Impact of Teachers' Training on the Use of E-Portfolios and Digital Inquiry-Based Information Technology and Pupils' Literacy Abilities

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Executive Summary

Background and Objectives

The study explored the effectiveness of teacher training on E-Portfolios and digital Inquiry-Based Information Technology (I-BIT) strategies in improving literacy skills among grade six pupils in public primary schools in Benue State, Nigeria. Given the persistent challenges in reading and writing among primary school pupils, the study sought to determine whether integrating ICT-based strategies could enhance instructional delivery and improve literacy outcomes. The research also examined gender-based differences in pupils' performance and the overall impact of digital tools on classroom reading and writing engagements.

Methodology and Implementation

A quasi-experimental research design was employed, involving a pre-test, a post-test, a control group setup alongside a survey approach. The study sampled 15 English Language teachers and 630 pupils from 15 public primary schools through purposive and random sampling techniques. Teachers underwent a structured training in the use of E-Portfolios and I-BIT strategies before applying them in the classroom. Data collection instruments included reading and writing achievement tests, teacher observation rating scales, and self-assessment protocols. Reliability testing ensured that these instruments provided accurate measures of teachers' effectiveness in the application of the strategies and pupils' perception of themselves as self-regulated and their progress in reading and writing outcomes. The intervention lasted 12 weeks, during which pupils were exposed to either E-Portfolios, I-BIT strategies, or conventional teaching methods.

Findings and Key Insights

The study found that teachers who received training in E-Portfolios and I-BIT strategies significantly improved their instructional effectiveness. While both strategies enhanced reading and writing performance compared to traditional methods, the I-BIT approach was particularly effective in lesson planning and fostering interactive learning. Gender-based differences were observed, with male pupils excelling in writing tasks through I-BIT strategies, while female pupils demonstrated stronger reading comprehension with E-Portfolios. Additionally, students in the experimental groups exhibited greater enthusiasm, improved vocabulary, and better independent learning habits due to the integration of digital tools.

Conclusion and Recommendations

The findings underscore the importance of ICT-based instructional strategies in enhancing literacy education. Both E-Portfolios and I-BIT strategies proved to be effective in improving student engagement, comprehension, and writing skills. Given the positive outcomes, the study recommends the expansion of ICT integration in primary school education, alongside continuous teacher training programs to ensure sustainable implementation. Policymakers and educators should consider these strategies as viable tools for addressing literacy challenges in primary schools in Benue State, Nigeria.

Abstract

This study ascertained the impact of teachers' training on the use of E-Portfolios and digital

Inquiry-Based Information Technology (I-BIT) strategies on enhancing literacy abilities of grade six pupils in public primary schools in Benue State, Nigeria. Developing learners' reading and writing abilities are challenging to the school system especially in the public primary schools. Learners are unable to learn to read and write and to read and write to learn. Often, the challenge is the strategy and materials selected for use including use of ICT. The design for this study is an eclectic type consisting of pre-test, post-test, control group quasi experimental and survey types.

The descriptive survey aspect involved the training of the sampled teachers on the use of E-Portfolio strategy, the I-BIT strategy, the computer and other ICT related gadgets before they were deployed to their classes. The population of the study includes all the English Language teachers and grade six pupils aged 10-12 years in public primary schools in Benue State, Nigeria. Fifteen English Language teachers and 630 male and female pupils from 15 schools constituted the sample. Both purposive and random sampling techniques were used. Six instruments were used for data collection. They include the Reading Achievement Test (RAT), the Writing Achievement Test (WAT), the Teachers' Observational Rating Scale (TORS), the Pupils' and Teachers' Interview and Self-Assessment Protocols (PTISAP), the Pre and Post Training Evaluation on the Use of ICT Related Gadgets in E-Portfolios and I-BIT and the Focused Group Discussion Guiding Questions (FGDGQ). All the instruments were face validated by four experts; two in English Education and two in Measurement and Evaluation of the ranks of Senior Lecturer and above. Both WAT and RAT were trial-tested for reliabilities. WAT's reliability was determined using Kudar Richardson 20 and the value was 0.93 while RAT was determined using inter rater of the writing assessment and the value was 0.85. TORS was a paper-based assessment and its reliability was 0.70 using Pearson correlation coefficient. The 15 schools were grouped into three through random assignment, the E-Portfolios and the I-BIT experimental groups as well as the conventional group. The intervention lasted for a full academic term of 12 weeks. Week one was for introduction of the focus of the intervention and the administration of the pre-test, week two to ten were used for teaching while week 12 was used for the post-test, teachers and pupils' self-assessment protocols. Two weeks after the exercise, some of the teachers in the experimental groups interacted in Focused Group Discussions to share their feelings concerning the experience, the knowledge gained, and to underscore the prospects of the study. Both descriptive and inferential statistics were used. Specifically mean and percentages were used along with bar graphs for all research questions. The T-Test and ANOVA were used on the post-test results to determine the significant level of the effects. Further effects of the strategies on gender were determined using ANCOVA statistic. It was found among others that:

1. Teachers improved on their level of effectiveness on the use of E-Portfolios and I-BIT strategies to teach reading and writing after training. Teachers in I-BIT strategy class were effective in the use of I-BIT for lesson development but those in E-Portfolios classes were not as effective in the use of E-Portfolios for lesson development. There was significant difference in the teachers' level of effectiveness in use of E-Portfolios and I-BIT strategies in lesson development in favour of I-BIT strategy.

