

**Learning in the Digital Age: A Convergent Parallel Mixed Methods
Investigation of the Dynamic Trio in Promoting Student Engagement and
Academic Performance**

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Abstract

Incorporation of digital interactive tools help academics customize their learning environment. Although technology is not the only actor, the academics need to be supportive and enthusiastic. The present study is aimed at understanding the variables that lead to student engagement and ultimately academic performance through using interactive tools along with teachers' support and enthusiasm. A convergent parallel mixed-methods approach is adopted to achieve the objectives of the research. Following this approach authors are collecting qualitative and quantitative data through interviews and surveys from business students within UK higher education. This study has enormous promises for both students and academics to improve their learning experience. This research intends to bring fresh perspectives into pedagogical practices to increase student engagement and academic performance. This research will support teachers in refining their teaching practices by integrating optimizing support systems with interactive tools.

Keywords: Convergent Parallel Mixed Methods, Teacher Support, Enthusiasm, Interactive Tools, Academic Performance, Student Engagement

Word Count 1896

Introduction

The students of modern era need to be engaged differently. Employing traditional methods of participating in class activities are not appreciated by students due to various reasons. A desire to remain anonymous or lack of confidence might be few of them (Sawanget al., 2017). Thus, there is a need that educators adapt interesting and innovative pedagogies in teaching for better learning, performance and engagement of students (Fortuna, de la Fuente & Velasco, 2023). This scenario also sheds light on the importance of teacher's enthusiasm and support accompanied by interactive technological tools (Borgonovi, Pokropek & Pokropek, 2023; Haleem, Javaid, Qadri & Suman, 2022). The present research is aimed at investigating the factors that may lead to student engagement and performance within management education. Engaged students have high internal motivation to exert efforts to perform well in various learning activities (Alghowl & Alhamad, 2024). Despite the realization of the positive relationship between student engagement and students' success; the variables influencing engagement deserves more attention. The move toward technology-driven teaching methods has generated a lot of discussion in the context of higher education. Advocates contend that digital tools promote collaborative learning, increase student engagement, and make it easier to present more dynamic and varied curriculum platforms (Rohman, 2025). Alghowl and Alhamad (2024) stressed on the need of more studies in the area of students' engagement and academic performance.

Theoretical Background

To enhance student engagement technology based interactive tools may offer help to academics to develop their teaching in numerous ways by making learning an interesting experience for students to learn (Haleem, Javaid, Qadri & Suman, 2022).

Enthusiastic and supportive teachers leave a positive impact on their students (Borgonovi et al. 2023). Self-determination theory postulates that student engagement and satisfaction may be achieved when students feel that their academic journey (including factors like university support and classroom setting) fulfils their psychological needs for autonomy, competence and support (Ryan & Deci, 2000).

Students' engagement depends on their quality of interactions with teachers as engagement is likely to be influenced by teachers who encourage their students (Fredricks, Blumenfeld & Paris, 2004; Hofkens & Pianta, 2022). High-quality instructional support classrooms are defined by verbal interactions between the teacher and students that emphasize reasoning, dialogue-structured questioning, idea expression, and discussion to improve students' comprehension of study material (Hofkens et al., 2023). Simultaneously, when instructional support is of high quality, it is anticipated to increase student engagement (Hamre et al., 2013; Pianta, Hamre, & Allen, 2012).

Significant changes in teaching and learning methodologies have resulted from the growing use of technology in the classroom (Tsai & Wang, 2019). A significant trend is the use of modern methods of instruction that make use of digital resources including interactive digital content, multimedia apps, and online learning platforms (Rohman, 2025). Research on the impact of technology-based education has taken several approaches, including quantitative and qualitative studies on learning outcomes, instructional strategies, and technical obstacles (Luscombe & Montgomery, 2016). However, a large portion of the body of current research has ignored the intensely subjective and intimate experiences of those immediately engaged in the process—the teachers and children who deal with this technological change on a regular basis (Stanislaus, 2022).

Recently an innovative engagement paradigm is emerging where teachers utilize creative strategies in classes like use of word cloud (Mentimeter, KAHOOT) using case studies and open ended questions, interactive tools for quizzes, and silent discussions (using Shared Google Documents). Therefore, use of technology in teaching and learning enhances student engagement (Javaid, Ijaz, Latif & Azam, 2024). Extant literature maintains these strategies are useful to win students engagement by creating a stimulating and safe learning environment. On the one

hand, these tools enable swift communication (e.g., Mentimeter) and on the other hand promote thoughtful reflection that increases student interest, participation and engagement. Ramzan, Javaid, Kareem, and Mobeen (2023) emphasize that positive environment supports the students learning and this increased engagement leads to a richer understanding and comprehension of business concepts therefore enhances their academic performance.

