MEDIATING ROLE OF ADAPTIVE TEACHING ON THE RELATIONSHIP BETWEEN ADAPTIVE LEARNING AND TECHNOLOGY INTEGRATION AMONG STUDENTS: A CONCURRENT TRIANGULATION DESIGN

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ABSTRACT

The purpose of this study was to examine the adaptive teaching, adaptive learning and technology integration among students. The design of this research study was a mixed method of concurrent triangulation in which the data from qualitative and quantitative sources was analyzed and interpreted at a 0.05 level of significance. The data was merged, connected, and confirmed based on the salient data integration. 300 participants are utilized in the study for quantitative survey questionnaires, 10 participants for an in-depth interview, and 7 participants for a focus group discussion (FGD); a total of 17 participants are utilized during the conduct of qualitative questionnaires. Of the quantitative results, it was revealed that the assessment of adaptive teaching, adaptive learning and technology integration among students was very high. It means that student is struggling and present them with more resources to assist them in overcoming the challenge on their own. Adaptive learning may assist students in determining whether they are prepared to progress. Furthermore, the correlation analysis revealed that there was a strong relationship between Adaptive Teaching and Adaptive Learning, Adaptive Teaching and Technology Integration, and Adaptive Learning and Technology Integration. Furthermore, the regression analysis revealed that adaptive learning and adaptive teaching are the best predictors of technology integration. Of the results revealed from the thematic analysis, there were eight themes that emerged from the lived experience of students pertaining to technology integration namely: Learning Skill Development, Accessible Learning, Student-Teacher Engagement, Effective Communication, Access to Internet Connectivity, Lack of Proficiency and Technological Equipment, Personalized Learning, Teacher's Technological Proficiency. Meanwhile, the results revealed from the quantitative and qualitative findings indicated that the data integration was confirming, connecting, and converging. Therefore, it is recommended that teachers adopt adaptive instruction with technology integration, and that the material and knowledge be related to students' learning experiences. The topic's learning concepts, facts, theories, principles, ideas, and terminology must be accessible and understandable.

Keyword: *Adaptive learning, Adaptive Teaching, Technology Integration, Sobel Test President Roxas, North Cotabato*

INTRODUCTION

In the preceding decades, technological development has occurred on every continent. Despite all the resources spent on incorporating technology into the classroom, more than 95 % of students reported being interrupted by technology, having their jobs adversely impacted by technology, or abusing technology. They are among those most impacted by this convergence of technology because they do not see the introduction of new technology as a potential educational challenge and, as a result, do not adjust to the current teaching and learning process (Ainley, 2021).

Moreover, adaptive learning systems come in a variety of flavors, from basic rules-based systems to complicated self-learning algorithms. The empirical effect of adaptive learning is still largely unknown, because adaptive systems are still in their infancy (Ames, 2021). However, preliminary research indicates that certain early studies may have beneficial benefits on students' learning outcomes and a reduction in course dropout rates. It was discovered, for

example, that the majority of higher educational leaders had a favorable attitude toward adaptive learning and feel it has significant potential to increase student achievement in a study on computers and information technology in higher education. However, the same study discovered that adaptive learning technologies are used in just 8% of educational courses in practice (Ames, 2021).

Furthermore, faculty sometimes struggle with the use of adaptable software for engaging with students and adjusting learning material during the pilot phase of adaptive learning, due to a lack of expertise with adaptive technology or insufficient assistance (Maehr & Midgley, 2019).

However, a study of past research revealed that students' technology integration and adaptive learning issues are often fragmented or presented through narrow lenses in the literature. Until recently, no comprehensive categorization of the difficulties associated with students' technology integration has been offered. Additionally, it is unclear which issues need additional attention throughout the implementation phase. Finally, the debated issues are dominated by the perspectives of a few nations, where adaptive learning is the most widely utilized method of instruction. To our knowledge, no comparative view on the difficulties has been published so far, especially in the context of varying students' technology integration in adaptive learning environment situations. While performing comparative studies across nations is often beneficial, it is also beneficial to include examples with a range of experiences in the research issue and a high degree of variety in the attributes being investigated. This technique may assist academics in rethinking critical aspects affecting the adoption of technology advances in educational settings, identifying new ones, and gaining fresh views on the adoption issues (Hicks, 2020).

Thus, this research will examine the mediating effect of adaptive teaching as estimated by classroom adaptive learning on students' technology integration.

FRAMEWORK

This theory is anchored on the Learning philosophy known as connectivism learning theory by two theorists, George Siemens and Stephen Downes, encourages students to link ideas, theories, and knowledge in a meaningful way. That technology is an important aspect of learning and that we have the freedom to choose how we learn is acknowledged. Also, it encourages group cooperation and conversation, allowing for multiple opinions and perspectives when it comes to decision-making, problem-solving, and making sense of data. The idea of "connectivism" encourages people to learn from sources other than their own heads, such as social media, online networks, blogs, and data repositories. We no longer learn by ourselves; we learn by connecting with others. This is the philosophy of connectivism. Knowledge and ideas should be linked together, students should be given the opportunity to seek out their own understanding, and information should be shared through technology.

