

Effectiveness of an Authentic-Based Multimedia Learning Environment on Students' Engagement and Performance in South-West Nigerian Higher Institutions

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ABSTRACT

Students' relationships to the curriculum and their cooperation with peers and instructors during the learning processes have both benefited by engagement. The main objective of the study aims to examine the effect of students' performance and engagement in an authentic-based multimedia learning Environment. The study adopted Quasi experimental design with a purposive sample of 90 undergraduates' students from a public university in South-west Nigeria. The students were furtherly distributed into 45 students each for experimental and control group. The data collected through student engagement questionnaire and achievement test were analysed to descriptive and inferential analysis (paired t-test) with the use of pre-test and post-test to describe the students' performance test (SPT). The results of the study showed the significant effect of authentic-based multimedia learning environment on students' performance level, cognitive and behavioral engagement level. The findings indicated that students perform better and increased their cognitive thinking skills to improve their interaction towards the utilization of multimedia in the learning process. Moreover, it was found out that cognitive and behavioral engagements were positively allied to the student academic performance. The instructors and management of the higher institution should have strong collaboration to provide more opportunities for the students to interact with different course activities in the learning environment to maximize their performance and engagement levels.

Keywords: Student Performance, Engagement, Learning approach, Authentic-based multimedia

INTRODUCTION

Nigerian education has been experiencing advancement particularly in terms of technology. This is evident that students' performance can be improved with the use of technology in the learning environment which is allowing them to engage with more educational content than the traditional classroom setting (Sawang et al., 2017). However, despite these achievements, the students' academic performance is below average which in turns affects their engagements in the learning environment. This is compounded by inadequate infrastructures and resources such as reliable electricity supply, internet connectivity, multimedia labs and other necessary equipment negatively affect the academic performance of students in the learning environment (Ferrer et al., 2022). Also, educators lack proper training in utilizing technology effectively, thus hindering students' academic progress. Furthermore, as suggested by Al-Azawei & Al-Masoudy, (2020) the inability of students to perform better academically and their engagement in the learning environment may be due to inadequate infrastructure which can hinder effective implementation of technology-based learning methods. Hence, a different teaching strategy is required to compensate for this limitation. Introducing diverse technologies will ensure a new face of instructors with an ICT-compliant

status and attitude to assist the teaching processes in the twenty-first century classroom. Engagement has traditionally been centred on enhancing all students' capacity to comprehend how to study in a knowledge-based environment in order to become more effective learners (Delfino, 2019). However, there is an increasing concern among students on how to engage fully in their learning courses effectively following the observations that the students' interest and performance affect students' choice of courses (Odia & Ogiedu, 2013). Therefore, students' engagement with their education should be a deliberate learning strategy to influence their learning performance which can be achieved using multimedia aids in student learning environment. According to Barker et al. (2018), multimedia aids enable students to achieve self-management of the appropriate aid, which can cushion learning challenges. Thus, when students use multimedia technologies, learning becomes practical and fascinating since it allows them to have a positive personal experience. Learning is the process of gathering information, determining its relevance, and combining it with existing knowledge to rebuild knowledge (Munna & Kalam, 2021). Students' academic achievement is aided by learning. However, one of the most important determinants of successful learning is student engagement. The engagement of student in learning has also been a strategic learning procedure that affect the students' performance. Cents-Boonstra et al., (2021) identified that engagement has played a part in the relationship of students to the curriculum and their collaboration with instructors and peers in classroom processes, whereas students who participate most in the learning process reflect better academic performance. Therefore, it has been realized at present that students' school engagement is a variable that plays an important role in promoting students' learning and achievement.

LITERATURE REVIEW

Previous studies have examined the student's performance in academics using different approach. Putri et al. (2019) developed an approach for student-based learning and found that the approach utilized was effective to improve student self-efficacy and their learning performance. In investigating the performance of student in Iraq, Al-Azawei & Al-Masoudy, (2020) developed a virtual learning environment (VLE) model and found that students' participation in different VLE activities had a great effect on their performance in order to encourage the integration of educational technologies and enhance the learning process to meet student's needs. Similarly, Vicneas & Ahmad, (2020) developed Quiz based Multimedia Learning Environment (QMLE) and found that the existence of happiness, delightful and excitement among students resulted the acceptance of all the different realism level of virtual agents used for the development of Quiz based Multimedia Learning Environment (QMLE) that makes student to feel excited to interact with. Despite the existing studies on the development of authentic based model, based on literature search, there are no studies on the assessment of students' engagement and performance in the multimedia learning environment. Therefore, this study aims at examining effectiveness of an authentic-based multimedia learning environment on students' engagement and performance in south-west Nigerian higher institutions. To effectively debate the challenges surrounding developing technologies should be based on the accessibility to technology, updating and aligning the curriculum, providing teachers with training and support, investing in infrastructural development. Therefore, by incorporating current technology gadgets into all subject areas taught in the school system, the modern classroom needs a variety of instructional methodologies and resources to enhance the value of the conventional approaches. Nigerian education may attempt to increase student performance and promote a more engaging learning environment by tackling these concerns. Hence, there is no denying that technology is current and that it is crucial to today's society. Technology, according to Çalışkan, (2015), is scientific information that is applied in practical ways to produce new things, as well as the distinctive talent and aptitude to construct or build products. The use of experiments and devices such as iPads which have advanced beyond the traditional teaching methods, has had an impact on how students learn around the globe in the educational sector (Falloon, 2019). In order to assist students' intellectual thinking skills during the learning process, multimedia activities have been incorporated to engage the student with the method of teaching (Wang & Tseng, 2018). Many scholars have different views about engagement and therefore have attempted to define it in different ways. For this

reason, engagement will be deemed with no universal and precise definition. Hew et al. (2016) identified engagement as a frequent involvement and determination especially in a discussion which constitutes rigorous attention that involves interactions between learners and their instructors. In addition, Suarta et al., (2022) described engagement as social networks, mutual participation and obligation, interaction with instructors and peers that may help to build a reputation and involvement in a school organization that can create a social network which can be helpful in learning activities such as Experiential learning activities. This will be helpful for students to remain focused in such a way that Students who are engaged and learning actively are less likely to become bored and disinterested in the learning activities. Also, they learn differently to be more engaged emotionally, helping their experience learning in a dynamic or new way for problem-solving and critical thinking to boost the student engagement, accelerating learning and improving the content retention.

