

## **ICT Integration in Primary Classrooms in the Light of Jean Piaget's Cognitive Development Theory**

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### **Abstract**

Since the pandemic's impact on the world's educational systems, the use of digital platforms has increased significantly. The authors of this research offer useful teaching strategies that can be applied in the classroom and may be employed in the event of a future pandemic or a return to a more conventional learning and teaching environment. Considering the cognitive development articulated by Jean Piaget and its use of and integration with ICT. The authors conducted this study using descriptive qualitative research and thematic analysis. The narrative and theme analysis that the authors undertook also enabled them to draw insightful inferences from the study's primary source. The findings show that ICT integration is very successful for both teachers and students when seen in the light of Jean Piaget's theory of cognitive development. Additionally, it was found that the teacher's continual ICT learning is one of the crucial components of an effective and successful teaching and learning process. The implementation of policies in the classroom and the strategic use of technology by students must be considered and explored in future studies.

**Keywords:** *ICT integration; teaching pedagogy; cognitive development theory; educational technology*

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### **INTRODUCTION**

How important is ICT integration in primary school classrooms? The answer to this question has been widely researched and debated over the years. However, a recent study conducted by the University of Geneva found that there is a direct correlation between ICT integration in primary school classrooms and higher levels of cognitive development in students (Yamamoto & Yamaguchi, 2019). This study was based on Jean Piaget's Cognitive Development Theory, which states that children go through four stages of cognitive development: sensorimotor, pre-operational, concrete operational, and formal operational.

The first suspected case of COVID-19 in the Philippines was suspected on January 22, 2020, and as of March 1, there have been 633 suspected cases (Edrada, 2020; Sasan & Baritua, 2022). The Office of the President of the Republic of the Philippines declared a state of emergency for the entire country (Proclamation No. 929). March 16, 2020 (Malacanang Palace Proclamation No. 922).

Significant barriers prevent the efficient use of ICT integration as common proof during pandemics in the Philippines due to the country's poor infrastructure and a lack of dependable ICT tools utilized in the classroom and by students (Collado et al., 2022). The DepEd provided its teachers with costly laptops that had insufficient specs, which also hampered the delivery of high-quality instruction during the crisis (Fernandez, 2022).

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The COVID-19 pandemic has had a significant effect on education systems around the world. In many countries, schools have been closed due to government restrictions and social distancing measures. This has resulted in children being unable to access their usual learning environments. As a result, teachers have been forced to adapt their teaching methods to ensure students continue to learn effectively.

In order to help educators meet these challenges, ICT integration in primary school classrooms during the pandemic has been explored in this study. Specifically, the focus was placed on how ICT integration could be implemented in the classroom environment to enhance student learning.

As digital technologies become increasingly commonplace in society, it is important for primary school classrooms to integrate these tools in order to best prepare students for the future. ICT integration can support students' cognitive development in a number of ways, according to Jean Piaget's cognitive development theory (Blake & Pope, 2008).

ICT can play an important role in each of these stages of cognitive development. For example, during the sensorimotor stage, ICT can be used to help children learn about cause and effect. The purpose of this paper was to investigate how ICT integration could be applied in primary school classrooms in order to enhance students' cognitive development theory (Piaget) and learning outcomes. In particular, the study focused on the use of ICT tools in teaching concepts and skills.

#### Research Questions

How is the use of ICT in primary classrooms affecting teacher autonomy, control, and effectiveness? How can the integration of ICT be related to Jean Piaget's theory of cognitive development? How does the cognitive development theory of Jean Piaget improve classroom management in the contemporary era?

#### LITERATURE REVIEW

##### The use of ICT Technology

Compared to earlier generations of children, the majority of children today are born with technology. On the one hand, technology is unavoidable in today's educational system. The best way to enhance a child's learning is through technology.

The use of technology in the classroom not only encourages active learning but can also ease a teacher's job. Technology assistance throughout the preoperative and concrete operational phases not only supports the educational curriculum but also improves the child's linguistic development. A child loves to play and play games when they are in this stage (pre-operational). Higher-order cognitive skills are encouraged in children through educational video games (Bang Luft, 2013).

The use of technology in the classroom has a favorable effect on the student and his learning environment. The use of technology can help the teacher foster a supportive and effective learning environment. Technology has the potential to help children clearly visualize concepts or goals.