2. Teachers in the I-BIT strategy class were effective in the use of I-BIT in asking and answering questions. The finding further revealed that there was a significant difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in asking and answering questions.
3. Both teachers in the I-BIT and E-Portfolios strategy classes were effective in integrating

teaching aids in the use of the strategies. The finding further revealed that there was no significant difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies when teaching aids were integrated.

4. Teachers in E-Portfolios and I-BIT classes were effective in the use of strategies in content, application and summary. Furthermore, there was no significant difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in content, application and summaries.

5. Teachers trained in the use of E-Portfolios and I-BIT could employ technologies to obtain teaching information, materials as well as discover new ideas, skills and methods from the internet. Teachers in both groups agree that their pupils could: access and navigate the internet with ease, self-assess their learning and monitor their personal study. Teachers in the I-BIT strategy submitted that formative assessment and personal study among pupils enhanced their assessment skills. The teachers were in agreement that exercise and class work, selection of diagrams and frequency of assignments would help them to continue teaching even after the intervention. Teachers in the E-Portfolio group did not agree that pictorial selection could help them to continue further teaching as compared to those in the I-BIT strategy. Teachers in both strategies, however, agreed that keeping records of assessments helped them to continue further teaching.

6. Male and female pupils from both groups read and wrote better after intervention. Male pupils were confident in using E-Portfolio and I-BIT in reading and writing. While male pupils were found to have acquired more knowledge in using E-Portfolio as compared to their counter parts in the I-BIT, the female pupils agreed that E-Portfolio and I-BIT strategies helped them to read and write better. There was a significant difference in the number of female pupils who affirmed that using E-Portfolio in reading and writing made them more confident as compared to those that were confident when I-BIT was used in reading and writing in favour of females in the I-BIT group. Less female pupils claimed to have acquired more knowledge using E-Portfolio as compared to their male counterparts that acquired more knowledge using I-BIT. Concerning the progress made with reading and writing performance, male pupils exposed to E-Portfolio read and wrote more fluently after the intervention, could select materials to be used for personal reading, spell words better, write easily and concentrate better in class in similar manner as the male pupils in I-BIT. Also, both female pupils in E-Portfolios and I-BIT strategies read and wrote more fluently, could select materials for personal reading, spell words better, write more easily and concentrate better in class in similar manner.

7. Our findings revealed a significant difference in the benefit of low, moderate and high scorer pupils before and after the use of E-Portfolios strategy in teaching reading comprehension. The multiple comparisons of benefits of low, moderate and high scorers in E-Portfolios strategy before and after teaching reading comprehension confirmed that there was significant difference in the benefit of pupils in reading comprehension across ability levels.

8. It is found that the high scorers benefited more from the use of E-Portfolios strategy in writing followed by the moderate scorers and the low scorers. Finding further revealed that there was a significant difference in the benefit of low, moderate and high scorer pupils in the use of E-Portfolios strategy in teaching writing. The multiple comparisons of benefit of low, moderate and

high scorer pupils in E-Portfolios strategy before and after teaching writing confirmed and upheld that there was a significant difference in the benefit of pupils in writing across ability levels.

9. The pattern of percentage mean gain shows that application of E-Portfolio enhanced pupils' ability more in reading followed by I-BIT strategy than the application of conventional strategy. It was also found that there was a significant difference in the pupils' achievement in reading with application to E-Portfolios, I-BIT and conventional strategies.

10. The pattern of the percentage mean gain shows that the application of E-Portfolios enhanced pupils' ability in writing most, followed by I-BIT strategy and the least is conventional strategy. Furthermore, there was a significant difference in pupils' achievement in writing with application of E-Portfolios, I-BIT and conventional strategies with only 6.1 percent of pupils' achievement in writing attributable to the strategies applied.

11. The difference in the mean reading achievement of male and female pupils with the use of E-Portfolio strategy is in favour of female pupils. Furthermore, there was a significant difference in the reading achievement of the male and female pupils with the use of E-Portfolio strategy. The difference in the mean writing achievement of male and female pupils with the use of E-Portfolio strategy is in favour of male pupils. However, there is no significant difference in the mean writing achievement of male and female pupils with the use of E-Portfolio strategy.

