considered a positive activating emotion, arises when learners feel both competent in and personally connected to a task, resulting in increased persistence, enthusiasm, and deeper processing (Pekrun, 2006). Meanwhile, academic performance serves as a tangible outcome of learning, typically measured through test scores, grades, and other forms of academic achievement (York et al., 2015).

While substantial research has explored the individual impact of technology on engagement or performance, fewer studies have examined the interconnected effects of educational technology on student engagement, excitement, and academic achievement collectively—especially within mathematics classrooms. This gap is even more apparent in the Philippine educational context, where localized studies on this topic remain limited.

In public high schools in Himamaylan City, where access to educational technologies is increasing, it is imperative to assess their actual impact on learners, particularly among students in the Science, Technology, Engineering, and Mathematics (STEM) strand. As the country continues to embrace digital learning strategies, understanding how these tools influence key aspects of the student learning experience helped guide more effective teaching practices and policy development.

This study, therefore, seeks to explore the levels of engagement, excitement, and academic performance among Senior High School students as they interact with educational technology in mathematics classrooms—contributing valuable insights to both local and broader educational discourse.

RESEARCH QUESTIONS

This study aimed to fill a significant research gap by examining the effects of educational technology on student engagement, excitement, and academic performance in the context of mathematics education. Specifically, the study focuses on Grade 12 STEM students at a public secondary school in Himamaylan City, where the integration of educational technology in classroom instruction is becoming increasingly prevalent.

By investigating these three interrelated variables—engagement, excitement, and academic performance—the study seeks to provide a more holistic and data-driven understanding of how technology-enhanced learning environments shape student outcomes in mathematics.

1. What is the level of engagement, excitement, and academic performance of Grade 12 STEM students?
2. Is there a significant relationship between:
   - engagement and academic performance; and
   - excitement and academic performance in the context of educational technology use?

By addressing these questions, this study not only contributes to the limited body of local literature on educational technology in mathematics education but also provides practical insights for educators and policymakers aiming to improve mathematics instruction through technology to enhance instruction and learning outcomes. Additionally, the results may inform the design of future interventions and strategies that effectively integrate technology into teaching to maximize student success.

Review of Related Literature

Technological advancements have not only introduced new methods of content delivery but have also redefined the learning environment. Modern students, often referred to as "digital natives," are accustomed to

using technology in their daily lives. In a study cited by D'Angelo et al. (2009), students who learned in technology-enhanced environments demonstrated better academic performance compared to those in traditional settings. Building on this, D'Angelo (2018) emphasized that technology plays a significant role in promoting student engagement and improving academic performance.

Similarly, Pandita and Kiran (2023) noted that the global shift to online learning during the COVID-19 pandemic underscored the importance of understanding how students interact with digital tools, particularly in mathematics education. This transition accelerated the integration of educational technology and highlighted the need to assess its impact on student outcomes (Ali et al., 2023). However, the effectiveness of digital platforms depends not only on their features but also on how they are implemented in instructional practices.

Research consistently demonstrates that educational technology has a positive effect on student motivation and enthusiasm. For instance, Tivaraju (2017) and Budiati (2017) reported increased levels of engagement and excitement among students using digital tools in the classroom. These tools—including simulations and educational games—create authentic learning contexts, encourage critical thinking, and align with student preferences, thus fostering active participation (Noori, 2018).

Further reinforcing these findings, Johnson et al. (2021) found that online educational games boosted both student engagement and academic performance. Likewise, Liu et al. (2020), in a systematic review, concluded that educational software significantly enhances engagement, motivation and achievement, especially in mathematics education.

This study is grounded in key learning theories that provide a conceptual lens for understanding how educational technology can enhance students' engagement, excitement, and academic performance in mathematics. Constructivist Learning Theory (Piaget, 1973) posits that learners build knowledge through hands-on interaction with their environment making tools like simulations and games ideal for mathematics instruction. Flow Theory (Csikszentmihalyi, 1990) suggests that students become more engaged and motivated when learning activities are both challenging and enjoyable, helping maintain focus and excitement. Additionally, Engagement Theory (Kearsley & Schneiderman, 1999) emphasizes the importance of active, collaborative, and technology-enhanced learning. Its core principles such as relate, create, and donate highlight the role of technology in fostering meaningful, real-world applications of academic content.