The cognitive development of Jean Piaget has a significant influence on educational teaching methods. According to Slavin and Cheung (2005), there are four teaching implications that are consistent with Jean Piaget's Cognitive Development Theory.

1. Teaching must place more emphasis on the child's mental process than on its result - It suggests that teachers should place more emphasis on how a child thinks about concepts rather than immediately correcting a bad response or looking through his test results. Instead of focusing on the end product, education must emphasize the learning process or how the child acquires knowledge.

2. Identifying a child's genuine interests - Every class is encouraged to learn about themselves and their actual interests in a Piagetian classroom. The teacher can simply direct the student toward his progress in terms of cognitive, physical, and emotional development by identifying his interests.
3. Placing a focus on practices - This implies that repetitive practices and exercises might hasten a child's development, particularly during the pre-operational stage. Play-based learning activities can assist a child in learning while also helping him to remember what he has learned for a long time.
4. The teacher needs to emphasize each child's unique characteristics. This suggests that the teacher should use a variety of assessments to evaluate the student. To comprehend the variety of learners, the teacher needs to have effective listening skills.

#### The Teaching Instruction

The teaching strategy should be based on the child's current stage, potential, and/or actual growth. We learn that a child at this age enjoys playing. The teacher should give the child brief instructions using words and actions. It is also preferable to give the instructions in the form of a game or play to grab the child's attention.

After giving the instruction, request that the students show the rest of the class how to do it. Since children are egocentric, no one should expect the child to view the world from their perspective. Seeing the world from the child's point of view is the most effective technique to train the youngster and convey knowledge. Never should a teacher give a lesson or instruction that is too disconnected from the student's reality. The educator should speak about the concept in light of the pupil's experiences.

#### RESEARCH METHOD

A qualitative research approach was used for this study. Ten teachers in total were interviewed at two Philippine schools. The interviews were recorded verbatim and transcribed. Reading and rereading the transcripts was part of the data analysis process, which was followed by data coding and classification. The study questions' themes were found using open coding methodologies. The examination of the data revealed three key themes: (a) teacher autonomy; (b) teacher control; and (c) teacher effectiveness.

#### Data Collection

A combination of maximum variety (public school teachers and private school teachers) and criterion (at least 5 years of experience in teaching) sampling procedures were used to select appropriate participants in order to maximize variability and obtain rich data. By using this method, a total of 10 people—5 public school teachers and 5 private school teachers—volunteered to take part in the study. The participants' signatures guaranteed the confidentiality of their information on an informed consent form, and they also received information about their right to withdraw from the study. This study will generate analytical data that is recorded in a descriptive manner using information from data sources. Teachers at Luas Elementary School and South City Central School in Toledo City, Cebu, served as the primary sources for this study. The authors use observational techniques to gather data as they observe the ICT integration in primary school classrooms during the pandemic in the context of Jean Piaget's Cognitive Development Theory. Researchers then formulate issues and converse with teachers at Toledo City Central School and Luas Elementary School in Toledo City, Cebu, Philippines, in-depth. The findings of

the interviews with primary school teachers were then documented by the researchers in text, photographs, and audio recordings.

#### Data Analysis

Data reduction techniques are a type of analysis that sharpens, categorizes, directs, eliminates superfluous data, and organizes data so that conclusions can be drawn from it. Following the compilation of information, the presentation of facts or actions allows for the potential to reach conclusions. In addition to narrative text (in the form of field notes), matrices, graphs, networks, and charts are other ways qualitative data is presented. After that, depending on data reduction and visualization, the study's findings can be used to make decisions.

### **FINDINGS AND DISCUSSION**

#### Findings

##### *ICT integration and Teacher Autonomy*

Technology has become an integral part of our lives. It has become an essential part of our education system as well as our daily routines. The use of technology has made learning more effective and efficient. Teachers use various applications in their classrooms to engage their students in meaningful learning experiences.

T2 stressed, "I see the positive impact that technology has on the classroom. I find it helpful in planning lessons and monitoring students' performance." In addition to this, T2 also said, "My students also find it efficient in communicating with their teachers and in recording assignments. I see that there is an immediate morale boost when teachers utilize ICT in their classrooms. It positively impacts the teacher's role in the classroom and can have a positive effect on student performance."