Furthermore, Kao et al. (2019) highlighted the concerns of engaging students in learning through reading of comprehension with the use of multimedia contents such as graphics and text information to attracts the students' attention and to explore the different between the text and the graphics. The major problem occurred when there is distraction from the text without paying much attention during the reading process which might affect the engagement and motivation of the students. This indicates that the graphics used can increase the involvement of students with reading material and to help them focus on their roles and characters to draw out visual interest from the students' ability, to play roles in a creative manner and making reading more enjoyable (Mangen & van der Weel, 2016). In an attempt to differentiate between the types of engagement in learning issues (Sesmiyanti, 2018) expressed that students' affective reactions in the classroom examined stress which has a negative effect on the students' performance and students' emotions is subdivided into the positive emotions which include happiness, hope, interest, enjoyment while the negative emotions include anger, anxiety, frustration, boredom in the students' affective learning (D'Mello, 2013). In order to promote positive emotions in students that will facilitate the learning process and reduce negative behaviours, or conserve students from dropping out especially in developing countries like Nigeria, for example, classrooms and other learning. environments can be reformed to make the students more encouraging to learning. Nevertheless, instructors may develop a strategy for observing students' attitudes by gauging their emotional states, or the administration of the institution may provide counselling or peer mentorship D'Aniello et al., (2020) that mostly seek to give students the assistance they need to succeed academically and emotionally to feel positive. In this sense, affection exposure helps to identify and make students emotion visible during their learning experiences, especially when conscious of their emotions, students are more mindful of their environment which can motivate them to change their behaviour (Arguedas et al., 2016). Generally, Veiga, (2016) presumed students' engagement as a multivariate term which is composed on three concepts of engagements (behavioural engagement, emotional engagement and cognitive engagement) which he figures out on how their elements can address the institutional factors to internalise positive learning strategies, to produce good academic performance and to develop satisfactory interactions and a sense of belonging with their peers and teachers' respect.

Cognitive engagement

The engagement theory used for the study involved a classroom-based engagement that addressed the three types of engagement based on (Fredricks et al., 2004). He further examined that classroom-based engagement has an effect on the students' performance by paying attention and completing of tasks to what has been taught in the classroom. Therefore, this process enables the general levels of engagement constructs to be assessed in the classroom. With the level of cognitive engagement, Caruth, (2018) reviewed that classroom-based engagement evaluate the involvement of students with their academic work during assessments for better achievement.

Therefore, since the researcher has discovered that students can represent their knowledge in the learning

environment by developing new skills, communicating their ideas and exploring what has been learned in the classroom, using an appropriate instructional approach to become involved learners in the learning process. The researcher will tend to check the student's cognitive engagement using (Corno & Mandinach, 1983) principles such as knowing, deep learning, self-regulation, surface learning and metacognition to obtain their learning outcomes. The second level of the engagement constructs assessed in the classroom settings will also be examined as follows:

Behavioral engagement

Behavioural engagement referred to task involvement time, learning task persistence, effort and participation, which existed concurrently with the academic performance (Li & Lerner, 2013) which has a two-way correlation with affective engagement and cognitive engagement. On the basis of this study, after the students used their learning module in the learning process, the researcher would check the student behavioral engagement using (Skinner et al., 2009) concepts to get the student learning outcomes.

This study tends to use this level of behavioral engagement to explore how student behavioral involvement has changed depending on the nature of learning and to explain the interaction that predicted greater engagement between other students and their teachers. Therefore, the levels of behavioural engagement is in line with Skinner et al., (2009) which opined that behavioural engagement is the interaction between learners and the learning environment that includes efforts, involvement, attention, persistence, absorption and intensity.

Issues of Engagement in learning

The engagement of student in learning has also been a strategic learning procedure that affect the students' performance. Most previously, engagement has been focused on the aim of improving the capacity of all students to understand how to learn in a knowledge-based environment to become better students (Delfino, 2019). It's clear that students live in an environment that engages them differently from how they will be effective in their academic world. A major challenge may occur when students leave school unprepared or unknowledgeable in the information Community for a prosperous and stable life in which they will work and lead if the instructors fails to reform the pedagogy, instruction, and evaluation methods used for teaching which can jeopardise their own future (Wudu, 2015). Thoughtfully, whenever students seem to be engaged in school system effectively, then the teachers should engage with the students' understanding and interact with them through the use of appropriate methods to connect their learning. However, these challenges could be addressed by enhancing student engagement with structured collaboration, integrated technology, study-based learning, learning evaluation, and making learning associative and relevant to real life (Ferrer et al., 2022).

Hughes et al. (2018) ascertained the issue of lack of media diversity through different forms of media to deliver the contents of information to the students during lectures and when two medias such as the auditory and visual media are combined at the same time, work together to make the information more relevant to the students. Research has also found out that students who lacked media diversity became deficient in terms of recognizing the information provided to them in the learning process (Costley & Lange, 2017) that performs a major role in the retrieval of information by students. Additionally, poor quality in the incorporation of learning strategy to engage the students in the learning contents such that if the instructors are unfamiliar with the technological devices are less likely to engage it with the students (Darling-Hammond et al., 2020). Thus, in order to create interactive and engaging learning environment, teachers should be trained the appropriate use of the technologies available to them. Moreover, an increasing body of research denoted that low academic performance and behavioral effects are correlated with student engagement challenges in the specific academic learning environments as a result of disruptive behavior such as truancy that affect the learning readiness of the students (Granero-Gallegos et al., 2020). Hence, this indicates that students can

become active in the classroom to avoid prospect disengagement and educational problems by their persistence to task and paying attention to completing the academic activities in the learning process.