METHOD

Research Design

This research used a concurrent research design. This method simultaneously gathered qualitative and quantitative data and integrated the results in order to get a completer and more comprehensive grasp of the subject matter (Creswell, 2013). Verifying, cross-validating and confirming findings was the goal of this procedure. It was used to make up for the shortcomings of one approach by emphasizing the positive aspects of another (Creswell, 2013). Researcher must concurrently gathered and evaluated quantitative and qualitative data, but in distinct ways, to properly understand the topic of the study (Creswell, Plano Clark, et al., 2003). To make sense of the results, the investigator attempted to adapt and merge the two sets of data. Data on the same occurrence is collected, analyzed, and interpreted separately by the researcher, who then combined the disparate findings from the two approaches. Using convergent

approach, performance was enhanced, and individual defects were corrected. Because of this, a more comprehensive and well-rounded knowledge of the topic was gained (Creswell & Clark, 2011). Descriptive and correlational techniques are two examples of quantitative methodologies.

Respondents

In this survey, 300 students from President Roxas, North Cotabato division were randomly selected as respondents. Simple random sampling was used as the sampling approach. Each sample had an equal chance of being picked as part of the sampling procedure known as random sampling. A randomly selected sample was intended to provide a fair reflection of the entire population. Sampling mistake occurs when, for any reason, the sample does not accurately reflect the population. When collecting a sample, there are several options to choose from. Samples selected from the population were the focus of our discussion here. Pre-drawn populations guaranteed that every piece had an equal chance of being selected for a drawing. It's supposed to be a true reflection of a political party's image. Because each person in the population has an equal probability of being selected, it was seen as a rational strategy. There were 17 students who were selected using a purposive sample approach. As a result, 10 instructors were interviewed in-depth, and seven teachers were questioned in a focus group.

Instruments

In the quantitative phase of the study, the researcher administered a standardized questionnaire to gather the essential data for analysis and interpretation. In addition, during the qualitative phase, the researcher created a questionnaire for interview guides. After being used to perform the investigation, the questionnaire was validated by the research committee. The first questionnaire sought to answer the level of adaptive learning in terms of flexibility, engagement and development, the researcher adopted the survey questionnaire from the study of Mirata (2020). The second part of questionnaire was to determine the level of adaptive teaching in terms of remediation and compensatory (Trabelsi, 2022). The third part of the questionnaire sought to determine the level of students' technology integration in terms of capabilities, adaptability, and self-efficacy. There researcher adopted the survey developed by Prensky (2011).

Statistical Tools

Frequency count, percentages and weighted mean were to determine the indicators of the adaptive learning, adaptive teaching, and technology integration. The concept of a weighted mean is similar to that of an average. Some data points contributed more "weight" to the final mean than others, rather than each contributing equally. If all the weights are equal, the weighted mean equals the arithmetic mean (the regular "average" you're used to) (Andale, 2014). Statistics using Pearson's r tool was used to determine the extent to which respondents' responses on adaptive learning, adaptive teaching, and technology integration are related. Regression Analysis. utilized to determine the significant influence between the variables. Sobel Test. was also employed to determine the significant mediation of the mediating variable between independent and dependent variable. Meanwhile, thematic analysis was used to analyze the notes obtained from in-depth interviews and focus groups. This approach focused on identifying, analyzing, and recording patterns (or "themes") in data. Patterns in data sets that are important to the description of a phenomenon and were linked to a specific research question are called themes (Boyatzis, 1998).

RESULTS AND DISCUSSION QUANTITATIVE STRAND

Adaptive Learning

Table 1 shows the level of adaptive learning. The teachers' adaptive learning contains three indicators namely flexibility, assessment, and development. This variable obtained the overall mean score of 3.86 and standard deviation .391 which reflects the consistency of the responses of the participants.

According to Ames (2021). her research revealed that engaging students in the educational process boosts their attention and concentration and stimulates them to participate in higher-level critical thinking.

It helps the firm and its workers in concrete ways. Learning and development activities not only help people grow and stay up with one another, but they also boost the organization's efficiency and production, leading to increased earnings and a more reputable name (Anderman & Maehr, 2020).

Table 1
Level of Adaptive Learning

Indicators	Mean	Std. Deviation	Interpretation
Flexibility	3.75	.544	High
Engagement	3.94	.486	High
Development	3.89	.532	High
Overall Mean	**3.86**	**.391**	**High Level of Adaptive Learning**

Adaptive Teaching

Table 2 shows the High Level of Adaptive Teaching. The variable Adaptive Teaching contains two indicators namely remediation and compensatory obtained the overall mean score of 3.70 as high and standard deviation of .428 which reflected the consistency of the responses of the participants.

The implication of the study is supported by Maehr & Midgley (2019). They emphasized that remedial programs provide the opportunity to concentrate on students who are falling behind and educate at a level suitable for their present level of abilities. In an ideal world, such an intervention would accelerate their development while reducing the variability of student learning levels in a particular grade.