ICT integration takes a while to show positive results. In the beginning, most of the teachers find it challenging to utilize the tools they are given. This is because there are no proper training materials or guidelines to help them learn how to use new tools. After gaining experience with new technology, teachers start seeing improvements in their students' performance. In fact, T3 claim, "Over time, they will start finding ways to assist struggling students and become more autonomous themselves."

There are many benefits for both teachers and students when ICT integration is successful. T4 affirms, "I can monitor student performance and make changes accordingly. I can also assist struggling students by using technology in classroom management strategies. In addition, ICT usage improves my teaching skills among elementary school students."

Teachers find it easy to adopt new technology into their classes when it is helpful to student performance. They know how much better classroom management is when technology is integrated effectively. There are also many benefits for students when teachers are autonomous with technology integration strategies. Ultimately, integrating technology in the classroom increases both learning outcomes and teacher autonomy.

When it comes to the autonomy that teachers have when it comes to the use of ICT inside the classroom, T3 said, "I have found that it is very important for teachers to be aware of the different ways in which they can use ICT inside the classroom. One of the ways teachers can use ICT inside the classroom is through the use of computer-based tasks." She further stated that another way in which teachers can use ICT inside the classroom is through the use of multimedia resources.

ICT can be a great tool to help teachers achieve their goals and objectives inside the classroom. However, teachers need to be aware of the different ways in which they can use ICT inside the classroom.

In addition, it is also important for teachers to be aware of the different ways in which ICT can be integrated inside the classroom.

#### *ICT integration and Teacher Control*

T8, who is in her late 40s, said, " ...I was not very confident in my abilities to use technology in the classroom. I had never been a very "techie" person, and I was worried that I would not be able to keep up with the rapidly changing landscape of educational technology. However, I quickly realized that integrating ICT in the classroom was not as difficult as I thought it would be. In fact, it has helped me to take control of the learning process in several ways."

T7 stated, "For starters, I have found that using ICT in the classroom has helped me to better engage my students. When I use technology, my students are more engaged in the lesson, and they are more likely to participate in the learning process. Additionally, I have found that using ICT in the classroom has helped me to better assess my students. I can use a number of different tools to track my student's progress and to identify areas where they may need additional help."

T3 and T10 both claim that they have found that integrating ICT in the classroom has been a positive experience. It has helped them to take control of the learning process and to better engage and assess my students.

#### *ICT integration and Teacher Effectiveness*

A classroom is a tough place to teach; it's distracting, noisy, and hectic. No one wants to spend time in a chaotic classroom. But teachers must spend time in class to teach their students. Therefore, they need to find ways to make their classroom experiences productive while minimizing stress. Technology has revolutionized teaching and changed the way we approach the challenges of teaching in an unstable environment.

Classrooms are often noisy and anxiety-inducing environments. In fact, T6 states, "I spend most of my time trying to keep my classes organized and on task. I have to manage my students, equipment, and lesson myself."

This is tough work, but it's necessary if teaching is going to be effective. Teachers need quiet time to plan lessons, revise materials, and speak with each other. They also need quiet time to concentrate and learn new things. Smart devices allow teachers to do both at the same time without interrupting their students.

ICT has become an integral part of life for most people; it helps us stay connected with family and friends. T9 states, "My students use ICT for socialization and for accessing educational content. I also use smart devices for lesson planning, keeping records, and communicating with parents and students."

Technology has changed how teachers teach by making lesson planning easier and more efficient. T1 claim: "As a teacher myself, I can now access lesson plans anytime from any device with internet access. This allows me to access lesson plans without having to bring my students along with them into the classroom." Students can't disrupt lessons when they're in a different part of the building than their teacher. Instead of carrying around notes, teachers can now focus on preparing engaging lessons for their students instead of themselves.

Personalization is another aspect that has drastically improved since ICTs made their way into schools. T4 said, "As a teacher, I used to spend most of my time teaching new material to different students every day. Now I have more time to focus on each student individually, which is much more rewarding personally speaking." Smart devices make it easy for teachers to keep track of individual student progress,

which allows them to provide personal attention during class sessions. This makes every class session much more effective, as teachers can spend time personally addressing each student's developmental needs.