Engagement issue supported by Authentic-based strategy

Authentic learning is a real-life learning and it is a learning style that allows students to build a concrete and practical experience that they can share with their society for a motivational task to provide the essential planning, resources and maintenance to aid student achievement. It also ensues when the teacher exploits facts about how students’ designs learning tasks based on their knowledge (Maschinen et al., 2020). Authentic learning approaches encourage the reasoning and problem solving skills of students thinking and allow their presence in the learning experience as they become fully engaged in the learning process (Rajabalee et al., 2020) and also helps teachers’ to use numerous teaching strategies for giving problems task to solve by their students when learning. Moreover, students’ active engagement with authentic learning enhance the intellectual thinking with theoretically coherent when the construction of knowledge is an active process of experience (Nguyen et al., 2018). Therefore, the constructivist theory of learning proposed that previous knowledge is used as a foundation on which to construct new knowledge with a pedagogical approach which is required by the theory of learning where students associate their preceding learning to find support for constructing new knowledge (Ginting, 2021) which vary in the way the students learn. This indicates that the design of multimedia module with the combination of the auditory and visual presentation is to reduce the cognitive load on the students learning, through the multimedia as an instructional tool which has been developed to improve the active engagement of students, with the integration of authentic-based strategy to amplify the cognitive process that makes the traditional method of teaching to be ineffectual in the classroom learning. Therefore, the integration of authentic-based pedagogy used for learning can enable the students to perform better and improved their interaction with the utilization of multimedia learning modules used for the students to increase their cognitive thinking skills.

METHODOLOGY

Research Design

The study adopted the quantitative research design with specific focus on sequential explanatory approach. Also, quasi-experimental design method with non-randomization on the pretest posttest control and experimental group was used. These groups were administered pre-tests (O_1 and O_3) to assess their quality shown in (Table 1). An experimental group where participants who received the new intervention that affected what to study while the control group were participants who did not receive any intervention at all (or receive some standard intervention). After the experiment commenced, each subject was measured again one or more times to obtain the Posttest scores.

Table 1 The procedures for the experimental pre-test post-test control group design.

	Pre-test	Treatment	Post-test
Experimental Group	O_1	X_1	O_2
Control Group	O_3	X_2	O_4

Where O = Pretest-posttest Scores (observation), X_1 = The experimental group exposed to a treatment, which the effects are to be measured (exposure to the independent variable), X_2 = Learning in the Control class, O_1, O_3 =Pre-test (before treatment), and O_2, O_4 = Post-test (after treatment).

Participants

The participants for this study comprise of the accounting education (year 2) students in the Higher institutions located in Ekiti State, Nigeria. The location for the study was chosen due to its requisite representation of the population needed for the study, and for the ease of access to the respondents and the safety of the environment. In order to ensure the attainment of adequate sample size and proper illustration of the geopolitical zone, one higher institution from Ekiti State (Ekiti State University) was purposively selected from the population. The total population of students offering accounting course in the State zone is 120.

Sampling techniques

The sample consisted of 90 out of 120. The students were examined concerning their methods of understanding during time interval of change that leads to their performance outcome within Ekiti State University. Two classes were used for control group and the other two classes were used for experimental group (treatment) to ascertain the sample size of the population. This is based on the recommendation by Krejcie and Morgan (1970) table that ascertained the sample size of the population. The multi-stage sampling technique was adopted in drawing the sample for the study. The 90 students were furtherly distributed into 45 students each for experimental and control group which involved two different groups of participants; (45 participants) in the conventional classroom group and (45 participants) in the multimedia group. This arrangement allows for addressing issues like replacement sessions that may arise due to public holidays or other unexpected events that may prevent a scheduled lab session. Each session consists of a group of 45 in the multimedia group and 45 in the conventional classroom group making a total of 90 students for each experimental and control session. Therefore, Fig 1 showed the proposed research design and the main steps followed in order to achieve the key aims of the study.