Research Framework

The use of educational technology in the classroom significantly influences students' levels of engagement and excitement, which are critical motivational and emotional factors impacting academic performance. Engagement itself can be understood as a multifaceted construct consisting of behavioral, emotional, and cognitive components. According to Fredricks et al. (2004), behavioral engagement involves students' active participation in learning activities, emotional engagement reflects their interest and excitement, and cognitive engagement pertains to the mental effort and investment they dedicate to mastering the content. Excitement, as a key element of emotional engagement, can enhance students' attention and intrinsic motivation, a phenomenon well explained by Flow Theory (Csikszentmihalyi, M., & Nakamura, J., 1989)., which describes how individuals become fully absorbed and energized by challenging and enjoyable tasks. The extent to which students experience engagement and excitement is further influenced by their perceptions of the educational technology's usefulness and ease of use, concepts central to the Technology Acceptance Model (TAM). When students perceive technology as beneficial and easy to navigate, they are more likely to engage deeply and feel enthusiastic about its use. Complementing this, Self-Determination Theory (Deci, E. L., & Ryan, R. M., 2008). highlights the role of intrinsic motivation in sustaining engagement and excitement, emphasizing the importance of fulfilling psychological needs such as autonomy, competence, and relatedness. Finally, Cognitive Load Theory (Sweller, J., 1988). provides an instructional design perspective, suggesting that educational technology that effectively manages cognitive load can facilitate better engagement and optimize academic performance by enabling students to process information efficiently without being overwhelmed.

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Together, these theoretical insights offer a comprehensive understanding of how educational technology use can drive student engagement, excitement, and ultimately, academic success.

METHODOLOGY

Research Design

This study adopts a quantitative research design utilizing a descriptive-correlational approach to investigate the levels of engagement, excitement, and academic performance among Grade 12 STEM students in classrooms where digital educational technologies are integrated. The primary goal is to describe students' levels of engagement and excitement and to examine the extent to which these variables are associated with academic performance in mathematics.

The descriptive aspect of the study focuses on quantifying students' engagement and excitement using validated and pilot-tested survey instruments, which include Likert-scale items designed to measure behavioral, emotional, and cognitive dimensions of their experiences with educational technology.

The correlational component explores the statistical relationships between engagement, excitement, and academic performance. Academic performance is assessed through students' current general averages in mathematics-related subjects that incorporate digital tools and platforms.

This design enables the researcher to determine whether increased engagement and excitement are significantly associated with higher academic achievement, thereby providing evidence-based insights into the educational benefits of technology integration in senior high school classrooms.

Participants of the Study

The study employs purposive sampling to select participants from among Grade 12 STEM students enrolled at a national high school in Himamaylan City for the academic year 2025–2026. As a non-probability sampling technique, purposive sampling allows for the intentional selection of participants based on predefined characteristics directly aligned with the study objectives.

According to Palinkas et al. (2015), purposive sampling involves the selection of "information-rich cases for study in depth," meaning participants are chosen because they can provide valuable insights relevant to the research questions.

To ensure the relevance and appropriateness of the participants, a screening process were conducted—either through short interviews or the use of checklists—to verify the students' exposure to digital learning platforms such as GeoGebra, Kahoot, Google Classroom, and Microsoft Excel. The inclusion criteria are as follows:

- Currently enrolled as a Grade 12 STEM student.
- Demonstrated exposure to educational technology tools (e.g., GeoGebra, Kahoot, Google Classroom, Microsoft Excel).
- Completed coursework and obtained academic performance records in mathematics subjects that integrated digital technology.
- Regular access to digital devices (e.g., smartphone, tablet, laptop) for learning activities.
- Active participation in technology-based learning activities.
- Willingness to participate voluntarily and provide informed consent.

This sampling strategy ensures that selected participants have the necessary experience and contextual background to provide meaningful data aligned with the study's objectives.

Research Instrument

The primary research instrument for this study is a structured survey questionnaire made by the researchers. It is designed to assess senior high school students' levels of engagement and excitement in relation to the integration of educational technology in the classroom. A 5-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree," were used to measure students' responses regarding their degree of engagement and excitement, in line with the recommendations of Joshi et al. (2015).

The questionnaire consists of three following parts:

1. Student Engagement Scale: This part focuses on engagement, assessing students' behavioral, emotional, and cognitive engagement in educational activities that incorporate technology. The Likert scale ranges from "Strongly Agree" (indicating high involvement, interest, and effort) to "Strongly Disagree" (reflecting minimal participation and low engagement).
2. Excitement Scale: This part measures excitement, students were asked to rate their emotional responses toward the use of educational technology in the classroom. The Likert scale ranges from "Strongly Agree" (indicating strong enthusiasm, anticipation, and enjoyment) to "Strongly Disagree" (reflecting disinterest or lack of positive emotion).