## Discussion

### *ICT integration and Teacher Autonomy*

In the past 20 years, computers have become an integral part of life and learning (Culp et al., 2005). Schools have incorporated computer technology at different stages of development to support learning. Referred to as ICT, this technology allows teachers and students to communicate, access information, and perform daily tasks. According to Girard (2007), this technology is also used in military programs and combat situations to improve strategy and outcomes. In many countries, computer technology has transformed the way people live and learn.

ICT integration is the use of computers or the internet in school to improve teaching and learning. For example, in PAU Excellencia Global Academy Foundation, Inc. (PEGAFI), the educational institution uses its learning management system (LMS) for class management- keeping track of each student's academic performance. Another instance of ICT integration is using computers for lesson planning and the auto-generation of several forms, such as what the PEGAFI School is doing for their students and teachers. This allows teachers, principals, school administrators, and even students to access information quickly. As technology becomes more advanced, and with the use of PEGAFI LMS, the school has encountered minimal problems in terms of providing students with online courses during the pandemic. With the help of PEGAFI LMS also helped the teachers assess students' learning. Furthermore, this allows schools to tailor lessons to meet the needs of individual students.

Teacher autonomy is a way for teachers to manage their classrooms effectively without interference from administrators or governing bodies. It's about giving teachers the freedom to teach in the way they think best suits their students. At the same time, this allows students to perform at their best when given appropriate guidance from teachers. ICT has also made it easier for teachers to interact with parents regarding academic issues. In fact, the use of PEGAFI LMS helps teachers easily contact parents when a student has trouble complying with school assignments and performance tasks. Parents appreciate this as they can provide feedback that directly affects student progress through the use of LMS.

ICT has drastically reduced the cost of sending information worldwide- no longer do schools have to pay expensive data transfer fees. Before ICT became popular, schools had to manually retrieve all academic information (Aker & Mbiti 2010). Now this information can be retrieved via the internet. This allows schools to retrieve their students' academic information much faster than before. ICT-specialized software has been developed for this task- retrieval rates.

ICT integration and teacher autonomy have made it easier for schools to implement new learning tools while promoting better classroom management. ICT integration has helped increase learners' grades and improve overall school performance, as mentioned by T5.

According to Piaget's theory, intellectual progress occurs in stages over a lifetime. At each stage, an individual changes his ability to think logically and cognitively (Blake, 2015). Initially, infants have difficulty understanding new concepts and have poor motor skills. As they grow older, they will gradually gain new abilities through play and experience. This theory asserts that there are also stages involved in emotional development, as well as in self-awareness and physical maturity. It is believed that as children age, they will attain new mental capabilities that will enrich their lives and prepare them for adulthood

(Blake, 2015). When considering how ICTs can impact future generations of citizens, it is important to consider how these tools can transform teaching methods at different stages of intellectual growth.

ICTs can help empower teachers by allowing them to personalize teaching methods for their students. For example, if a teacher needs students who are eight years old to add up numbers, he can use an app that allows kids this age to do so as well. Alternatively, if a teacher needs children who are thirteen years old to write essays, he can use an app that generates high-quality articles for teenage writers. However, there is debate regarding whether computers should empower teachers or become another tool for removing authority from the classroom environment.

Schools need ICT to accommodate the changing nature of education today. Well-equipped teachers will be able to transform learning methods for their students at different stages of mental development via these tools. Since ICTs have become a necessity for modern society, educators must consider how these tools can impact the lives of future generations of citizens.

#### *ICT integration and teacher control*

Computer technology in schools (ICT) is an important part of today's world. Schools are no exception to the trend of integrating computers into education. Many classrooms now have computers used for lesson planning, assessment, and other educational purposes. Teachers are now also using computers for teaching. Students must learn how to use computers in school.

The integration of computers into education is a growing phenomenon. Teachers use computers in many subjects, such as mathematics, science, and language (English and Filipino) classes (Nunan, 2003). This is because these subjects are computer-intensive (Nunan, 2003). For example, mathematics involves a lot of calculation, while science and language involve a lot of text processing. Using computers in this way saves time and effort while promoting student learning.