Conceptual Definitions

Student engagement refers to the effort, energy, time and thought that learners invest into their learning (Dixson, 2015). This construct includes three dimensions including emotional, cognitive and behavioural engagement (Yi, Zhang, Lu, & Shadiev, 2024; Zyngier, 2007).

Academic performance refers to the accomplishment of scholastic aims (Arshad, Zaidi & Mahmood, 2015). This is one of the main concerns for university students (Beiter et al., 2015).

Lecturer use of interactive tools refers to the teacher's use of digital interactive tools, for example Kahoot, Padlet, Mentimeter and Socrative to foster student engagement and enhance the quality of learning in the classroom. (Lai, Lik, Pheng, Shee, Joyce & Rosli, 2019).

Teacher's Characteristics:

Teacher's Support refers to the extent to which instructors demonstrate an interest in every student's learning, offer additional help as and when needed, support students with their learning, and continue teaching until the students understand. The conceptualization of this variable in the present research is same as conceptualized by Borgonovi (2023)

Teacher's enthusiasm refers to when students feel their teachers are excited, passionate and enthusiastic (Kunter, Klusmann, Baumert, Richter, Voss, & Hachfeld, 2013). The literature maintains that students have more positive attitudes towards learning when they have teachers who are enthusiastic and show this enthusiasm in class (Lazarides, Gaspard, & Dicke, 2019).

Research Questions:

1. How do interactive tools, teacher support, and teacher enthusiasm influence student engagement and academic success in a digitally integrated learning environment?
2. How do students describe and perceive the role of interactive tools, teacher support, and teacher enthusiasm in fostering their engagement and academic performance?

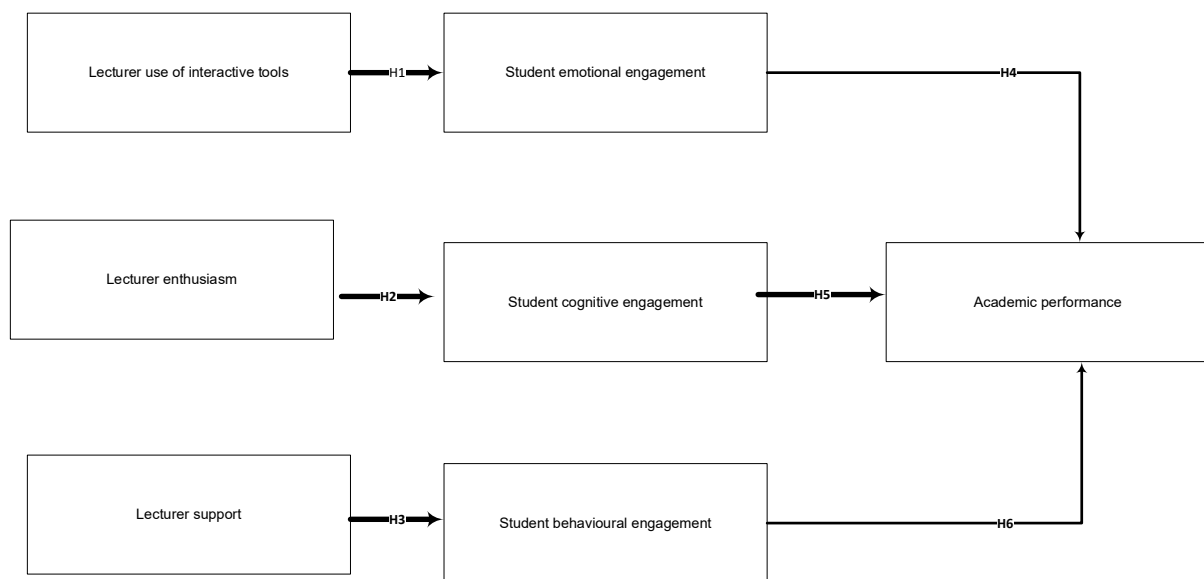
Rationale of the Study

The current study is unique as currently there is no research which provides a holistic view using all the variables such as interactive tools, teacher support, teacher enthusiasm, student engagement and academic performance. Prior research indicate that it would be beneficial to conduct additional research on academic performance of students who differ in nationalities. (Alghowl & Alhamad, 2024; Lu et al., 2018). Current research fills the literature gap by focusing on the student demographics in UK universities by adopting a quantitative as well as qualitative (student interviews) approach to assess their academic achievement and engagement.