12. The mean reading achievement of male and female pupils with the use of I-BIT strategy is in favour of female pupils. The study further revealed that there was no significant difference in the mean reading achievement of male and female pupils exposed to I-BIT Strategy. The mean writing achievement of male and female pupils with the use of I-BIT strategy is in favour of male pupils. The finding further revealed no significant difference in the mean writing achievement of male and female pupils with the use of I-BIT strategy.

13. There was a consensus from the discussion on the teachers' impression about the programme generally that the learners could read and get meaning from what was read and could also relate it or put it into writing. The pupils were interested in learning; they were so eager to learn that it was an encouragement to some teachers to extend the strategy to other classes. Pupils were open to the use of the internet and discovered much information on their own, thus improving their reading, exposure to online sources of information, expression during the lesson and active participation and interaction among learners, teachers and materials in reading and writing. The change in attitude of the learners observed in the E-Portfolios and I-BIT classes was facilitated by the fact that the learners participated more in classes from the collection of artefacts by themselves, answering questions and then getting the opportunity to explore the internet. Furthermore, the excitement in choosing suitable topics in the writing classes was also a key factor in addition to the understanding that apart from textbooks, there are other ways of getting information such as viewing and getting information in pictures of different kinds, distinguishing among, factual, inferential and critical levels of answers while reading and making researches before lessons. The teachers also observed that students' vocabulary improved which made reading and writing easier. Besides, it was observed that learners could write assignments by themselves.

Background

There is a decline in the interest and participation of young people in school literacy activities and language-related careers. The negative impact this may have on society's workforce and general proficiency in English Language knowledge, attitude and skills cannot be glossed over, especially in an environment where English is used as a second language. Poor performance and low engagement in literacy have been blamed on teachers' use of strategies not in line with the rich ICT endowed environment of the 21st century learners (ICT natives). Literacy instruction in public schools is not producing the required result of developing "permanent literacy and the ability to communicate effectively" as enshrined in the country's national policy on education (FRN, 2014, p. 11). This has resulted in public primary school products not being able to read and write functionally for academic and other purposes. This translates to low achievements at higher education levels. Teachers need professional support to shift from teacher dominated one-size-fits-all textbook instructional approach to a result-orientated student-based instruction that is research-proven, purposeful and interactive (Muodumogu, 2019). A change in pedagogy towards E-Portfolios and I-BIT strategies is considered a critical factor in addressing the problem of students' disengagement in the learning process and the subsequent poor achievement in literacy. A literate person can with understanding both read and write a short simple statement on his/her everyday life (UNESCO, 2008). This presents literacy in its most basic form as just the ability to read and write. However, the scope of literacy has widened in the contemporary society to include being able to access, use and give information through digital technologies such as the internet and mobile devices (Kabir & Jeromes, 2022). Digital technology has drastically changed the world views and perceptions on a lot of issues and approaches to doing things including perception of literacy and its application to everyday life.

Inquiry learning in English Language is the engagement of students in the kinds of cognitive processes such as asking questions or interrogating the author at the three levels of comprehension – literal, inferential and critical - and generating hypotheses about the most likely interpretation of a text based on the readers' application of relevant prior knowledge (Al-Khamaiseh, 2023). Inquiry learning also involves experimenting such as brain-storming to generate ideas, drafting, editing and re-writing to resolve grammatical issues and conceptual issues that boarder on logical presentation of ideas, communicating and justifying explanations (Wale & Bogaie,2021). Inquiry learning ensures that students develop abilities to engage literacy in an interactive environment that encourages transactional learning where meaning is constructed or encoded through teacher-students and materials interaction rather than being transmitted from teacher to learners.

Inquiry based-learning is a strategy about student exploration of knowledge. Though educators have provided different definitions of inquiry (Looi, 1998; White & Frederiksen, 1998), they generally agree that there are at least four critical steps when conducting inquiry learning: 1-generating hypothesis, 2-collecting data, 3-interpreting evidence, and 4- drawing conclusions. Tan (2015) reiterates that the effectiveness of inquiry-based learning in science education has been widely valued. In arts, especially English Language, literature regarding this is scarce. Inquiry-based learning engages students in a process of active learning that supports students' conceptual understanding through stimulating conceptual conflicts, testing hypotheses, discussing ideas, sharing opinions, developing evidence-based explanations (Gbolam,2019). The process involves active guided observation leading to noticing of scenarios in detail, learning to ask imperative questions, researching those questions for solutions, and presenting the information to others in a way that is clear and concise. Depending upon which media outlet

is chosen; technology can be used in practically every aspect of inquiry-based learning. It can be used to create scenarios for analysis through videos or puzzles, as well as provide unlimited research materials to help students find solutions to the problem areas they outlined in the earliest steps. Technology can even be used in the final steps – or the presentation portion of IB learning – which encourages students to explain their findings to others through interactions, provision of dialogue boxes for questions and answers as well as viewing stations for the students in a group at the same time.