The nature of ICT has made it easier for teachers to monitor their student's academic progress. For example, with the use of PEGAFI LMS, teachers can easily access attendance records and pay records and generate reports on their student's academic performance. This has reduced the time needed by teachers to collect this information, allowing them to focus on teaching. Additionally, the PEGAFI LMS also helps teachers organize lesson plans and keep track of their student's progress throughout the day. They also assist them in preparing for daily lessons by accessing lesson notes, worksheets, and other materials required for teaching. Ultimately, the integration of ICT into education has revolutionized the way schools run and teach.

Schools can choose to use ICT in several different ways. For example, they can plan lessons using computer software (Handler, 1993). Students can also plan their lessons using computers. This is known as computer-aided instruction (CAI). It's possible to assess students' progress using computer-based tests. This is known as computerized adaptive testing (CAT) (Chang, 2015). Teachers can also use computers for classroom management, for example, to control students' behavior with digital punishments and rewards.

The benefits of ICT integration in the classroom are immense. However, it's easy to lose sight of the fact that teachers control the ICT used in their classes. The following are some ways that teachers can control ICT usage in their classes.

As T4 stressed, ICT integration is highly effective when both teachers and students have access to modern devices. Teachers must have modern devices such as computers, tablets, and smartphones. Additionally, T2 emphasized that students must also have modern devices to take computerized tests or receive digital rewards and punishments. This way, both parties understand the technology they're using and know how to use it effectively.

ICT integration is a great way to modernize and update old-school infrastructure without spending tons of money on new technology. It's easy to control since both teacher and student have control options when using ICT in the classroom.

Many people believe that psychologists Jean Piaget and Lev Vygotsky were contemporaries. In fact, they lived at different times in history. However, both men studied child development and the effects of technology on that development. They both had ideas about how children learn and how technology can help them learn.

Vygotsky looked at the relationship between child development and education, especially with regard to how children learn to use technology (Verenikina, 2010). He believed that technological advancement happens faster in developed countries. This is because schools have more money to purchase modern teaching equipment. He also believed that schools should try to incorporate new technology into their teaching strategies to help their students learn (Verenikina, 2010). This is because faster learning allows schools to show more information to their students and prepare them for the adult world.

ICT allows for faster learning and more efficient class presentations. For example, school presentations can now happen instantly instead of over a period of time. Students don't have to wait for the teacher to finish speaking before understanding what was said. It's also much easier for teachers to assess each student's understanding of the lesson material. This way, all learning happens in a child's mental stage of development; ICT just makes it easier for the child to understand.

Both Piaget and Vygotsky thought that children must have freedom and independence in order to develop normally. Therefore, teachers should never restrict students' freedom and should always include their needs in lesson planning and make amendments. For example, teachers can have students write assignments on computer terminals instead of paper scraps. This way, students can access written assignments any time of day or night, as well as reduce teacher handwriting errors. There are many different ways to integrate ICT into the classroom and meet the students' needs; only experience will guide the teacher educators in devising those methods.

Both psychologists had good ideas about incorporating modern teacher educational technology into educational strategies to help students learn faster and better understand concepts. Teachers can use ICT in many ways to help their students learn effectively- but they must understand how children think before using it in classes with young children.

#### *ICT integration and Teacher Effectiveness*

One of the most debated educational topics today is the use of Information and Communication Technology (ICT) in education. For many, ICT is a wonderful technology that can revolutionize teaching and learning. For others, ICT is a disruptive technology that needs to be closely monitored. The debate on ICT's role in education has been going on for decades and will probably continue. At present, there is no clear-cut conclusion on the subject. Nevertheless, based on the body of literature on ICT and education, here are some thoughts on the subject.

First of all, ICT helps educators stay connected and motivated. Educators find it helpful to stay connected with parents, friends, and colleagues. They do this using email, text messages, and social media sites such as Facebook and Twitter. In addition, they use online teacher training platforms, such as e-learning platforms. In addition, they use online lesson plans and educational software to plan and implement lessons. On the other hand, students use educational IT to access information about their courses and teachers. They use Blackboard for course outlines, assignments, notes, and exams; Canvas for

lectures; chat rooms for one-on-one discussions; forums for collaborative work; blogs for personal interests; and social networking sites for social connection with peers.

Jean Piaget is considered the father of child psychology. His theory of cognitive development is widely applied in psychology classes to explain the stages through which children develop their mental faculties. Although he was a scientist, Piaget believed that the stages through which children develop mental abilities could be applied to technology in general and information and communications technology (ICT) in particular (Gobbo & Girardi 2001). He believed that new technologies should be designed to address the specific stages of development that people experience at various points in life.