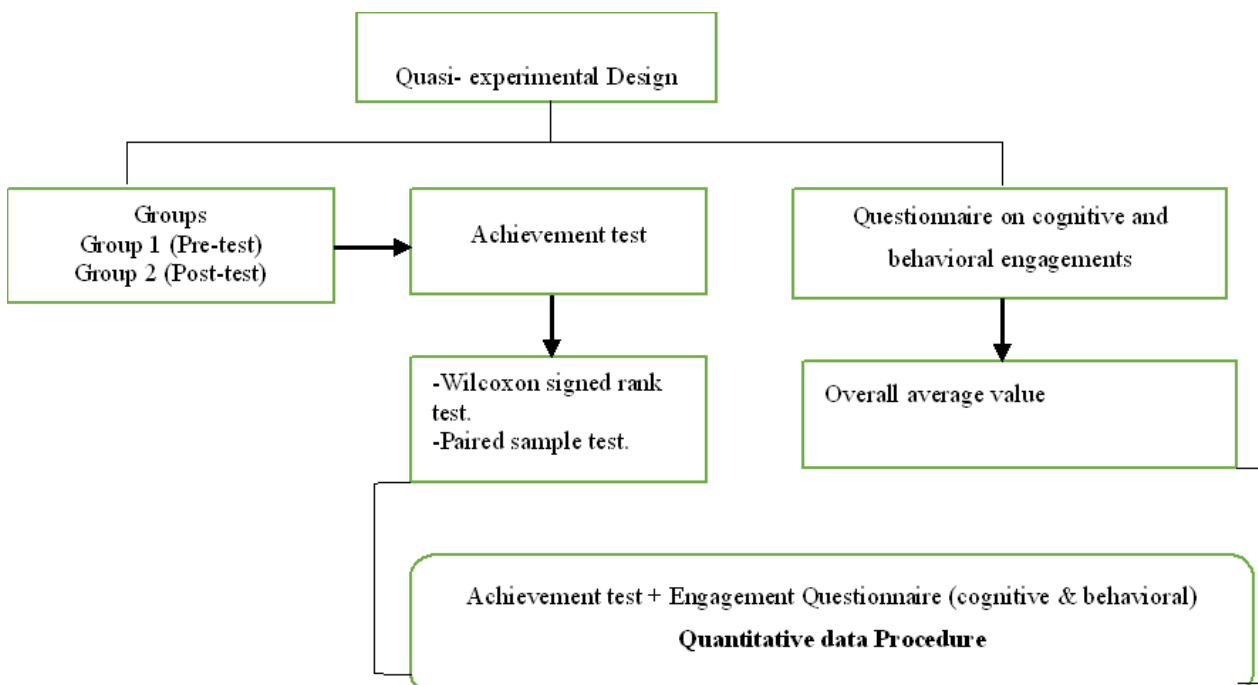


Fig 1: The proposed research design

Data analysis

In this study, quantitative data analysis was done. The data were analysed by using the Statistical Data

Social Sciences Software (SPSS 27). Descriptive analysis of the demography was done while the normality test of the data for each group (control and experimental) was examined to check the data distribution. The study also utilized inferential statistical analysis to investigate the participants' achievement in pre-test sheet (FAAT I). This result was compared with the post-test sheet (FAAT II) and analyzed to identify the effect of authentic-based multimedia learning environment on students' performance level. Thereafter, the effect of authentic-based multimedia learning on students' performance level, cognitive and behavioral engagement level was examined using descriptive analysis (mean, standard deviation, frequency and percentages) and inferential statistics (paired t-test).

RESULTS

This study presents findings on the survey carried out in the quantitative data collected for the study. The demographic information of the respondents (students) was presented while the Mean scores using descriptive analysis and standard deviation were also found. The participants of this study were 90 second year accounting education students, from the faculty of Education, in Ekiti State University, Nigeria. The demography of the participants on gender and group basis is shows that male students in the experimental and control groups were 31(68.89%) and 24(53.33%) respectively while female students in the experimental and control groups were 14(31.11%) and 21(46.67%) respectively.

Descriptive and Inferential Statistics of control group and experimental group on students' performance level

The analysis of the participants results from the overall test scores of the pretest and posttest of both the control and experimental groups shows that the difference between the mean percentages for pretest and posttest for the control group was 10.05% and the comparison for minimum scores between pretest and posttest for the control group was 2 and for the maximum score values was 5 (Table 2). Also, for the experimental group, the difference between the percentages was 53.62%. Meanwhile, for the comparison between minimum and maximum scores for the pretest and posttest, the difference between the minimum scores was 43, while the difference between the maximum scores was 63. Hence, from Table 2, it could be observed through the pre-test (prior to treatment) that participants in control and experimental groups had mean scores 20.44 and 20.82 respectively, while the values of their standard deviation are 10.19 and 5.92. The data from Table 2 was illustrated in Figure 5.1 which showed the mean and standard deviation between experimental Group and Control Group on students' performance level with the minimum and maximum values of the data. It could also be observed through the post-test (after being exposed to treatment) that participants in control and experimental groups had mean scores 30.49 and 74.44 respectively, while the values of their standard deviation are 10.55 and 12.57.

Table 2 Mean Score and Standard Deviation between Control Group and Experimental Group on students' performance level

Group	Type of test	N	Min	Max	Mean Percentage %	Std. Deviation
Control	Pre-Test	45	8	43	20.44	10.19
	Post-Test	45	10	48	30.49	10.55
	Differences	45	2	5	10.05	0.36
Experimental	Pre-Test	45	9	31	20.82	5.92
	Post-Test	45	52	94	74.44	12.57
	Differences	45	43	63	53.62	6.65

This indicated that mean score in the experimental group is higher than the mean score in the conventional

group on the student performance level. The post-test scores in the experimental group were higher than the pre-test scores in the experimental group because when the student were introduced to the learning modules, they performed excellently better than when the students don't have the knowledge of the new methods in their learning content due to their familiarity with the conventional ways of learning.

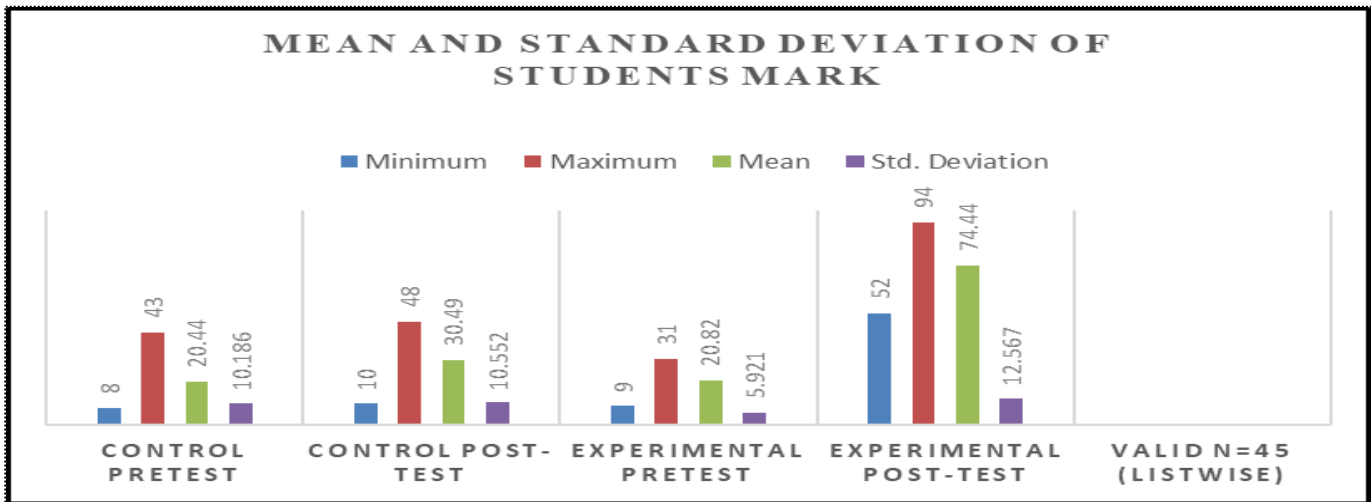


Figure 2. Mean Score and Standard Deviation between Experimental Group and Control Group on students' performance level.