Children naturally explore and learn about their environments through inquiry. Computer and internet technologies offer an accessible vehicle for extending the domain and range of this inquiry. There are various apps available on computer or mobile devices which facilitate inquiry-based learning. These apps can be used by educators and students for designing inquiry questions, identifying problems, planning projects, integrating assessments, assisting with the management and location of research materials, creating multimedia projects, and connecting with an audience. They offer immense possibilities and continue to evolve with updates. Some of such apps are; for the inquiry process of tuning in by watching, questioning, thinking, observing, reading, Safari and YouTube. BrainPop can be used, for supporting students as problem solvers, critical thinkers, collaborators, and communication creators. Acquaintance with these apps will enable students to use Lino, Podcast, Evernote, for collecting, curating, searching, gathering, identifying a topic, connecting with others, using Skype, Google Earth, Diigo, Twitter, for synthesizing information by interpreting, comparing, reviewing, sorting, formulating and analyzing, and using Skitch, Socrative, Dropbox, Calendar, Google Drive, among others.

The potential of web-based technologies to support the more interactive and collaborative pedagogies required for effective inquiry-based learning is swell documented (Voogt, et al 2013; Williams, et al 2017). Particular affordances that web-based technologies offer to support inquiry learning include quick and flexible access to information, resources and experts (Wright, 2010). The multimodal nature of resources and ways of communicating ideas have the potential to enrich outcomes and provide support for differentiation to meet varying student abilities and preferred pace in ways that underscore the concept of multi-literacies.

Traditional assessment is both limited and subversive. Students and teachers' creative energies are being subverted into students responding to tests which appear to have very little relationship to literacy (Muodumogu, 2010). The goal of portfolio assessment is to have assessment which is responsive to what students are doing; assessment that represents the range of things they are involved in; the processes they enlisted, the efforts they put in, and the improvement and range of abilities that students have demonstrated (Tierney, et al 1991). Building E-Portfolios into English literacy classes means providing students with valuable opportunities to engage in the most effective long-term learning activities in which every child is empowered. E-Portfolios teach students to self-assess, to monitor and evaluate their learning progress, to think critically and actively about their learning processes, to take ownership of their work, and to practice planning, implementation, and revision all of which enhance meaningful long-term learning. An academic E-Portfolio is a digital collection or artifacts created by students of their course-related work, like essays, posters, photographs, videos, and artwork. Academic E-Portfolios can also capture other aspects of a student's life, such as volunteer experiences (from home) like engagement, extracurricular activities, and more. Artefacts are the main features of the E-portfolio; the objects students choose to display in their E-portfolios, such as an essay or a slide

show which may be framed and contextualized by the reflective writing. Reflective writing is the contextual, analytical, and affective framework that students build to support and highlight their collection of artifacts, creating a cohesive narrative that ties them all together.

The use of E-Portfolios and I-BIT strategies to develop literacy abilities of grade six pupils have potential to encourage greater student ownership of learning and to enrich their reading and writing skills while valuing each individual as a learner who has expertise to share and new competencies to learn. These strategies enhance engagements which are critical in learning. Masaeli and Chalak (2016) conducted research on impact of electronic portfolios on students' writing and found that electronic portfolios improved students' writing abilities. In another study, Guo and Li (2024) conducted a study on the impact of electronic portfolio-based writing instructions on performance in second language writing and found that electronic portfolio-based writing instructions significantly improved global writing performance and its underlying components; contents, organization, language use, vocabulary and mechanics. Besides improving learning outcomes, the studies further revealed that students were more motivated with electronic portfolios, had enhanced collaboration and better feedback. The studies also report that employing portfolios was effective for both learners and teachers.

It is clear that technology-supported learning does not happen without the deliberate pedagogical actions of the teacher (Wright, 2010; Muodumogu & Dankaro; 2018). In the same vein, IRA (2009) states that literacy educators have a responsibility to effectively integrate the new technologies into the curriculum preparing students for the literacy future they deserve.

The teachers' role in scaffolding learning with or without technology remains critical in creating the collaborative, student-centered and knowledge-building and learning environments. These are characteristic of authentic and successful inquiry-based strategy (Ministry of Education New Zealand, 2006). However, having a student-centred and knowledge-building learning environments cannot happen automatically as they are dependent on teachers effecting considerable changes in their pedagogy and their roles in the classroom.

This study is aimed at addressing the issues raised by researchers and to build on and contribute to understanding of how information technology-supported literacy inquiry and E-Portfolios instructional strategies help to enhance the teaching and learning of literacy in primary schools. It is intended that both teachers and students will explore this for one academic term of 12 weeks. This case is chosen on the basis of teachers' willingness to be trained to develop their inquiry and use of E-Portfolios experience and to be available for the research.

The gender of the learners is considered important in this study. This is because the culture of the study area streamlines male and female learners into gender stereotype and sometimes this affects how they learn. Achor, Igyu and Ogah (2020) have shown that there was no significant difference between ICT related activities of the male and female students both at home and in school. The finding recorded in this study may or may not apply to primary school pupils as there are differences due to age and level of study.