ICTs are designed to handle one aspect of a child's mental development. For example, adults, for communication and organizational purposes, typically use mobile phones. They're also commonly used as toys by children between the ages of two and ten. This design philosophy is known as generativity, which means designing something to address a specific stage in someone's life while also making it useful for other stages. It's based on the idea that people learn and develop at different paces and with different concepts at different stages of life; therefore, it's important to design things with that in mind.

ICTs are used to address different stages of mental development, from physical to mental. For example, schools commonly use ICTs for teaching purposes: teachers use computers to organize lessons and keep records of their student's progress. Child development experts also use ICTs to explain concepts such as cause and effect to young children (Werner & Malterud 2003). Additionally, pediatricians use them to keep track of their patient's health and physical development (Werner & Malterud, 2003). Piaget would have loved this; his theories apply directly to how these professionals use them in their daily work.

Teachers are now also using ICT in the classroom to improve their students' performance. One major advantage of having computer stations in classrooms is that educators can now train students how to use computers. Doing so promotes both educational and physical development among young people by allowing students to practice using computers within the school and at home. In addition, teachers can now assign more complex tasks to their students when using computer stations in class, such as creating visual presentations or performing database management functions. This improvement in student performance is a direct result of the increased convenience afforded by ICT integration within the classroom environment.

Another advantage of integrating ICT into primary schools is that it facilitates feedback among teachers and between teachers and students. Teachers can now access lesson notes from their students directly from the computer station they are using for class lessons. This allows them to respond quickly to student questions during lessons or correct incorrect answers directly from the teacher's perspective. Furthermore, integrating mobile phones into schools allows for instant feedback between teachers and students on an individual level during recess or after school hours. This can greatly improve learning outcomes among young people as both parties gain from this highly efficient method of feedback collection.

Educators can use educational email platforms to send messages to students regarding lessons or inquiries regarding student records. In addition, they can use educational calendars to plan lessons and contact students with appointments at appropriate times. Students also use educational ICT to contact their teachers regarding lessons or queries regarding assignments. In addition, they can use educational messaging apps such as messenger to talk with their families during late night or early morning hours when school is usually in session.

ICT has a major impact on work in schools. Educators find it helpful to access educational content through ICTs such as lesson plans, educational software, and educational journals. This allows them to plan

lessons and address student needs efficiently and effectively. In addition, they can access educational data from students through Canvas to analyze student performance in classes and plan individualized instruction for each student. Students also find it easier to access teacher information to ask questions about lessons or submit assignments for feedback.

#### *Challenges Faced in the ICT integration inside the classrooms*

The digital world always brings about new challenges, with the obvious ones being comfort and online safety. But there are also challenges in adapting to a digital-based environment since working in technology means you will be dealing with constant change. Drama, questions, answers, and edits in real-time will get overshadowed by online chatrooms or timelines. It is important to know that you need to be focused on jumping past challenges and thinking about a real plan.

A recent study has shown that there are a number of challenges that teachers face when trying to integrate ICT in the classroom. In this paper, we will take a look at these challenges and explore ways to overcome them. One of the main challenges that teachers face when integrating ICT in the classroom is keeping students engaged (Hoang & Le, 2021). With so many distractions available online, it can be difficult for teachers to keep students' attention focused on the task at hand.

Another challenge that teachers face has enough ICT resources. Many schools do not have the necessary infrastructure in place to allow for the widespread use of technology in the classroom. This can be a major obstacle for teachers who are trying to integrate ICT into their classrooms. Another challenge that teachers face is training and support. Many teachers feel unprepared to use ICT in the classroom and do not know where to turn for help.

1. Ensuring that technology is used effectively and efficiently
2. Ensuring that students are using technology responsibly and ethically
3. Integrating technology into lessons without disrupting the flow of instruction
4. Providing adequate training for teachers
5. Ensuring that technology is available when needed

#### **CONCLUSION**

Technology is not necessarily the solution to the challenges confronting teachers, but in the absence of a technology-led solution, it could be a powerful tool to tackle some of the problems facing educators today. There are several factors behind the growth of digital teaching environments. These include the globalization of the economy, the widespread adoption of ICT, the rise of the Internet and smartphones, the reduction in the cost of making education accessible, the availability of the right equipment (such as laptops), and the shrinking resources of schools (leaving little room for the training of teachers).