On the aspect of compensatory received the overall categorical mean score of 3.71 and interpreted is agree. Among the five statements," I receive good grades because of my hard work" obtained the highest mean score of 3.82 while "I never fail to do my homework" obtained the lowest mean score of 3.51. This indicates that Students get high scores because they work hard. It helps to improve their potentials and capabilities so that they may reach their academic goals.

The findings of the study are supported by Barron & Harackiewicz, (2020). They emphasized that a student who puts in the effort will be rewarded in numerous ways. It aids in being the person you want to be, achieving your objectives, and regaining your joy in life. Contrarily, if you get achievement without putting up any work, you will inevitably suffer a decline in confidence. You'll come to rely greatly on other people. Success in life doesn't come easily, therefore it's crucial to put in the effort required to achieve it.

Table 2
Level of Adaptive Teaching

Indicators	Mean	Std. Deviation	Interpretation
Remediation	3.70	.493	High
Compensatory	3.71	.557	High
Overall Mean	**3.70**	**.428**	**High Level of Adaptive Teaching**

Technology Integration

Table 3 shows the High Level of Technology Integration. The variable Technology Integration contains three indicators namely technology capabilities, technology adaptability, and technology self-efficacy obtained the overall mean score of 3.84 as high and standard deviation of .428 which reflected the consistency of the responses of the participants.

The result of the study is supported by Dweck (2020). He pointed out that Technological competence is a company's ability to perform any necessary technical task, including the capacity to create new products, procedures, and technological expertise to increase organizational efficiency.

On the aspect of Technology Adaptability obtained the categorical mean of 3.87 and interpreted as agree. The statement" Internet access allows me to interact with my classmates" got the highest mean score of 4.91 while the statement "I take technical skills into account in group discussions" got the lowest score of 3.72. This means that students have access to an abundance of internet resources, which encourages them to do research and cultivates their independence.

The adaptive learning technology can determine when a student is struggling and present them with more resources to assist them in overcoming the challenge on their own. Adaptive learning may assist students in determining whether they are prepared for the next level. Technology enables unlimited access to instructional materials (Covington, 2021).

According to Elliot (2020). He believed that self-efficacy is one of the most significant psychological elements that might influence students' impressions of their learning surroundings. Consequently, self-efficacy may also influence students' performance in online learning contexts.

Table 3
Level of Technology Integration

Indicators	Mean	Std. Deviation	Interpretation
Technology Capabilities	3.80	.498	High
Technology Adaptability	3.87	.483	High
Technology Self-Efficacy	3.85	.481	High

Overall Mean	**3.84**	**.377**	**High Level of Technology Integration**

Relationship Between the Variables

Table 4 presents the results of correlational analysis of the variables between Adaptive Teaching and Adaptive Learning, Adaptive Teaching and Technology Integration, and Adaptive Learning and Technology Integration. The result indicates that these variables have a significant relationship with each other.

Particularly, the reported results demonstrate that the correlation between adaptive teaching and adaptive Learning yielded a p value of.000, which is less than the 0.05 level of confidence, indicating that a correlation can be inferred between the two variables is high. With a modest degree of correlation (r=.508**), the null hypothesis "There is no significant relationship between Adaptive Teaching and Adaptive Learning" is consequently rejected.

This implication of the study is supported by Johnston et al., (2020). They emphasized that adaptive learning, also referred to as adaptive teaching, is the provision of customized learning experiences that target an individual's specific requirements through just-in-time feedback, paths, and resources (rather than delivering a one-size-fits-all learning experience.

Also, there was a significant correlation between the Adaptive Teaching and Technology Integration yielded a p value of .000, which is less than the 0.05 level of confidence, indicating that a correlation can be inferred between the two variables is high. With a modest degree of correlation (r=.255**), the null hypothesis "There is no significant relationship between An Adaptive Teaching and Technology Integration" is consequently rejected. By using technology in education, educators want to promote pedagogic change and address core challenges affecting students with special needs. Therefore, technology may be seen as a both tool and a catalyst for innovation. Technology allows students to create creative and engaging classrooms and provides them with access to new materials. Effective instructors are aware of the advantages of bringing technology into the classroom and discovering innovative methods to make courses relevant (Midgley, 2020).

Furthermore, the reported results demonstrate that the correlation between Adaptive Learning and Technology Integration yielded a p value of.000, which is less than the 0.05 level of confidence, indicating that a correlation can be inferred between the two variables is high. With a modest degree of correlation (r=.274**), the null hypothesis "There is no significant relationship between Adaptive Teaching and Adaptive Learning" is consequently rejected.

The findings of the study are supported by Kaplan & Middleton, (2021). The discipline of Educational Technology concentrates on a specific subset of technologies: those that facilitate two-way communication and knowledge transfer. Educational technology is a kind of education that use technological means to educate its pupils in the usage of a limited range of tools created by science and engineering. Educators' goals in incorporating technology into the classroom include bringing about pedagogical change and resolving basic difficulties that impact students with special needs. So, technology is both a means to an end and a force for transformation.