Academic performance is assessed through the general average of students' grades in mathematics subjects, as recorded in official school documents. These grades reflect objective measures of student achievement and were used in the correlational analysis to determine whether a statistically significant relationship exists between students' levels of engagement, excitement, and their academic outcomes.

Validity and Reliability of the Instrument

To establish content validity, the survey questionnaire underwent expert validation. A panel of experts in education and research was invited to evaluate each item using Lawshe's Content Validity Ratio (CVR) method. The experts rated each item as essential, useful but not essential, or not necessary. The CVR was then calculated for each item, and only those that met or exceeded the minimum threshold—based on the number of experts—were retained. Items falling below the threshold were revised or removed accordingly.

After expert validation, the revised questionnaire was pilot-tested with a group of senior high school students who were not included in the main study but shared similar characteristics with the target population. The pilot test aimed to assess the clarity, coherence, and consistency of the survey items. Based on the feedback and results obtained, revisions were made to improve item wording and overall structure.

To assess the internal consistency reliability of the instrument, the researchers computed Cronbach's alpha for each of the two main scales: engagement and excitement. A Cronbach's alpha coefficient of 0.70 or higher was considered acceptable, indicating satisfactory reliability of the scales. The engagement scale demonstrated a reliability coefficient of 0.870, while the excitement scale yielded a reliability coefficient of 0.902, indicating high internal consistency for both instruments.

Through expert review, pilot testing, and reliability analysis, the questionnaire was verified to be both valid and reliable for measuring students' engagement and excitement in relation to the integration of educational technology.

Data Gathering procedure

The data collection process began with the distribution of formal request letters to the School Principal to seek approval for conducting the study. The letter outlined the study's objectives, scope, and ethical considerations, ensuring transparency and institutional support. Upon receiving approval, the researchers coordinated with the Grade 12 STEM class advisers to arrange a schedule for the administration of the research instruments.

A pre-survey was then conducted to identify students who met the inclusion criteria, particularly those with substantial exposure to educational technology in their mathematics classes. This pre-screening process was carried out using either Google Forms or printed questionnaires, depending on the availability of resources. Students who qualified based on the inclusion criteria were selected as participants for the main survey.

Before the main data collection, informed consent was obtained from all participants. The finalized survey questionnaires were then administered during regular class hours on a scheduled date mutually agreed upon with the STEM advisers. This arrangement also enabled the researchers to provide immediate clarification or assistance to respondents as needed.

Once the surveys were completed, the accomplished questionnaires were collected immediately. The responses were then carefully organized, encoded, and entered into a statistical software program for analysis. Standardized coding procedures were applied to ensure data accuracy, consistency, and confidentiality. To maintain data integrity, the encoded responses were reviewed and validated by both the research adviser and a qualified statistician.

With the consent of the students and the school administration, academic performance data were obtained from official school records. These records consisted of students' general average in mathematics-related subjects and served as a reliable and objective measure of academic achievement for the correlational analysis.

The analyzed data formed the basis for examining the relationships among students' levels of engagement, excitement, and academic performance, particularly in the context of their exposure to digital educational technologies in the classroom.

Data Analysis Method

The data analysis in this study followed a systematic and structured approach, aligned with the principles of a quantitative-dominant mixed methods design.

For the quantitative data, responses from the structured survey items and academic performance records were coded and entered into a statistical software program such as SPSS (Statistical Package for the Social Sciences). Descriptive statistics, including means, standard deviations, frequencies, and percentages, were computed to summarize students' levels of engagement and excitement in the use of educational technology. These descriptive measures provided a general overview of student perceptions and experiences across the sample.

To examine the relationships between variables, inferential statistical analyses were performed. Specifically, the Spearman Rank-Order Correlation Coefficient were used to assess the relationships between:

- student engagement and academic performance, and
- student excitement and academic performance.

A significance level of 0.05 were established to determine whether the observed correlations are statistically significant, indicating the strength and direction of the associations.

Ethical Considerations

During the data collection process, all participants were fully informed about the nature, purpose, procedures, potential risks, and benefits of the study. This information were communicated through a clear and comprehensive explanation prior to their participation, ensuring that each individual has a thorough understanding before being asked to provide informed consent.

Participation in the study were entirely voluntary, and participants had the right to withdraw at any time without penalty or negative consequences. This assurance reinforces the ethical principle of respect for autonomy.