Theoretical Framework

The study is anchored on three learning theories: Lev Vygotsky's Theory of Social Development; Garrison, Anderson and Archer's theory of Community of Inquiry (CoI); and Siemen's Connectivism Learning Theory.

Lev Vygotsky's (1962) Theory of Social Development

The theory of Social Development propounded in 1962 is the work of a Russian Psychologist, Lev Vygotsky. This theory is one of the foundational theories of constructivism on which this study is underpinned. This theory upholds that learning is fundamentally a social act emphasizing an inspiration for active learning and human-like tutors in the form of software for teaching and learning. It holds that a transformation of an interpersonal process into an intrapersonal one is the result of a long series of developments. This theory proposes that learning is socially constructed during interactions between people or appliances, and so an embodied or humanoid agent in the form of education software which can deliver lessons and exhibit nonverbal behaviours would necessarily increase the social nature of learning experience.

Vygotsky posits that learning is problem-solving and that the social construction of solutions to problems is the basis of the learning process. Based on this, he explains that, there are three major tenets of the theory of social development. These include; social interaction, the more knowledgeable other (MKO), and the zone of proximal development (ZPD). To him, social interaction plays a fundamental role in the process of cognitive development; and that every function in the child's cultural development appears twice: first, on the social level between people (inter-psychological), and later, on the individual level, inside the child (intra-psychological). The MKO refers to anyone who has a better understanding or a higher ability level than the learner, with respect to a particular task, process, or concept. The MKO is normally thought of as being a teacher, tutor, coach, or older adult; however, the MKO could also be seen as peers, a younger person, or even a dedicated software. The ZPD is the distance between a student's ability to perform a task under teacher's guidance or a with peer's collaboration and the student's ability to perform that task independently. According to Vygotsky, learning occurs in this zone with focus on the connections between people and the socio-cultural context in which they act and interact in shared experiences. Vygotsky added that humans use tools that develop from culture such as speech and writing to mediate their social environments. Vygotsky believed that the internalisation of tools can lead to higher thinking skills, motivation, self-esteem and improved performance. In addition, Vygotsky made mention of the concept of 'social situatedness', the idea that the development of individual intelligence requires a social and cultural embodied agent. This has in the 21st century received much attention in cognitive science and artificial intelligence research. The theory encourages the use of e-learning such as E-Portfolios and I-BIT to supplement classroom instruction.

Vygotsky's theory of social development has a link with teaching and learning of reading and writing and hence can be related to this study in the following ways as discussed below.

Vygotsky's theory lays emphasis on social learning environment and social situations in which students play an active role in the classroom. The use of face-face along with downloaded learning materials, and artefacts provided numerous approaches including the use of tools such as animated videos, e-fora, computers, websites, live chat, video conferences apps, audios, chatbots among others as social teaching and learning environments. This implies that

knowledge could be developed from personal interactions with tools. In this study, the use of ICT tools to facilitate learning can be seen as the MKOs. The internalization of ICT tools is expected to lead to higher reading and writing abilities or learners.

E-Portfolios and I-BIT initiatives which involve the use of multimedia, video, WhatsApp, interactive chatbot and animation and other social learning tools may help grade six pupils to acquire new ICT abilities, literacy skills and the confidence for problem-solving and language dialogue. When technological tools are provided for pupils to support knowledge construction, skill acquisition, active participation, and personalised and collaborative instruction, the teacher only remains as a facilitator or a guide on the side instead of being a sage on the stage. This gives the students autonomy over their learning.

George Siemens' (2004) Theory of Connectivism

George Siemens is an Associate Director of Research and Development with the Learning Technologies Center at the University of Manitoba. He is the founder and President of Complexive Systems Inc. It was he, who proposed connectivism learning theory in 2004. According to the theory, learning is a network phenomenon, influenced by socialisation and technology. The theory also holds that learning (defined as actionable knowledge) can reside outside of ourselves (within an organisation or a database), and is focused on specialised information sets. The connections that enable us to learn more, are more important than our current state of knowing. This theory is anchored on the following central premises:

1. learning and knowledge rest on diversity of opinions; learning is a process of connecting specialised nodes or information sources;
2. learning may reside in non-human appliances (apps); the capacity to know more is more critical than what is currently known;
3. nurturing and maintaining connections are needed to facilitate continual learning;
4. the ability to see connections between fields, ideas, and concepts is a core skill;
5. currency (accurate, up-to-date knowledge) is the intent of all connectivism learning activities; and
6. decision-making itself is a learning process.

Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision.

The theorist describes today's students as the Net Generation (Net Gen), who have grown up with widespread access to ICT and all tools of the digital age. Members of the Net Gen have some features which are different from previous generations and which can affect their education. The Net Gen students are well virtually literate, but their text literacy is not developed enough. Students (73 %) prefer to use the internet to conventional libraries, do multitask and move quickly from one activity to another and sometimes perform them simultaneously, prefer to learn by doing rather than by being told what to do by their peers. This exploratory style enables them to retain information better and to use it in creative meaningful ways. They often prefer to learn and inquire in teams (network). These changes necessarily have an impact on English language skills of reading and writing and teacher effectiveness in teaching the skills.