Table 4

Relationship between the Variables

VARIABLES	R	p-value	Remarks

Adaptive Teaching and Adaptive Learning	.508**	.000	Significant
Adaptive Teaching and Technology Integration	.255**	.000	Significant
Adaptive Learning and Technology Integration	.274**	.000	Significant

*Significant at .05 level

Predictors of Students Technology Integration

Table 5 revealed the results of regression analysis that Adaptive Learning has significant influence on and technology integration as reinforced by the magnitude with their respective p-value which is all less than 0.05. It was revealed that Adaptive Learning (r=.188, p<0.05) is the best predictor of Technology Integration. Thus, it was revealed that in every increase of a single unit in Adaptive Learning, an increase of .188 in Technology Integration can be expected.

The findings of the study are supported by Kaplan & Middleton, (2021). Technology's most consequential effect on the classroom is the rise of student participation and active learning. There are many ways in which technology has improved the educational experience for today's students, including but not limited to enhanced understanding, hands-on experience, time management, and the integration of different teaching strategies.

Moreover, Adaptive Teaching (r= .138, p< 0.05) is also the predictor of student's technology integration. Thus, it was revealed that in every increase of a single unit in Adaptive Teaching, an increase of .138 in technology integration can be expected.

The results of the study are supported by Arunkumar & Urdan, (2020). They emphasized that the importance of adaptive learning in adaptive teaching, which provides personalized learning experiences that target an individual's particular needs via just-in-time feedback, routes, and resources (rather than providing a one-size-fits-all learning experience.

Furthermore, the model explains that 26.7 % of the variance between the adaptive learning and adaptive teaching on students' technology integration. This shows that the remaining 73.3 % of the variance of the variables can be attributed to other factors aside from the recognized variables.

Table 5

Influence of Adaptive Learning and Adaptive Teaching on Technology Integration

Variables	Unstandardized Coefficients		Standardized Coefficient	T	p-value	Remarks
	B	Std. Error	Beta			
(Constant)	2.609	.225		11.586	.000	
Adaptive Learning	.188	.062	.195	3.038	.003	Significant
Adaptive Teaching	.138	.057	.156	2.432	.016	Significant

Note: R=.516[a], R-square=.267, F=44.718, P>.05

Mediating Effect of Adaptive Teaching Between Adaptive Learning and Students' Technology Integration

Table 6 shows the use of Medgraph involving Sobel Test provides analysis on the significance of mediation effect. Hence, it can determine whether the mediation is full or partial. As can be gleaned in figure, the direct effect of Adaptive Teaching on Adaptive Learning is decreased from beta of .225 to .195 when mediator variable was placed in the relationship model. Since the direct effect of adaptive teaching on Adaptive Learning is no longer significant, it would imply a full mediation.

Meanwhile, the Sobel's test denotes that there is a significant mediation that take place in the model (z= 2.369946, p = < 0.017791). Since it is full mediation, it could totally claim that Adaptive Teaching is the reason how adaptive learning can influence students' technology integration. This indicates that adaptive teaching is a contributory factor on how students adaptive learning affect students technology integration.

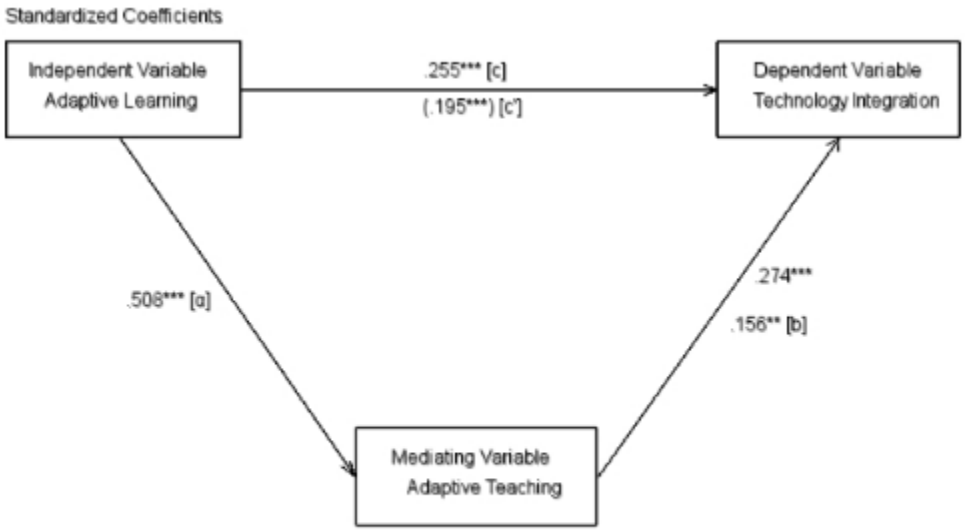
On the other hand, the effect size (β=.079) measure how much of the effect of adaptive learning (IV) on students' technology integration (DV) can be attributed to the indirect path (IV to MV to DV). The total effect (β=.255) is the summation of both direct effect and indirect effect. The direct effect (β=.195) is the size of correlation between adaptive learning (IV) and students' technology integration (DV) with Teachers' adaptive teaching (MV) included in the regression.