To uphold the integrity of the research and protect the rights and welfare of the participants, all data collected were treated with strict confidentiality. No personal identifiers were included in the data sets. All records—both digital and physical—were securely stored and accessible only to the researchers and authorized personnel involved in the study.

The anonymity of participants were strictly maintained throughout the research process and in any subsequent reporting, presentation, or publication of the findings. All results were presented in aggregate form to ensure that no individual participant can be identified, either directly or indirectly.

This ethical protocol aligns with standard research practices and guidelines to ensure that the study is conducted in a responsible, respectful, and transparent manner.

RESULTS

This section presents the findings of the study based on the responses of 32 Grade 12 STEM students. Both descriptive and inferential statistical analyses were employed to assess the students' levels of engagement, excitement, and academic performance, as well as to explore the relationships among these variables.

Descriptive statistics were used to determine the overall levels of engagement and excitement, based on student responses to the researcher-developed 5-point Likert scale survey, and to assess academic performance, as indicated by the students' final grades in Mathematics.

Table 1 presents the mean scores, standard deviations, and corresponding descriptive interpretations for students' levels of engagement, excitement, and academic performance.

Table 1: Level of Engagement, Excitement, and Academic Performance of the Grade 12 STEM Students

Variable	n	Mean	SD	Description
Excitement	32	3.65	.66	Enthusiastic
Engagement	32	3.78	.62	Invested
Academic Performance	32	90.73	2.67	Outstanding

Note: For Engagement: 4.51-5.00 Empowered; 3.51-4.50 Invested; 2.51-3.50 Participatory;

1.51-2.50 Compliant; 1.00-1.50 Disengaged

For Excitement: 4.51-5.00 Exuberant; 3.51-4.50 Enthusiastic; 2.51-3.50 Interested;

1.51-2.50 Passive; 1.00-1.50 Apathetic

For Academic Performance: 90–100 – Outstanding;85–89 – Very Satisfactory;

80–84 – Satisfactory;75–79 – Fairly Satisfactory; Below 75 – Did Not Meet Expectations

(Failing)

The results show that the students demonstrated a moderately high level of excitement with a mean score of 3.65 (SD = 0.66), interpreted as Enthusiastic. Their engagement level yielded a mean of 3.78 (SD = 0.62), falling within the Invested category. Additionally, the average academic performance of 90.73 (SD = 2.67) is interpreted as Outstanding, based on the school's performance grading scale.

To examine the relationships between students' levels of engagement and excitement with their academic performance, the Spearman's rank-order correlation coefficient was calculated. The results of this analysis are presented in Table 2.

Table 2 Significant Relationships Between Engagement and Academic Performance and Excitement and Academic Performance Among Grade 12 Students

	Spearman's rho	p-value
Engagement and Academic Performance	.308	.087
Excitement and Academic Performance	.426	.015

Note: $p < .01$ – Significant at .01 level

Spearman's rho: ±0.1 to ±0.3 – Small/Weak, ±0.3 to ±0.5 – Medium/Moderate,

±0.5 to ±1.0 – Large/Strong

The summarized results in Table 2 indicate that the relationship between engagement and academic performance was weak and not statistically significant ($\rho = 0.308$, $p = 0.087$). In contrast, the correlation between excitement and academic performance was moderate and statistically significant ($\rho = 0.426$, $p = 0.015$), suggesting a meaningful association between students' emotional enthusiasm and their academic achievement in mathematics within a technology-integrated classroom environment.

DISCUSSION

The findings of the study indicate that the Grade 12 STEM students exhibited relatively high levels of excitement and engagement in the use of educational technology in mathematics classrooms. With mean scores of 3.65 for excitement (Enthusiastic) and 3.78 for engagement (Invested), it is evident that students generally respond positively to the use of educational technology. The enthusiastic and invested ratings indicate that students are both emotionally and behaviorally involved in technology-integrated instruction.

Notably, the academic performance of the respondents was classified as (90.73) Outstanding on average. This suggests that educational technology may contribute to higher levels of achievement when effectively integrated into instruction.

However, when examining the relationship between engagement and academic performance, the results did not show a statistically significant correlation. While students reported high engagement, this alone may not directly predict their academic success. This aligns with the findings of Fredricks et al. (2004), who noted that engagement is multifaceted and does not always translate linearly to academic gains.