The theory of connectivism is related to this study because, the use of E-Porfolios and I-BIT agrees with the tenets of the Connectivism Theory. Similar to the theory, the study emphasises the use of visual experience, use of internet, assessment of skills, sharing of skills and knowledge-engaged learning among others.

The theory and the study encourage instructors to shift from controlling course content, to bypass textbooks and traditional lecture presentations and bring learners to the forefront of learning thereby locating, presenting and making sense of updated knowledge. When knowledge is no longer teacher-centered, and content and conversations are continuous, it is likely that expert performance, meaningful learning, confidence, motivation and interest to learn can occur among grade six pupils. Information flow within teachers and pupils is an important factor of reading and writing, which is an element of the theory. This connotes that, English Language teachers and pupils should be provided with digital devices to help them remain engaged in sustained social interactions through the use of apps, websites, audio conference, WhatsApp, Facebook, live chats, zoom video conference among others to enable them to learn, share and collaborate in the learning process. This is likely to promote reading and writing abilities of grade six pupils.

Research Objectives.

The purpose of this study is to ascertain the impact of teachers' training on the use of E-Portfolios and digital Inquiry-Based Information Technology (I-BIT) strategies to enhance literacy abilities of grade six pupils in public primary schools in Benue State, Nigeria. The specific objectives of the study are to:

1. determine the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies to teach reading and writing before and after training.
2. determine the teachers and pupils' assessment of contributions of E-Portfolios to their assessment skills.
3. ascertain what are the teachers' levels of effectiveness on the use of E-Portfolios and I-BIT as observed in their classroom practices,
4. find out which of the low, moderate and high scorers exposed to E-Portfolios and I-BIT strategies benefited more in reading comprehension and writing,
5. determine the difference in reading and writing achievement of grade six pupils taught using E-Portfolios, I-BIT and conventional strategies and
6. determine the difference in reading and writing achievement of male and female pupils taught reading and writing using E-Portfolio and I-BIT strategies.

Research Questions

This study answered the following research questions:

1. What is the teachers' level of effectiveness in the use of ICT related gadgets (E-Portfolios and I-BIT strategies) to teach reading and writing before and after training?
2. What are the teachers and pupils' assessment of the contributions of E-Portfolios and I-BIT to their teaching and learning skills?

3. What are the teachers' levels of effectiveness on the use of E-Portfolios and I-BIT as observed in their classroom practices?
4. Which of the low, moderate and high scorers exposed to E-Portfolios and I-BIT strategies benefited more in reading comprehension and writing?
5. What is the difference in reading and writing achievement of grade six pupils taught using E-Portfolios, I-BIT and Conventional strategies?
6. What is the difference in reading and writing achievement of the male and female pupils taught using E-Portfolio and I-BIT strategies?

Intended Outcomes

First, this study produced 15 English Language teachers as a sample out of the entire population that were trained to use E-Portfolio and I-BIT strategies to teach literacy in primary schools in Benue State. These 15 teachers will to some extent introduce their colleagues to the use of the strategies as a way of cascading the study. Secondly, there will be pre-prepared lesson plans of I-BIT and E-Portfolio for teaching of reading and writing for use by teachers who have not been trained in the use of the strategies. Thirdly, improvement in pupils' performance in reading and writing is envisaged. Equally important is the pupils and teachers' self-assessment of their use of E-Portfolio. The use of E-Portfolio is beneficial to both pupils and teachers for the fact that:

1. The individual and group processes of capturing and storing evidence, reflecting and planning that many institutions currently encourage have a great potential to support future individual or group E-Portfolio development.
2. There are some learners who find that templates for planning, calendars and goal-setting exercises scaffold their learning until they are confident enough to progress to working independently.
3. Tools that support the important learning process of feedback from teachers and peers, and collaboration within class groups and across institutions, are much appreciated by learners and teachers.
4. There is great potential to make connections between E-Portfolio processes, such as storing, reflecting, publishing, and learners' use of emerging social software tools outside formal education.

Significance of the Results

The findings of this study could be of benefit to the teachers of English Language, pupils, government, researchers, curriculum planners and professional bodies like Literacy Promotion Association of Nigeria (LiPAN), State and Federal Ministries of Education and textbooks writers. The findings of this study when published could be of significance to both teachers and students because they may provide a new insight for literacy teaching to improve in the areas of reading and writing. Basically, language teachers may have the opportunity to compare which of the two approaches enhance teaching and learning of literacy more. The findings of this study have the potentials of promoting literacy across the school curriculum. Thus, they would be helpful for promoting Science. The written text is the pivot of teaching and learning at school. The literacy empowerment which this study projects can cut across school subjects and thus optimally and maximally enhance the teaching and learning of school subjects apart from the English Language.