The indirect to total ratio index reveal an R-square of .0000. This means that about 100 percent of the total effect of IV on the DV goes through MV, and zero percent of the total effect is either direct or mediated by other variables not included in the model.

Table 6

Type of Mediation Used

Type of Mediation	Significant	
Sobel z-value	2.369946	p = 0.017791
	95% Symmetrical Confidence Interval	
	Lower	.06228
	Higher	.65781
Unstandardized indirect effect		
	a*b	.36004
	se	.15192
Effective Size Measures		
Standardized Coefficients		R2 Measures (Variance)
Total:	.255	.075
Direct:	.195	000
Indirect:	.079	.075
Indirect to Total ratio:	.310	997



NOTE: The numerical values in the parentheses are beta weights taken from the second regression and the other values are zero order correlations.

QUALITATIVE STRAND

This part obtained the results from the qualitative data in analyzing mediating effect of adaptive teaching on the relationship between adaptive learning and technology integration among students.

Essential Themes That Emerge from Lived Experiences Of The Students Pertaining To Technology Integration

This section discusses eight main themes that arose from the in-depth interviews and focus group discussions with the participants. Table 1 depicts these themes as the respondents' assessment in analyzing the lived experiences of students pertaining to the relationship between adaptive learning and technology integration among students such as: Learning Skill Development, Accessible Learning, Student-Teacher Engagement, Effective Communication, Access to Internet Connectivity, Lack of Proficiency and Technological Equipment, Personalized Learning, Teacher's Technological Proficiency.

Learning Skill Development. To effectively engage children in learning and guarantee the desired outcome in our students, teachers must constantly develop and hone their craft.

> *Technology integration is the utilization of technology tools in general content areas in education to enhance student learning experiences. (IDI_P1)*

> *my point of views regarding technology integration it is broadly use in education that allows students to apply their skill herein, because as we know technology is very important regarding to this, student must learn to use any technology devices social media platforms and networks. (IDI_P2)*

> *The professional development that I have experienced in my workplace just like internship, taking classes, going to workshops and seminar, and teaching themselves new skills. In that way, we can give professionals the opportunity to learn and apply new knowledge and skills that can use or help in our job and further in our career. (IDI_P5)*
>
> *Technology integration is a good stuff because it is use of technology tools in general content areas in education that allow us as a student to apply computer and technology skills to learning and problem solving. (FGD_P2)*

The comments made by the participants gave the impression that if teachers want to innovate in their field, they will need to acquire new skills. Thus, the ideas of the participants is supported by Kress (2020) which states that To prepare for the uncertainties of the future, "we need a different kind of education than we had in the past." You can explain why rethinking how teachers advance their careers is necessary by referring to Kress's beliefs. The purposes of education are always evolving to meet the needs of an increasingly advanced society. The educational experience is influenced by these norms. The success of every educational system depends on the teachers who work inside it, and these teachers need a wide range of expertise. The growth of both humanity and education necessitates a reappraisal of teachers' capacities.

Accessible Learning. It encourages students to actively participate in class through the use of interactive learning tools. It offers content in several mediums, such as audio and video, to accommodate students with sensory impairments. To improve their reading abilities, they require access to a wide range of auxiliary aids.

> *Technologies now are helpful tool of learner's life. Integrating technology into classroom instruction and routine makes the way of learning easier and faster. Technology integration is the use of any technology resources within our workplace in our daily classroom practice. (IDI_P4)*
>
> *technology integration is the use the modern technology in line with education for us to easily understand and know what are the learnings or insight we need to learn. (IDI_P5)*
>
> *As we all know technology integration is the use of technology tools in general content areas in education in order to allow students to apply computer and technology skills to learning and problem-solving. We are born and living in an era wherein we all defend our daily life in technology. (FGD_P3)*

The remarks of the participants imply Learning can be made more interesting and personalized with the help of AI technology by providing feedback to students even when they aren't in class.

The remarks of the participants are supported by Since students may engage in learning via e-learning at their own pace and in their own environments, it naturally leads to positive learning results Lee et al., (2019). At recent years, adaptive e-learning has become a common practice in universities worldwide. An new area of study, the adaptable e-learning environment

modifies the concept of distributing e-content to accommodate different learning styles in the context of a learning management system (LMS).

Student-Teacher Engagement. Using technology in the classroom, students are able to pursue meaningful learning, work together on projects, and take charge of their own education. We have included a number of creative strategies for using technology in the classroom to pique the interest of your students.