In contrast, the statistically significant and moderate positive correlation was found between excitement and academic performance. This implies that students who experience greater emotional positivity and enthusiasm during technology-based lessons tend to perform better academically. This supports Flow Theory (Csikszentmihalyi, 1990), which highlights that enjoyable, immersive learning environments foster higher levels of focus and achievement.

These findings are consistent with prior studies such as those by Tivaraju (2017) and Johnson et al. (2021), which emphasize that positive affective experiences—particularly those driven by interactive digital tools—can significantly influence student achievement. Thus, emotional engagement (excitement) may be a stronger predictor of academic performance in technology-enhanced classrooms than behavioral engagement alone.

CONCLUSIONS

The findings suggest that Grade 12 STEM students exhibit a moderately high level of both excitement and engagement in using educational technology for mathematics learning. Their outstanding academic

performance may be partly attributed to the supportive role of these digital tools in enhancing classroom experiences. Students likely find AI-enhanced platforms stimulating and enjoyable, which could help sustain their interest and focus in a subject often perceived as challenging.

Interestingly, while students showed strong engagement—demonstrated by their active participation and cognitive investment—this did not significantly correlate with academic performance. Perhaps this is because engagement, though necessary, does not always directly translate into measurable achievement, especially if it is not consistently directed toward effective learning strategies or if external factors such as teaching quality and assessment methods also influence academic outcomes.

On the other hand, the significant positive correlation between excitement and academic performance suggests that students' emotional responses—such as enjoyment, curiosity, or enthusiasm—may have a more direct influence on how well they perform. This could be because emotional engagement helps reduce anxiety, improves attention, and fosters a more positive learning mindset, especially in technology-rich environments. Probably, students who feel more excited are more open to exploring content deeply, taking initiative, and persisting through difficulties, thereby enhancing learning outcomes.

Overall, the results imply that emotional factors like excitement may play a more pivotal role than behavioral engagement in determining academic success when educational technology is involved. This underscores the importance of not only integrating digital tools into instruction but also designing them to emotionally engage learners.

RECOMMENDATIONS

1. Design Emotionally Engaging Learning Experiences

Educational technology tools used in mathematics instruction may prioritize emotional engagement by incorporating elements that evoke curiosity, excitement, and enjoyment. Developers and educators may consider integrating interactive visuals, real-world problem scenarios, and gamified elements to heighten students' enthusiasm, which may positively influence their academic performance.

2. Train Teachers to Foster Excitement in Technology Use

Professional development programs for mathematics teachers may include strategies for cultivating emotional engagement in technology-integrated classrooms. Teachers play a critical role in shaping students' emotional responses, so training may emphasize how to present content using digital tools in ways that inspire interest and motivation.

3. Use Excitement as an Indicator of Learning Readiness

Since excitement was found to have a stronger correlation with academic performance than behavioral engagement, schools and educators may consider using students' emotional responses as an early indicator of their readiness to engage deeply with mathematics content. Surveys or feedback tools could help monitor emotional engagement levels.

4. Balance Engagement Strategies with Instructional Effectiveness

While fostering behavioral engagement is important, educators may align engagement activities with effective instructional goals. Activities should not only involve students actively but also ensure that these tasks directly contribute to learning outcomes.

5. Develop AI-Driven Tools that Support Intrinsic Motivation

AI-based platforms may be designed in line with theories like Self-Determination Theory to support autonomy, competence, and relatedness—factors known to enhance intrinsic motivation and excitement in

learning. Features like adaptive feedback, personalized learning paths, and opportunities for self-directed exploration can reinforce students' internal drive to succeed.

6. Further Investigate Other Factors Affecting Academic Performance

Since engagement did not show a significant direct correlation with academic performance, future research may explore other possible mediating or moderating factors—such as study habits, home environment, assessment types, and instructional quality—to better understand the dynamics between technology use and academic success.

These recommendations aim to maximize the benefits of educational technology in mathematics learning by focusing not just on how students interact with tools, but how they feel while doing so—highlighting the pivotal role of emotional engagement in academic success.