Inferential analysis

The study also utilized inferential statistical analysis: participants' achievement in pre-test sheet (FAAT I). This data was compared with the post-test sheet (FAAT II). The two sets of data were analyzed and then used to identify the effect of authentic-based multimedia learning environment on students' performance level. The dependent variables were the participants' performance scores in FAAT test and the authentic-based multimedia learning environment that was claimed to have a significant effect on participants' performance level. After the descriptive analysis was achieved, the normality test of the data for each group (control and experimental) was ascertained. The results for the paired t-test for pretest and posttest in the experimental group.

Table 3. Paired samples test for pretest and posttest in the experimental group

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
Pair 1	Pretest – Post test				Lower	Upper			
Pair 1	Pretest – Post test	-53.622	14.350	2.139	-57.933	-49.311	-25.067	44	.000

Table 3 also shows the sig value (p value) for post-test is 0.00, which is less than 0.05. For the confidence interval of 0.05 (5%), then it was claimed that there was a significant difference between the means of the pre-test and post-test scores if the p values were less than 0.05 which H_0 was rejected. From the paired sample test, it was revealed that there was a significant positive effect on students' performance level after the treatment using authentic-based multimedia learning environment.

Effect of authentic-based multimedia learning environment on students’ cognitive engagement level and behavioural engagement level’

The findings of the effect of authentic-based multimedia learning environment on students’ cognitive engagement level is shown in Table 4 showing the mean and standard deviation based on each construct. The overall mean for knowing (3.20) in the cognitive engagement level which is lesser than the overall mean in the Deep learning (3.28) while the standard deviation is higher in knowing (0.69) than the deep learning (0.67). Self-regulation shows the mean value of (3.19) and standard deviation (0.64) while surface learning mean value is higher (3.21) than other four constructs and the standard deviation (0.69). Also, metacognition has the mean value (3.18) and standard deviation (0.63) which has the lesser value than the other four constructs. Therefore, in this current study, from the analysis on the cognitive engagement, deep learning has the highest mean value (3.28) more than the other construct while the standard deviation of knowing (0.69) higher than the standard deviation of deep learning (0.67). This result indicated that the effect of authentic-based multimedia learning enables the student to have a deep learning in their educational learning environment and enable them to be cognitively involved in classroom activities on their learning activities than knowing that requires students’ motivation to become aware of a task in the classroom, and for corrective action to take place. Table 4 also shows that the overall mean for effort (3.18) and the standard deviation (0.68) in the behavioral engagement level while the overall mean in involvement (3.16) and the standard deviation (0.57), also the overall mean for attention (3.21) and the standard deviation (0.61). The result denoted between the first three constructs signified that attention has the highest overall mean scores than involvement and effort which indicates that students pay more attention to the instructions on the implementation of the authentic-based multimedia learning environment and allows them to be more involved in the learning activities afterward with their effort to solve real-world issues. Hence, table 4 shows the overall mean for persistence (3.32) and the standard deviation (0.72) in the behavioral engagement level while the overall mean in absorption (3.14) and the standard deviation (0.84), also the overall mean for intensity (3.10) and the standard deviation (0.83). Therefore, the results denoted from the last three constructs implied that persistence has the highest overall mean score than absorption and intensity while both absorption and intensity. It could be observed from the first three constructs and the last three constructs that persistence (3.32) has the highest overall mean scores from the other constructs and this indicates that authentic-based multimedia learning environment had effect on students’ persistence in the learning environment which enable the students to be committed to their learning tasks and think critically and creatively because it is the base of thinking.

Table 4 Effect of authentic-based multimedia learning environment on students’ cognitive engagement level

A	Cognitive Engagement	Mean (SD)
	Knowing	
1	I understand more on how to keep financial accounts because I get motivated to learn more.	3.27(0.74)
2	I find out that when solving accounting information problem, I know the problem better by going over it again.	3.02(0.73)
3	I find reviewing previously solved problems in financial accounting content to be a good way to study for assessment.	3.18(0.69)
4	When I get an answer to any financial accounting issues, I find more confident in myself.	3.10(0.71)
	Overall mean &SD	3.20(0.69)
	Deep Learning	

5	I find that at times studying book keeping via the authentic multimedia learning environment gives me a feeling of deep personal satisfaction.	3.19(0.63)
6	I engage to most of the learning activities provided with questions in mind that I want to answer.	3.44(0.84)
7	I find most topics in the authentic multimedia learning environment interesting	3.29(0.67)
8	I spend a lot of my free time finding out more about interesting topics in financial accounting which have been discussed in the learning environment.	3.00(0.68)
Overall mean &SD		3.28(0.67)
Self -Regulations		
9	I organize my study time well to understand the preparation of accounting records in the learning environment.	3.12(0.68)
10	I structure an approach for solving any accounting information problem in my courses in the learning environment.	3.23(0.61)
Overall mean &SD		3.19(0.64)
Surface Learning		
11	I make sure that I recognize the accounting information content when studying in the learning environment.	3.14(0.68)
12	I do not find the learning environment interesting enough in book keeping topic, so I keep my work to the minimum.	3.13(0.76)
13	I make a point of looking at most of the suggested readings by the application that go with the lectures.	3.28(0.70)
Overall mean &SD		3.21(0.69)
Metacognition		
14	I explored different perspectives to accounting principles problem before I respond in the learning environment.	3.16(0.68)
15	I try to adjust my learning habits to suit the teaching of accounting procedures in the learning environment.	3.17(0.58)
Overall mean &SD		3.18(0.63)