The theoretical model of present research is based on gaps from contemporary research. For instance, Hanayshaa et.al., (2023) investigated how student involvement and academic performance were affected by the educational environment, competency of teachers, ICT resources, and university amenities. They underlined that additional factors influencing students' participation should be investigated by future research. The impact of lecturers' technology use on students' participation in online courses was also examined in a different study by Hazzam and

Wilkins (2023). They recommended that future research should look at this influence in a face-to-face setting or hybrid environment. Therefore, by analyzing the role of technology interactive tools, instructor support, and passion, the current study seeks to close the aforementioned gaps.

Theoretical Framework



Methodology

Mixed method convergent parallel design is employed in this research combining qualitative and quantitative study phases to obtain rich insights about student engagement. Following this design, authors are collecting qualitative and quantitative data simultaneously with equal priority (Dede & Demir, 2014, p.79).

Phase I: Quantitative Approach

In this phase authors are conducting quantitative approach using Likert type scales. Already developed and available scales are being used. Several statistical analyses will be applied to the data collected at this phase. This will allow us to systematically

investigate the association among all variables. For analysis, AMOS software will be used.

Sample and Procedure for Phase 1 Study

Students who have attended our classes for 1 month at least will comprise our population. Individual student is the level of analysis. Authors have invited all of their students to take part in the study. Students are told to keep specific module in their mind while answering the questions. This process ensures that the students respond the scale items effectively. Data is being collected through an online MS Form survey.

Scales Study I: Following scales are being used to collect quantitative data from students. The last question is an open-ended question asking about what makes you engage during lectures and tutorial.

1. Students' engagement developed by Sun & Rueda (2012)
2. Academic performance scale of Cunningham (2021)
3. Lecturer use of interactive tools scale is adapted from Lai et al., (2019)

Note: Authors of this study have adapted this scale as two additional items have been added to the existing scale. As part of pilot study, authors performed factor analysis to check the factor loadings which were all above 0.70 and Cronbach alpha reliability above 0.70.

4. Lecturer enthusiasm scale and Lecturer support scale adopted from Borgonovi (2023)

Participants are also be asked some demographic questions (age, gender, ethnicity). Research shows there can be variation in students' engagement and interest based on their demography.

Phase 2: Qualitative Approach

Sample and Procedure for Phase 2 Study

Authors are collecting qualitative data from students through interviews using open-ended questions. All the interview questions can be found in the appendix at the end

of this manuscript. These open-ended interview questions are helping the authors of this study to explore how they perceive the variables of study and link between them.

Practical relevance of the research

In this modern world full of distractions, lecturers face extreme challenges to engage their students. This dilemma requires lecturers to employ innovative strategies. Through the lens of self-determination theory, this action research is aimed at investigating the predictors and consequence of student engagement and both authors' own teaching practices in which they have introduced digital tools such as Mentimeter, Kahoot, Padlet etc. They have started using these tools for different purposes like during online lectures, on campus activities during tutorial, ice breaking activities during online and face to face sessions. Authors have developed a framework in this project exhibiting antecedents and outcome of student engagement. This research will evaluate the framework empirically. Authors will reflect and discuss what worked well and what could be improved with a view to modify future teaching practice. Therefore, this research aims to provide a guidance on how lecturers can enhance student engagement by exploiting technology/interactive tools and other personal resources including support and enthusiasm. Another objective of the present research is to understand learners' views on the efficacy of executed tools and strategies for enhancing student participation, engagement and academic performance.

Current stage

At the current stage, a literature review and pilot testing for quantitative study has been conducted. Both quantitative and qualitative data are being now collected and will be analysed.

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Open ended questions to be asked from students

1. Overall Engagement and Perception

1. What does 'student engagement' mean to you, and how does it feel when you're truly engaged in class?

2. Interactive Tools

2. Can you describe a time when a teacher used an interactive tool (e.g., online platform, game, app, or collaborative activity) that really captured your interest or helped you understand the material better?
3. How do these interactive tools affect your motivation, attention, or willingness to participate?
4. Are there any challenges or drawbacks you've experienced with interactive tools in the classroom?

3. Teacher Support

5. What kinds of support from a teacher help you feel more confident or interested in learning?
6. Can you share an example of when a teacher went 'above and beyond' to support you, and how that impacted your engagement or performance?
7. Are there any ways you wish teachers would support you more effectively?

4. Teacher Enthusiasm

8. How would you describe a teacher who is truly enthusiastic about what they teach?
9. In what ways does a teacher's enthusiasm affect your interest in the subject or your overall engagement in class?
10. Can you recall a moment when you felt your teacher's enthusiasm really influenced how you performed on an assignment or test?

5. Impact on Academic Performance

11. Thinking about your academic performance overall, do you feel interactive tools, teacher support, or teacher enthusiasm has made the biggest impact? Why?

12. Could you describe a specific instance where you noticed a direct connection between your level of engagement and your grades or test scores?