REFERENCES

1. Ali, M. S. B., Munawar, Z., & Yasmeen, R. (2023). The impact of technology integration on student engagement and achievement in mathematics education: A systematic review. International Journal of Computer Integrated Education, 6(3), 222–232. https://www.researchgate.net/publication/370446167
2. Budiati, B. (2017). ICT (information and communication technology) use: Kahoot program For English students' learning booster. Proceedings of Education and Language International Conference, 1(1).
3. Creswell, J. W., & Plano Clark, V. L. (2018). Designing and conducting mixed methods research (3rd ed.). SAGE Publications.
4. Csikszentmihalyi, M., & Nakamura, J. (1989). "Flow theory and research." In Handbook of motivation and cognition: Foundations of social behavior (Vol. 3, pp. 57–97). Guilford Press.
5. Deci, E. L., & Ryan, R. M. (2008). "Facilitating optimal motivation and psychological well-being across life's domains." Canadian Psychology, 49(1), 14–23. https://doi.org/10.1037/0708-5591.49.1.14
6. D'Angelo, C. (2018). The impact of technology: Student engagement and success. University of Ontario Institute of Technology. https://pressbooks.pub/techandcurriculum/chapter/engagement-and-success/
7. Ebrahimzadeh, M., & Alavi, S. (2017). The effect of digital video games on EFL students' language learning. Teaching English with Technology, 17(2), 87–112. https://files.eric.ed.gov/fulltext/EJ1140688.pdf
8. Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2012). How to design and evaluate research in education (8th ed.). McGraw-Hill Education.
9. Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. Review of Educational Research, 74(1), 59–109.https://doi.org/10.3102/00346543074001059
10. Johnson, D., Johnson, R., & Zhang, W. (2021). Online games, mathematics achievement, and student engagement: A randomized controlled trial study. Journal of Educational Computing Research, 59(1), 128–149. https://doi.org/10.1177/0735633120958949
11. Joshi, A., Kale, S., Chandel, S., & Pal, D. K. (2015). Likert scale: Explored and explained. British Journal of Applied Science & Technology, 7(4), 396–403. https://doi.org/10.9734/BJAST/2015/14975
12. Kearsley, G., & Shneiderman, B. (1999). Engagement theory: A framework for technology-based teaching and learning. Educational Technology, 38(5), 20–23. https://malat-webspace.royalroads.ca/rru0023/wp-content/uploads/sites/70/2018/12/Kearsley-1998-Engagement-theory-A-framework-for-technology-based-teaching-and-learning.pdf
13. Liu, F., Wang, L., & Wang, C. (2020). Educational software and mathematics learning: A systematic review. International Journal of Emerging Technologies in Learning, 15(14), 211–228. https://doi.org/10.3991/ijet.v15i14.14177
14. Mishra, L. (2016). Focus group discussion in qualitative research. TechnoLEARN: An International Journal of Educational Technology, 6(1), 1–5. https://ndpublisher.in/admin/issues/tlV6N1a.pdf

15. Noori, A. (2018). Attitudes of Afghan EFL lecturers toward instructional technology. TechTrends, 63(2), 170–178. https://doi.org/10.1007/s11528-018-0347-9
16. Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. Administration and Policy in Mental Health and Mental Health Services Research, 42(5), 533–544
17. Pandita, A., & Kiran, R. (2023). The Technology Interface and Student Engagement Are Significant Stimuli in Sustainable Student Satisfaction. Sustainability, 15(10), 7923. https://doi.org/10.3390/su15107923
18. Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. Educational
19. Psychology Review, 18(4), 315–341. https://doi.org/10.1007/s10648-006-9029-9
20. Piaget, J. (1973). To understand is to invent: The future of education. New York: Grossman.
21. Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. Cognitive Science, 12(2), 257–285. https://doi.org/10.1207/s15516709cog1202_4
22. Tivaraju, J., Yunus, M. M., & Badusah, J. (2017). Learning English is fun via Kahoot: Students' attitude, motivation and perceptions. Proceedings on Seminar on Transdisiplin Education (STEd2017), (pp. 218-229). https://sted18.files.wordpress.com/2016/12/1-26-jemimativaraju-melor-md-yunusjamaluddin-badusah.pdf
23. Wright, B., & Akgunduz, D. (2018). The relationship between technological pedagogical content knowledge (TPACK) self-efficacy belief levels and the usage of Web 2.0 applications of pre-service science teachers. World Journal on Educational Technology: Current Issues, 10(1), 52–69. https://eric.ed.gov/?id=EJ1196042
24. Yeh, C. Y. C., Cheng, H. N. H., Chen, Z.-H., Liao, C. C. Y., & Chan, T.-W. (2019). Enhancing achievement and interest in mathematics learning through Math-Island. Research and Practice in Technology Enhanced Learning, 14(1), Article 5. https://telrp.springeropen.com/articles/10.1186/s41039-019-0100-9
25. York, T. T., Gibson, C., & Rankin, S. (2015). Defining and measuring academic success. Practical Assessment, Research & Evaluation, 20(5), 1–20.