B	Behavioral Engagement	Mean (SD)
	Effort	
16	I encourage myself to study in the learning environment that will inspire me in the prospective of financial information.	3.14(0.78)
17	I engage with the audit procedures in addressing the auditor's concerns in my lectures properly.	3.14(0.68)
18	I exhibit solution to difficult issues in financial accounting in learning environment before I appreciate it.	3.18(0.64)
Overall mean &SD		3.18(0.68)
19	I involved in learning new things on the accuracy of financial records during class activities in the learning environment.	3.07(0.51)
20	When I am in class, I actively participate in accounting information discussion in the learning environment.	3.22(0.66)

21	I am engaged in the learning process through class work in the interim of financial information in the learning environment.	3.09(0.64)
	Overall mean &SD	3.16(0.57)
	Attention	
22	I appreciate the interaction with my instructors when studying financial information in the learning environment.	3.22(0.73)
23	I was able to engage in activities on the interpretation of financial statement to the authentic-based multimedia learning environment.	3.13(0.55)
24	I pay attention to the instruction given in the learning environment whenever I am studying the financial position of a business in bookkeeping.	3.17(0.66)
	Overall mean &SD	3.21(0.61)
	Persistence	
25	I make sure I study on a regular basis in the learning environment to enhance my knowledge in accounting information system.	3.03(0.73)
26	I am very persistent in my course activity when learning financial accounting in the learning environment.	3.51(0.76)
	Overall mean &SD	3.32(0.72)
	Absorption	
27	I engage totally in learning financial accounting to find something new in my work in the authentic-based multimedia learning environment.	2.91(0.88)
28	When I am studying in the learning environment, I can desert out all distractions facing my work especially in cash book account.	3.33(0.87)
	Overall mean &SD	3.14(0.84)
	Intensity	
29	I feel happy when I am working intensely with audit software in the authentic-based multimedia learning environment.	2.98(0.99)
30	When I encounter a difficult task in learning financial accounting, I concentrate on it until I have solved it in the learning environment.	3.15(0.73)
	Overall mean &SD	3.10(0.83)

From Table 4.1, it is shown that the cognitive engagement level in the mean score (3.21) and the standard deviation (0.68) were higher than the behavioral engagement level mean score (3.19) and the standard deviation (0.67). Therefore, it was indicated that the implementation of authentic-based multimedia learning environment had effect on students' cognitive engagement level more than the behavioral engagement level. The overall mean shows a high score rate (3.20) on both students' engagement level. Hence, the results in table 4, overall average findings on students' cognitive and overall average findings on students' behavioral engagement level were shown in table 4.1 to know the effect of authentic-based multimedia learning environment on both engagement level (cognitive and behavioral).

Table 4.1 Shows the Overall findings on the students' cognitive and behavioural engagement level

D	Engagement Level	Mean	SD	Scale rate Classification (3.01-4.00)
1	Cognitive Engagement	3.21	0.68	High
2	Behavioral Engagement	3.19	0.67	High
	Overall	3.20	0.66	High

DISCUSSION

The study examined the significant effect of authentic-based multimedia learning environment on students' performance in test, cognitive engagement, and behavioral engagement level. The findings indicated that students perform better and increased their cognitive thinking skills to improve their interaction towards the utilization of multimedia learning modules in the learning process. Also, the effect of authentic-based multimedia learning environment on students' cognitive and behavioral engagement level enables the students to develop new ideas and skills that had a positive influence on the students' performance.

Effect of authentic-based multimedia learning environment on students' Performance level

The study found that students were aware of authentic activities as an effective tool for boosting engagement and collaboration in the learning environment. This could be because real life scenarios effectively aid students understanding as they are able to connect the task to their everyday activity, thus sparking their interest and motivation. It could also be due to collaboration among students which enable them to share ideas, perspectives, and knowledge through group discussions consequently enhancing their learning process. This concurs with the findings of Panja, (2018) and Alcine, (2019) that enhancing the delivery of accounting instruction in the classroom through the use of interactive tools encourages student engagement and helps them find solutions to the challenges they experience in the learning context. The effect of authentic-based multimedia learning environment on students' cognitive engagement level was found to enable the students in developing new ideas and skills that may have a positive influence on the students' performance. This could be as a result of the multi modal learning experience in which exposes the students to varying means of learning. This basically involves the integration of diverse modes of representation like visual, auditory, and interactive element. These diversities of learning mode improve the retention capabilities and understanding rate of students. It also helps students to develop the abilities to generate new ideas and creativity. This is consistent with the result of Martínez-Argüelles et al., (2022) who found that the development of authenticity of learning environment enable students to be connected and collaborate with people all over the world to foster co-creation and deep understanding that give students opportunities to experience and resolve real-world problems.

Effect of authentic-based multimedia learning environment on students' cognitive engagement level and behavioural engagement level'

This findings aligns with Radianti et al., (2020) who found that the integration of authentic-based multimedia learning to the students in the real situation affect the students' cognitive engagement levels significantly. The use of authentic-based multimedia learning environment was found to have greater effect on students' behavioral engagement. One of the opportunities authentic-based multimedia offers student is the liberty to make choices on topics and materials of interest which suits their learning and perceptive patterns. This freedom of choice on areas of interest motivates and strengthens their learning engagement. Moreso, it makes the students enjoy their learning since it accommodates their interest and pace. The multimedia element also give room for feedback and assessment which allows students to get instant feedback and progress on their performance. This ability to track the progress and performance of students aids in identifying key areas for improvement and helps the students to be actively involved in the learning process. This agrees with the findings of Alioon & Delialioğlu, (2019) that active participation deepens the students understanding when they are actively engage and motivated to take ownership of their education to create more interactive learning environment. Meanwhile, the ability of students to stay focused and persistent in their learning is to overcome distractions in order to reach their learning goals and to facilitate more active and learning activities. This finding corroborates previous studies which confirmed that while integrating physical activities in teaching activities is not a negative thing, it does place a lot of

responsibility on the behavior of students' (Schmidt et al., 2016) which similarly indicated that engaging with learning activities enhances the students' attention.