> *Technology integration influence adaptive teaching and learning by fostering students' engagement. Students learned by doing using the technology with the suited activities for every learner. (IDI_P1)*
> *as a student teacher must engage their pupils/students in different technologies in their teaching methods most especially to those far flung areas. (IDI_P5)*
>
> *Technology integration influence adaptive teaching and adaptive learning because it makes our educations as a students and teacher plan to make it easier by using some sort of technology. Because of those technology you don't need to really have difficulties in making or converting some files. (FGD_P1)*
>
> *empowers teachers and learners develop creative and interactive classrooms discussion. (FGD_P4)*

Participants' thoughts suggest that students' social-emotional health, academic success, and overall happiness are all enhanced when they show high levels of behavioral, emotional, and cognitive engagement.

Thus, the participants' statement is anchored to Lee et al., (2019) and Nkomo et al., (2021). The level of interest shown by students in their studies is now widely recognized as a key measure of classroom activity and, by extension, the quality of education being provided. According to the literature, gauging students' engagement is a predictor of learning and academic achievement This calls for more research into the topic of student engagement. The relationship between learning environment and achievement needs to be untangled. Therefore, studying student involvement is crucial because it influences both a student's final grade and their likelihood of dropping a course.

Effective Communication. Without the ability to express themselves effectively, youngsters are more likely to struggle socially and academically. Success in school requires a wide range of communication abilities, but effective vocal expression is the foundation. In the classroom, students are frequently asked to volunteer their thoughts and opinions.

> *For me technology integration, is the use of technology just like computer, laptop, mobile phones and so on that we use now to communicate and also to our work and studies. (IDI_P6)*
>
> *it can influence technology integration influence adaptive teaching and adaptive learning to make easier the communication in a fast way. (IDI_P12)*
>
> *It influence us to learn faster and to reach more detail easier. (FGD_P5)*

The ideas of the participants imply that students' ability to interact and communicate with others is another area where technology is a great asset. Technology, when used properly and under the direction of knowledgeable teachers, can help students improve their written and vocal communication skills.

The ideas of the participants are connected to Akyürek & Afacan (2018), which stated that all the activities and barriers in the learning-teaching processes are fundamentally related to the communication activity so it's important to take a closer look at the notion of communication in today's educational technology. Communication styles play a significant impact in the classroom. The message's delivery method is based on feedback from these two crucial parties. Ideas, facts, emotions, perspectives, and abilities are all components of student and instructor feedback.

Access to Internet Connectivity. Internet search engines make it simple to get what you need, which is especially helpful for students who can find all the material they need for their homework by just typing it into a search engine. It also allowed them to communicate with one another in order to share ideas and data despite the fact that they were physically apart.

> *In using technology we have to prioritize having technology devices and internet connection in our school so that we can have our access to technology. (IDI_P4)*
>
> *I think it is not the technology integration that we should focus instead we should prioritize on how we could have a stable internet connection in that way it'll be easier to improve our teaching and it will be easier for us to learn. (IDI_P8)*
>
> *As a student, I propose for improving technology integration between adaptive teaching and adaptive learning is government spend a budget for giving a good and stable internet connection for the learner usage during classes. (FGD_P3)*

The ideas of the participants imply that without internet connection, students are unable to collaborate with their educators and peers, conduct independent research, or seek online homework help. Lack of internet access can prevent families from receiving important updates and prevent open lines of communication with their children's schools and teachers.

Also, the ideas of the participants are supported by Sahin (2019). He stated that insufficient access, inherent hazards, and problems like pornography and frauds are the biggest hindrances to the internet's full potential. Internet resources have been contested despite research showing that pupils are more interested in them than other sources. So, it's crucial that students have constant access to the internet, and that lectures and classes regularly direct students to reputable educational websites for additional resources.

Lack of Proficiency and Technological Equipment. Teachers face many obstacles when attempting to incorporate new technologies into their lessons, including a lack of appropriate access to technical support (in-class, informal), the availability of infrastructure (computer labs, software), policies (whether to administer digital homework), and a lack of time.

> *Challenges have you encountered regarding technology integration is the lack of budget for the technology devices and lack of kwowlegde and skills in operating the devices. (IDI_P2)*
>
> *We encountered budget limitations, is one of the major hurdle that proponents of education technology must overcome in order to successfully introduce technology into their classrooms. Second, lack of professional training, teachers need to be able to know not only how to get the most out of each new tool themselves, but also how to train their students in its use. Although professionally training teachers, faculty, and staff may require time and money, it's necessary if students are expected to get the desired effects out of their technological experience. (IDI_P3)*
>
> *Challenges faced regarding technology integration lack of gadgets and other technology to be used and lack of trainings how to use different technology. (FGD_P6)*

The statements of the participants imply that the availability of technical help (in-class and informal), computer labs, software, policy (whether to give digital homework), and teachers' time all provide challenges when seeking to integrate new technology into the classroom.

The statements of the participants are aligned to the ideas of Eady & Lockyer (2019). Despite many new tools being available for use in classroom training and inspiration, the main issue is that teachers do not have access to the most suitable and necessary training to make the most of them. If teachers are going to invest significant time and energy into using cutting-edge technological tools like interactive whiteboards, electronic mail, and the World Wide Web, they should be aware of this.