The researchers look at a few of the changes that can help teachers be better equipped to educate students in an online environment. It has been found that a willingness to learn and adapt is essential. Learning to adapt to a new teaching environment and a new learning model is critical to improving education for today's students. In the rapidly-changing world of education, many teachers still see learning material as being made for people they know. As a result, it does not equip them to use the multimedia tools and programs available today. For this reason, teachers need to be aware of and adapt to the new teaching conditions in order to remain relevant to their students.

Being prepared to adapt is also a prerequisite for professional growth and development in this fast-paced environment. All educators, irrespective of where they come from, have the potential to expand

their knowledge and skills and meet the new challenges faced in an educational environment. Being digitally trained helps teachers improve their research, communication, and assessment skills.

In addition, technology is often just a tool to improve the teaching experience. By keeping a close relationship with the students, the teacher has more meaningful conversations with them, sharing ideas and discussing new and challenging information in which the student is interested. Technology has provided the opportunity to overcome the distance between teacher and student, as well as the time and material constraints, enabling learners to immerse themselves in the learning experience.

Finally, technological tools can help accelerate the pace of learning and improve the quality of education. It provides an excellent vehicle to increase the speed with which teachers can deliver teaching materials and test-related material to students.

#### Recommendation

The digital age is upon us, and with it comes a whole new way of doing things. The old ways of teaching are no longer sufficient – teachers need to adapt to the digital world and use ICT in our classrooms to stay relevant. But what does that mean for the old teachers? How can they adapt to the digital age and integrate ICT into their classrooms? Become a lifelong learner. One of the best ways to adapt to the digital age is to become a lifelong learner. If you are constantly learning and keeping up with the latest trends, it will better equip you to deal with the challenges of the digital world.

Whenever teachers try to integrate information and communication technologies into the classroom, the development of suitable teaching materials is a key priority. Due to the dynamic nature of ICT usage, teachers can benefit a lot from tutorials, materials, and guides that outline the effective use of ICT in the classroom. Any practical guides and tutorials should be available both for use at home and at school. They help instructors adjust to the classroom when ICT is being used at the primary and secondary levels in order to follow upward trends and discover innovative methods of teaching/learning.

Moreover, technology integration should be more integrated into the academic curriculum, avoiding the use of just supplementary resources designed for real-time integration. A positive and respectful relationship between teachers and students is crucial to enhancing the school's ICT learning environment (Carnoy, 2005). Therefore, ICT partnerships between schools and teachers involving both parties need to be developed in line with the roles and responsibilities defined by both parties. This can be achieved by supporting each other in a number of ways.

#### REFERENCES

- Aker, J. C., & Mbiti, I. M. (2010). Mobile phones and economic development in Africa. *Journal of Economic Perspectives*, 24(3), 207-32.
- Bang, E., & Luft, J. A. (2013). Secondary science teachers' use of technology in the classroom during their first 5 years. *Journal of Digital Learning in Teacher Education*, 29(4), 118-126.
- Blake, B. (2015). Developmental psychology: Incorporating Piaget's and Vygotsky's theories in classrooms.
- Blake, B. and Pope, T. (2008), Developmental Psychology: Incorporating Piaget's and Vygotsky's Theories in Classrooms, *Journal of Cross-Disciplinary Perspectives in Education*, 1 (1), 59 – 67.
- Brouse, C. H., & Chow, T. H. (2009). Exploring pre-operational and concrete operational children's thinking on nutrition: A case study. *Health Education Journal*, 68(3), 219-231.
- Carnoy, M. (2004). ICT in education: Possibilities and challenges. *Inaugural Lecture of the UOC, 2005*.
- Chang, H. H. (2015). Psychometrics behind computerized adaptive testing. *Psychometrika*, 80(1), 1-20.