LIMITATIONS

Additionally, while analyzing the effects of authentic-based multimedia learning on students' cognitive engagement, the respondents have limited time to devote due to other academic commitments. As consistent with studies of this nature, the cross-sectional approach of the data collection would be deemed a limitation, however, the results have provided valuable preliminary insights with relatively few studies examining this conceptual model to date. As a result, this constraint must be considered in the future study.

CONCLUSIONS AND RECOMMENDATIONS

Irrespective of the prominence in relation to other forms of teaching, the use of authentic-based multimedia learning in higher institutions is here to stay. Similar to the conventional learning students' engagement to interact online is very crucial to their learning. Whilst this study presented positive results that identified the significant effect of authentic-based multimedia learning environments in order to improve students' performance level, cognitive and behavioral engagement level.

In the future, it is possible to identify other factors that may affect students' engagement before assessing their performance. This can assist identifying the most important online learning activities that should be considered further in such settings. Moreover, the integration of authentic-based multimedia learning in this study can be compared with other learning techniques to identify the most accurate one in predicting students' engagement and their performance level. Also,

1. Further study should be carried out on the perception of using authentic-based multimedia an in the learning environment to involve students in real-world learning situations, as emphasized in the 21st century learning method.
2. There is need to determine the effectiveness of intervention using authentic-based multimedia learning, concentrating on students' engagement after integrating this module into the school curriculum.

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REFERENCES

1. Al-Azawei, A., & Al-Masoudy, M. A. A. (2020). Predicting learners' performance in Virtual Learning Environment (VLE) based on demographic, behavioral and engagement antecedents. *International Journal of Emerging Technologies in Learning*, 15(9), 60–75. <https://doi.org/10.3991/ijet.v15i09.12691>
2. Alcine, E. (2019). Teachers' Perceptions of Academic Performance and Student Engagement Among Ninth-Grade Students. <https://scholarworks.waldenu.edu/dissertations>
3. Alioon, Y., & Delialioğlu, Ö. (2019). The effect of authentic m-learning activities on student engagement and motivation. *British Journal of Educational Technology*, 50(2), 655–668. <https://doi.org/10.1111/bjet.12559>
4. Arguedas, M., Daradoumis, T., & Xhafa, F. (2016). Analyzing how emotion awareness influences students' motivation, engagement, self-regulation and learning outcome. *Educational Technology and Society*, 19(2), 87–103.

5. Çalışkan, H. K. (2015). Technological Change and Economic Growth. *Procedia – Social and Behavioral Sciences*, 195, 649–654. <https://doi.org/10.1016/j.sbspro.2015.06.174>
6. Caruth, G. D. (2018). Student Engagement, Retention, and Motivation: Assessing Academic Success in Today's College Students. *Participatory Educational Research*, 5(1), 17–30. <https://doi.org/10.17275/per.18.4.5.1>
7. Cents-Boonstra, M., Lichtwarck-Aschoff, A., Denessen, E., Aelterman, N., & Haerens, L. (2021). Fostering student engagement with motivating teaching: an observation study of teacher and student behaviours. *Research Papers in Education*, 36(6), 754–779. <https://doi.org/10.1080/02671522.2020.1767184>
8. Corno, L., & Mandinach, E. B. (1983). The Role Of Cognitive Engagement in Classroom Learning and Motivation. *Educational Psychologist*, 18(2), 88–108. <https://doi.org/10.1080/00461528309529266>
9. Costley, J., & Lange, C. (2017). The effects of lecture diversity on germane load. *International Review of Research in Open and Distance Learning*, 18(2), 27–46. <https://doi.org/10.19173/irrodl.v18i2.2860>
10. D'Aniello, G., De Falco, M., Gaeta, M., & Lepore, M. (2020). A situation-aware learning system based on fuzzy cognitive maps to increase learner motivation and engagement. *IEEE International Conference on Fuzzy Systems*, 1–8. <https://doi.org/10.1109/FUZZ48607.2020.9177590>
11. D'Mello, S. (2013). A selective meta-analysis on the relative incidence of discrete affective states during learning with technology. *Journal of Educational Psychology*, 105(4), 1082–1099. <https://doi.org/10.1037/a0032674>
12. Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for educational practice of the science of learning and development. *Applied Developmental Science*, 24(2), 97–140. <https://doi.org/10.1080/10888691.2018.1537791>
13. Delfino, A. P. (2019). Student engagement and academic performance of students of Partido State University. *Asian Journal of University Education*, 15(1), 22–41. <https://doi.org/10.24191/ajue.v15i3.05>
14. Ferrer, J., Ringer, A., Saville, K., A Parris, M., & Kashi, K. (2022). Students' motivation and engagement in higher education: the importance of attitude to online learning. *Higher Education*, 83(2), 317–338. <https://doi.org/10.1007/s10734-020-00657-5>
15. 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>
16. Ginting, D. (2021). Student Engagement and Factors Affecting Active Learning in English Language Teaching. *VELES Voices of English Language Education Society*, 5(2), 215–228. <https://doi.org/10.29408/veles.v5i2.3968>
17. Granero-Gallegos, A., Gómez-López, M., Baena-Extremera, A., & Martínez-Molina, M. (2020). Interaction effects of disruptive behaviour and motivation profiles with teacher competence and school satisfaction in secondary school physical education. *International Journal of Environmental Research and Public Health*, 17(1), 2–14. <https://doi.org/10.3390/ijerph17010114>
18. Hew, K. F., Huang, B., Chu, K. W. S., & Chiu, D. K. W. (2016). Engaging Asian students through game mechanics: Findings from two experiment studies. *Computers and Education*, 92–93, 221–236. <https://doi.org/10.1016/j.compedu.2015.10.010>
19. Hughes, C., Costley, J., & Lange, C. (2018). The effects of self-regulated learning and cognitive load on beginning to watch and completing video lectures at a cyber-university. *Interactive Technology and Smart Education*, 15(3), 220–237. <https://doi.org/10.1108/ITSE-03-2018-0018>
20. Kao, G. Y. M., Chiang, X. Z., & Foulsham, T. (2019). Reading behavior and the effect of embedded selfies in role-playing picture e-books: An eye-tracking investigation. *Computers and Education*, 136(September 2018), 99–112. <https://doi.org/10.1016/j.compedu.2019.03.010>
21. Li, Y., & Lerner, R. M. (2013). Interrelations of Behavioral, Emotional, and Cognitive School Engagement in High School Students. *Journal of Youth and Adolescence*, 42(1), 20–32.