Definition of Key Terms/Concepts

E-Portfolio is a digital collection or artifacts created by students of their course-related work, like essays, posters, photographs, videos, and artwork which teach students to self-assess, monitor and evaluate their learning progress; to think critically and actively about their learning processes; to take ownership of their work and practice to enhance meaningful and long-term learning under the guidance and facilitation of teachers.

Reflective writing is the contextual, analytical, and affective frame the students build to support and highlight their collection of artifacts and creating a cohesive narrative that ties them all together.

Inquiry-Based Information Technology (I-BIT) is the use of web-based technologies to support the more interactive and collaborative inquiry pedagogy in literacy teaching and learning. It is the engagement of students in the kinds of cognitive processes that language experts use such as asking questions, generating hypotheses, designing investigations, collecting and analyzing, data answering the question, and communicating and justifying explanations with feedback.

Methodology

Design

The design for this study is an eclectic type consisting of quasi experimental and survey designs. Thus pre-test, post-test, control group quasi experimental type is adopted. This design is considered appropriate because of the use of existing intact class. There is also the descriptive survey aspect that involved training of sampled teachers on use of computer, E-Portfolio strategy, the I-BIT strategy and other ICT related gadgets before they were deployed to their classes.

Population and Sample

The population of the study includes all the English Language teachers and grade six pupils in public primary schools in Benue State, Nigeria. These are children between ages 10-12. Out of the entire population, 21 English Language teachers and 630 male and female pupils from 21 primary schools constituted the sample. Both purposive and random sampling techniques were used. Since it is a handful of schools that have ICT facilities, only schools with such facilities were selected purposively in the first place. However, selection of some schools among those that qualified and assignment of such schools to experimental and control groups was done randomly. Selection of teachers from each school was purposive as their ICT ability and interest in the study were the selection criteria

Training of Teachers

The practice in Nigeria both for teachers' production and as serving teachers is that they rarely use ICT and the facilities are not even available. This informs having the training component of this study to ensure that the teachers selected are able to teach using the two strategies – the E-Portfolio and I-BIT strategies and will be able to lead learners to draw artifacts and other e-resources for teaching and learning of reading and writing in the experiment.

This research involved intensive training of English Language teachers on how to guide pupils to create and use E-Portfolios and digital media Inquiry-Based Information Technology (I-BIT) strategy developed by ICT experts in collaboration with the researchers. Four experts (three researchers and one ICT specialist) conducted the training which lasted two weeks. Based on the nature of teacher training programmes in universities in Nigeria with no emphasis on use of ICT, evidence of obvious lack of e-resources in primary schools and dearth of research reports on their use in Benue State, it is assumed that all English Language teachers lack basic knowledge in the use of E-Portfolio and I-BIT strategies. They were therefore trained.

The training addressed how to help learners raise E-Portfolios, effective use of ICT in classroom, use of I-BIT to teach and how to overcome possible challenges. There were demonstration sessions through micro-teaching to ascertain teachers' competencies in using the strategies. The training was conducted centrally using the ICT center of the Benue State University, Makurdi where all required facilities were available.

The training impact was assessed by determining the interest and self-efficacy level of the teachers before and after training as well as their ability to teach reading and writing using the E-Portfolio and I-BIT strategies during the micro teaching. This involved classroom observations and non-quantitative self-assessment strategy like recorded video reviews.

The 15 teachers located in 15 schools were selected purposively (based on availability of ICT facilities) and trained. However, only teachers that are predisposed to using ICT and are willing to participate in the study were purposively selected. This eliminated the issue of teachers with poor ICT skills with regards to use of the teaching strategies at the end of the training.

The training contents included:

S/No	Content to be taught	Duration	Deliverables
1	Familiarity of teachers with the net and various sites. Pre training assessment	Day one	Ability to navigate any relevant site within a given time. Assessment reports
2	Opening two folders for E-Portfolios and I-BIT for storage of relevant sites, applications and how to manipulate some	Day two	Skill acquired and folders inspected
3	Gathering artefacts and other resources for E-Portfolios and how to use them	Day three	Evidence of materials in folders
4	Identification of relevant applications such as WebQuest, Skype, Google Earth, Diigo for use	Day four	Evidence of materials in folders
5	Use of lesson plans for E-Portfolios with integration of artefacts as well in micro teaching	Day five to six	Effective use of lesson plans
6	Use of lesson plans for I-BIT with integration of resources in micro teaching	Day seven to eight	Effective use of lesson plans

7	Revision and Questions and answers sessions for all topics	Day nine	Answers provided for all questions and clarification made
8	Post training test or assessment	Day ten	Results of the assessment

Statement of the Problem

Developing learners' reading and writing abilities are challenging to the school system especially in the public primary schools. Learners are unable to learn to read and write and to read and write to learn. Often, the challenge is the strategy and materials selected for use. Teachers use instructional strategies and practices that do not underscore the process nature of literacy knowledge, attitudes and skills and do not teach them as meaning making constructs. More disturbing is the fact that most teachers dread the use of ICT related strategies.