Personalized Learning. Conceptual knowledge and understanding are constructed by students in dialogue with one another during the learning process. In the context of teacher preparation, the concept of "Personalized Learning" refers to an interest in the ways in which different pedagogical approaches affect the education and development of prospective teachers. The quality of a student teacher's learning and the quality of their future teaching is affected not just by what and how they are taught, but also by the design of the learning process and setting.

> *To improve adaptive teaching and learning we need to focus in giving timely and customized activities which is suited to the learning needs of our students. (IDI_P4)*
>
> *Adaptive teaching is an educational method which uses computer algorithms as well as artificial intelligence to orchestrate the interaction with the learner and deliver customized resources and learning activities to address the unique needs of each learner so how does technological integration influence adaptive technology as we all know technology integration uses technology tools in education for the students to learn the same way as the adaptive teaching. (IDI_P8)*

> *Technology integration influence adaptive teaching and adaptive learning, in adaptive learning offers customized education to each student based on individual needs and it allows students to work at their own pace. It also saves time by keeping students engaged and learning at an optimized level. (FGD_P3)*

The statements of the participants imply that Many educators now understand that each kid brings something unique to the classroom. Tools and strategies that accentuate students' abilities rather than their disabilities allow them to express their passions and create their best work.

The statements of the participants is aligned to the ideas of Hussein & Al-Chalabi (2020). Adaptive e-learning environments enhance the efficacy of distance education through the provision of individualized course materials. Each student in a given course will have unique requirements and learning preferences, thus it's important that the tailored learning environment can accommodate these differences. To maximize or speed up a student's progress, adaptive e-learning dynamically adjusts the difficulty of lessons based on their individual learning styles. Personalized learning has been shown to reduce course failure, boost retention rates, and accelerate learning. To ensure that every student is able to actively participate in the learning process, the personalized learning method prioritizes offering an effective, individualized, and efficient path of learning.

Teacher's Technological Proficiency. The ability to think critically and solve problems is aided by familiarity with relevant facts. The very cognitive processes that educators strive to foster are enhanced by exposure to a richer body of knowledge. Learning more makes kids smarter in this sense.

> *As a student, I proposed that teachers should be well-trained and knowledgeable enough with the use of technology as tools in teaching. With that an effective adaptive teaching and learning would took place. (IDI_P1)*

> *The challenges that I've encountered regarding technology integration are students who do not know how to use the technology, teachers' enough knowledge about technology and its high cost of availing it. (IDI_P3)*

> *Insufficiency of in-service and pre-service training, content support, and incentive system emerged as major perceived obstacles to technology integration. Inadequacy of physical and technological infrastructure was also found to be an important obstacle to successful integration. (FGD_P1)*

The ideas of the participants imply that teachers who have participated in training for teachers workshops have been able to keep tabs on their own evaluation and teaching practices, allowing them to experiment with more cutting-edge academic strategies and methodologies, including webinars, extra-curricular modules, and others. Also, the ideas of the participants are supported by Timperley (2021). He emphasized the importance of continuing education for educators as a means of improving teaching methods, bolstering educational institutions, and boosting academic outcomes for students. Formal learning environments include things like universities' continuing education departments, research universities, and mentorship programs.

Joint display of Quantitative and Qualitative Results

Table 10 reveals the data of salient quantitative and qualitative results. It reveals the nature and purpose of data integration in both quantitative and qualitative findings of the study. On the status of Level of Adaptive Learning obtained the three indicators of Adaptive Learning such as Flexibility, Engagement, and Development obtained the high level as reflected of overall mean score of 3.86 and standard deviation of .391 which reflects the consistency of the responses of the participants. Participants have lived experiences in all indicators coming out as the priori of essential themes, all though not all items in the survey questionnaire have been mentioned. But as far as the themes are concerned, the result of the interview confirmed the three indicators. Hence, it forms an axiological implication that this imply that technology's greatest contribution to the classroom has been to pique students' curiosity and enthusiasm for learning. Better knowledge, hands-on experience, time management, and the capacity to integrate multiple teaching techniques are just a few of the ways in which technology has improved the educational experience for today's students.

Moreover, the level of Adaptive Teaching obtained the two indicators of Adaptive Teaching such as Remediation and Compensatory obtained the high level as reflected of overall mean score of 3.70 and standard deviation of .428 which reflects the consistency of the responses of the participants. Thus, the participants have lived experiences in all indicators coming out as the priori of essential themes, all though not all items in the survey questionnaire have been mentioned. But as far as the themes are concerned, the result of the interview confirmed the three indicators. The findings form an axiological implication that the importance of adaptive learning in adaptive education, which provides tailored educational experiences that address an individual's particular needs via just-in-time feedback, paths, and materials (rather than giving a one-size-fits-all learning experience.