- <https://doi.org/10.1007/s10964-012-9857-5>
22. Mangen, A., & van der Weel, A. (2016). The evolution of reading in the age of digitisation: an integrative framework for reading research. *Literacy*, 50(3), 116–124. <https://doi.org/10.1111/lit.12086>
 23. Martínez-Argüelles, M. J., Plana-Erta, D., & Fitó-Bertran, À. (2022). Impact of using authentic online learning environments on students' perceived employability. *Educational Technology Research and Development*. <https://doi.org/10.1007/s11423-022-10171-3>
 24. Maschinen, B., Investition, A., Beschaffungen, G., Ersatzbeschaffungen, B., & Mittelherkunft, S. (2020). *Teaching tough topics : how do I use children's literature to build a deeper understanding of social justice, equity, and diversity?* Pembroke Publishers.
 25. Munna, A. S., & Kalam, M. A. (2021). Teaching and learning process to enhance teaching effectiveness: literature review. *International Journal of Humanities and Innovation (IJHI)*, 4(1), 1–4. <https://doi.org/10.33750/ijhi.v4i1.102>
 26. Nguyen, T. D., Cannata, M., & Miller, J. (2018). Understanding student behavioral engagement: Importance of student interaction with peers and teachers. *Journal of Educational Research*, 111(2), 163–174. <https://doi.org/10.1080/00220671.2016.1220359>
 27. Odia, J. O., & Ogiedu, K. O. (2013). Factors Affecting the Study of Accounting in Nigerian Universities. *Journal of Educational and Social Research*, September 2013. <https://doi.org/10.5901/jesr.2013.v4n3p89>
 28. Panja, S. (2018). Creative methods of teaching accountancy- Its impact. <https://doi.org/10.31235/osf.io/n3y26>
 29. Putri, S. K., Hasratuddin, H., & Syahputra, E. (2019). Development of Learning Materials Based on Realistic Mathematics Education Approach to Improve Students' Mathematical Problem Solving Ability and Self-Efficacy. *International Electronic Journal of Mathematics Education*, 14(2), 375–383.
 30. Radianti, J., Majchrzak, T. A., Fromm, J., & Wohlgenannt, I. (2020). A systematic review of immersive virtual reality applications for higher education: Design elements, lessons learned, and research agenda. *Computers and Education*, 147, 2–29. <https://doi.org/10.1016/j.compedu.2019.103778>
 31. Rajabalee, B. Y., Santally, M. I., & Rennie, F. (2020). A study of the relationship between students' engagement and their academic performances in an eLearning environment. *E-Learning and Digital Media*, 17(1), 1–20. <https://doi.org/10.1177/2042753019882567>
 32. Sawang, S., O'Connor, P., & Ali, M. (2017). IEngage: Using Technology to Enhance Students' Engagement in a Large Classroom. *Journal of Learning Design*, 10(1), 11. <https://doi.org/10.5204/jld.v9i3.292>
 33. Schmidt, M., Benzing, V., & Kamer, M. (2016). Classroom-based physical activity breaks and children's attention: Cognitive engagement works! *Frontiers in Psychology*, 7(OCT), 1–13. <https://doi.org/10.3389/fpsyg.2016.01474>
 34. Sesmiyanti, S. (2018). Student's Cognitive Engagement in Learning Process. *Journal Polingua : Scientific Journal of Linguistics, Literature and Education*, 5(2), 48–51. <https://doi.org/10.30630/polingua.v5i2.34>
 35. Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement*, 69(3), 493–525. <https://doi.org/10.1177/0013164408323233>
 36. Suarta, I. M., Noortyani, R., Yarsama, K., & Adhiti, I. A. I. (2022). The role of Teachers' Indigenous Knowledge and Cultural Competencies in Enhancing Students' Engagement and Learning Outcomes. *Journal of Ethnic and Cultural Studies*, 9(1), 244–264. <https://doi.org/10.29333/ejecs/1025>
 37. Veiga, F. H. (2016). Assessing Student Engagement in School: Development and Validation of a Four-dimensional Scale. *Procedia – Social and Behavioral Sciences*, 217(351), 813–819. <https://doi.org/10.1016/j.sbspro.2016.02.153>
 38. Vicneas, M., & Ahmad Zamzuri, M. A. (2020). The effect of valence and arousal on virtual agent's designs in quiz based multimedia learning environment. *International Journal of Instruction*, 13(4),

903–920. <https://doi.org/10.29333/iji.2020.13455a>

39. Wudu, M. T. (2015). Challenges students face in their transition from primary to secondary school and the interventions schools take to ease the transition. *Educational Research and Reviews*, 10(5), 622–633. <https://doi.org/10.5897/err2014.2055>