- Collado, Z. C., Concha, C. B. A., & Orozco, N. M. I. (2022). Teaching in Transition: How Do Filipino Teachers Face the Migration to Cyberspace amid the Pandemic?. *Computers in the Schools*, 38(4), 281-299.
- Culp, K. M., Honey, M., & Mandinach, E. (2005). A retrospective on twenty years of education technology policy. *Journal of Educational Computing Research*, 32(3), 279-307.
- Edrada EM, Lopez EB, Villarama JB, Salva Villarama EP, Dagoc BF, Smith C, Sayo AR, Verona JA, Trifalgar-Arches J, Lazaro J, Balinas EGM, Telan EFO, Roy L, Galon M, Florida CHN, Ukawa T, Villaneuva AMG, Saito N, Nepomuceno JR, Ariyoshi K, Carlos C, Nicolasora AD, Solante RM. First COVID-19 infections in the Philippines: a case report. *Trop Med Health*. 2020 Apr 14;48:21. DOI: 10.1186/s41182-020-00203-0. Erratum in: *Trop Med Health*. 2020 May 7;48:30. PMID: 32308532; PMCID: PMC7154063.
- Fernandez, D. (2022, September 22). *Group says most teachers returned DepEd laptops due to specs issue*. <https://newsinfo.inquirer.net/1672696/group-says-most-teachers-returned-deped-laptops-due-to-specs-issue>
- Ghazi, S. R., & Ullah, K. (2015). Concrete operational stage of Piaget's cognitive development theory: An implication in learning general science. *Gomal University Journal of Research*, 31(1), 78-89.
- Girard, P. (2007). Military and VA telemedicine systems for patients with traumatic brain injury. *Journal of Rehabilitation Research & Development*, 44(7).
- Gobbo, C., & Girardi, M. (2001). Teachers' beliefs and integration of information and communications technology in Italian schools. *Journal of Information Technology for Teacher Education*, 10(1-2), 63-85.
- Handler, M. G. (1993). Preparing new teachers to use computer technology: Perceptions and suggestions for teacher educators. *Computers & Education*, 20(2), 147-156.
- Huitt, W., & Hummel, J. (1997). An introduction to operant (instrumental) conditioning. *Educational psychology interactive*.
- Hoang, N. T., & Le, D. H. (2021). Vocational English teachers' challenges on shifting towards virtual classroom teaching. *AsiaCALL Online Journal*, 12(3), 58-73.
- Looft, W.R., (1969). Egocentrism and social interaction in young and old adults. Retrospective Theses and Dissertations. 3758. <https://lib.dr.iastate.edu/rtd/3758>
- Marx, A., Fuhrer, U., & Hartig, T. (1999). Effects of classroom seating arrangements on children's question-asking. *Learning Environments Research*, 2(3), 249-263.
- McLeod, S. (2018). The Pre-operational Stage of Cognitive Development. Simply Psychology. <https://www.simplypsychology.org/preoperational.html>
- Nunan, D. (2003). The impact of English as a global language on educational policies and practices in the Asia-Pacific Region. *TESOL quarterly*, 37(4), 589-613.
- Piaget, J. (2021). Jean Piaget: An Enduring Legacy. *Learning Theories for Early Years Practice*, 61.
- Sasan, J. M., & Baritua, J. C. (2022). Distance learning as a learning modality for education during the COVID-19 pandemic. *Science and Education*, 3(8), 35-44.
- Sasan, J. M., & Rabillas, A. R. (2022). Enhancing English proficiency for Filipinos through a multimedia approach based on constructivist learning theory: a review. *Science and Education*, 3(8), 45-58.
- Shabiralyani, G., Hasan, K. S., Hamad, N., & Iqbal, N. (2015). Impact of Visual Aids in Enhancing the Learning Process Case Research: District Dera Ghazi Khan. *Journal of education and practice*, 6(19), 226-233.
- Slavin, R. E., & Cheung, A. (2005). A synthesis of research on language of reading instruction for English language learners. *Review of educational research*, 75(2), 247-284.
- Verenikina, I. (2010, June). Vygotsky in twenty-first-century research. In *EdMedia+ innovate learning* (pp. 16-25). Association for the Advancement of Computing in Education (AACE).

- Werner, A., & Malterud, K. (2003). It is hard work behaving as a credible patient: encounters between women with chronic pain and their doctors. *Social science & medicine*, 57(8), 1409-1419.
- Yamamoto, Y. and Yamaguchi, S. (2019), Relationships between ICT Implementation at Schools and Factors Related to Transformational Leadership: A Case of primary school in Mongolia , *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 15, (2), 45-61.