Furthermore, on the third variable technology Integration obtained three indicators such as Technology Capabilities, Technology Adaptability, and Technology Self-Efficacy obtained the high level as reflected of overall mean score of 3.84and standard deviation of .377 which reflects the consistency of the responses of the participants. Participants have lived experiences in all indicators coming out as the priori of essential themes, all though not all items in the survey questionnaire have been mentioned. But as far as the themes are concerned, the result of the interview confirmed the three indicators. Hence, it forms an axiological implication that teacher efficacy depends on their ability to adapt their lessons to their students' unique backgrounds, experiences, and learning styles. Children's academic success is most likely to increase if schools are attentive to their needs and adjust accordingly, for as by offering individualized support to kids who are struggling. As a result of technological advancements, educators now have access to a wider range of resources, allowing them to better engage their students in meaningful ways. Top-tier educators understand the importance of using digital tools and devising novel approaches to make lessons more interesting for their students.

Table 10
Joint display of Quantitative and Qualitative Results

Research Area	Quantitative Phase	Qualitative Phase	Nature of Integration	Axiological implication
Status of three variables	The three indicators of Adaptive Learning such	Participants have lived experiences in	Connecting Merging	This imply that technology's

Level of Adaptive Learning	as Flexibility, Engagement, and Development obtained the high level as reflected of overall mean score of 3.86 and standard deviation of .391 which reflects the consistency of the responses of the participants.	all indicators coming out as the priori of essential themes, all though not all items in the survey questionnaire have been mentioned. But as far as the themes are concerned, the result of the interview confirmed the three indicators	Confirmation	greatest contribution to the classroom has been to pique students' curiosity and enthusiasm for learning. Better knowledge, hands-on experience, time management, and the capacity to integrate multiple teaching techniques are just a few of the ways in which technology has improved the educational experience for today's students.
Level of Adaptive Teaching	The two indicators of Adaptive Teaching such as Remediation and Compensatory obtained the high level as reflected of overall mean score of 3.70 and standard deviation of .428 which reflects the consistency of the responses of the participants.	Participants have lived experiences in all indicators coming out as the priori of essential themes, all though not all items in the survey questionnaire have been mentioned. But as far as the themes are concerned, the result of the interview confirmed the three indicators	Connecting Merging Confirmation	The importance of adaptive learning in adaptive education, which provides tailored educational experiences that address an individual's particular needs via just-in-time feedback, paths, and materials (rather than giving a one-size-fits-all learning experience).
Level of Technology Integration	The three indicators of Technology Integration such as Technology Capabilities, Technology Adaptability, and Technology Self-Efficacy obtained the high level as reflected of overall mean score of 3.84and standard deviation of .377 which reflects the consistency of the responses of the participants.	Participants have lived experiences in all indicators coming out as the priori of essential themes, all though not all items in the survey questionnaire have been mentioned. But as far as the themes are concerned, the result of the interview confirmed the three indicators	Connecting Merging Confirmation	Teacher efficacy depends on their ability to adapt their lessons to their students' unique backgrounds, experiences, and learning styles. Children's academic success is most likely to increase if schools are attentive to their needs and make adjustments accordingly, for as by offering individualized

				support to kids who are struggling. As a result of technological advancements, educators now have access to a wider range of resources, allowing them to better engage their students in meaningful ways. Top-tier educators understand the importance of using digital tools and devising novel approaches to make lessons more interesting for their students.

CONCLUSIONS

Based on the descriptive results in the study it was revealed that the level Adaptive Learning is very high. It means that this allows students to concentrate on areas where they need to develop their abilities or knowledge while avoiding subjects in which they are already proficient. Moreover, there was a high level of adaptive teaching. This demonstrates that each instructor adapts to their pupils' needs. They had more overall success owing to their commitment to the material. Furthermore, based on the descriptive results Technology Integration obtained high level. This means that students have easy access to a wealth of online resources, which motivates them to do research and fosters their independence. Furthermore, it promotes learning by making things more accessible, such as via instructional films. Also, based on the correlation analysis it was revealed that there was a high significant relationship between Adaptive Teaching and Adaptive Learning ($r=.508$, $p<0.05$), Adaptive Teaching and Technology Integration ($r=.255$, $p<0.05$), and Adaptive Learning and Technology Integration ($r=.274$, $p<0.05$). Based on the results of regression analysis it was revealed that Adaptive Learning ($r=.188$, $p=0.003$) and Adaptive Teaching ($r=.138$, $p=0.016$) are the best predictors of Technology Integration. More likely, based on the results of Sobel test revealed that adaptive teaching significantly mediates adaptive learning and students technology integration ($z=2.369946$, $p=0.017791$). Based on the thematic analysis revealed that there were eight (8) themes that emerged from the lived experiences of students pertaining to technology integration such as Learning Skill Development, Accessible Learning, Student-Teacher Engagement, Effective Communication, Access to Internet Connectivity, Lack of Proficiency and Technological Equipment, Personalized Learning, Teacher's Technological Proficiency. Finally, based on the results revealed from the quantitative and qualitative findings the data integration was confirming, connecting, and converging.

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