The literature search shows that not much is done in Nigeria with regards to the use of E-Portfolio and I-BIT. For instance, the study by Nwankwo, et al (2019) on the extent of utilization of E-Portfolios for enhancing learning by business education students in Imo State, Nigeria revealed that business education students are not aware of E-Portfolios as a means of enhancing learning and therefore utilized them to a very small extent in learning. Similarly, Moghalu and Eboka (2015) explored the E-Portfolios that can be used for teaching and learning of vocational and technical education in Nigeria. None of these revealed that E-Portfolios are being used in teaching and learning. E-Portfolio and I-BIT are new innovations in Nigeria, particularly in Benue State. This is premised on the fact that the dearth of their usage coupled with the experience of COVID-19 makes it an area waiting to be explored. The level at which learners engage in ICT activities at home and at school is a function of a number of factors which include the availability of facilities, equipment and gadgets, which were found to be lacking in schools in Benue State. However, learners show enthusiasm and positive attitude to the use of communication gadgets especially handsets and the acquisition of computers/laptops was observed to encourage positive dispositions to their use (Achor, et al 2020; Egbe & Muodumogu, 2014).

The use of E-Portfolios and Inquiry-Based Information Technology (I-BIT) strategies to develop literacy abilities of pupils in grade six in public primary schools have potentials to enhance the acquisition of literacy skills that is, reading, writing as well as knowledge and attitude and to encourage greater students' ownership of their learning and therefore enrich their comprehension. Both research reports (Achor & Ityobee, 2020) and the observations of the two experienced researchers show that most primary schools in the study area with ICT resources do not use them in teaching and learning and many schools do not even have such facilities. The problem of this study put in question form is: what is the impact of training of teachers on use of E-Portfolios and digital Inquiry-Based Information Technology (I-BIT) strategies on literacy abilities of grade six pupils in public primary schools in Benue State, Nigeria?

Instrumentation

Five instruments were used for data collection. They are the Reading Achievement Test (RAT)s, the Writing Achievement Test (WAT), the Pupils' and Teachers' Interview and Self-Assessment Protocols (PTISAP), the Teacher Observational Rating Scale (TORS), and the Focus Group

Discussion Guiding Questions (FGDGQ). TORS was used to rate teachers' effectiveness in using the strategies. While RAT and WAT were used to determine pupils' performance in reading and writing, FGDGQ was used in eliciting the feelings of the teachers in the experimental groups concerning the effectiveness of the strategies and the way forward

The Reading Achievement Test (RAT)
This was a 30 multiple choice items of options a to d testing pupils' level of reading comprehension. It was based on contents taught for 10 weeks and it covered literal, inferential and critical levels of comprehension and vocabulary knowledge. It was used in conjunction with WAT to answer research questions 3, 4 & 5 (See RAT as appendix A).

The Writing Achievement Test (WAT)
It was a selection of six similar (knowledge demands, length and familiarity) topics. Three of the topics were used for pre-test and the other three as post-test for pupils to write on any two each time. The three topics covered narrative, argumentative and letter writing. It was used in conjunction with WAT to answer research questions 3, 4 and 5 (See WAT as appendix B).

The Teachers' Observational Rating Scale (TORS).
This was used to find out how effective the teachers were in using the strategies after training. Fifty items on teacher effectiveness in the use of the specified strategy similar to what is used during teaching practice supervision were administered to the teachers at the end of 10 weeks of intervention using E-Portfolios and I-BIT strategies. This addressed research question 3 (See TORS as appendix C).

The Pupils' and Teachers' Interview and Self-Assessment Protocols (PTISAP)
This was made up of 5 free expression interview questions and 5 questions that border on self-assessment by teachers and pupils. It is expected to generate non-quantitative data and used to address research question 2 (See interview schedule as appendix D).

The Focused Group Discussion Guiding Questions (FGDGQ)
There was a focused group discussion section. Two weeks after the exercise, the teachers from E- Portfolio and I-BIT groups were gathered for interaction about their feelings concerning the experience, knowledge gained, prospects of the study and their thinking going forward. Seven questions guided the discussion (See Appendix E).

Pre and Post Training Evaluation on Use of ICT Related Gadgets in E-Portfolios and I-BIT
Ten items were listed as pre and post training evaluation. The items were the same but they were first administered at the commencement of the training and re-administered after the training. It was to find out how skillful they were in the use of basic ICT related gadgets to teach E-Portfolios and I-BIT classes. The items were formulated around the use of mobile devices like desktop, laptop, smartphones, tablets, e-readers, web-based technologies, browsing, type and edit documents, creating files and folders, use of collaborative tools like zoom, teams, WhatsApp, skype, among others. They were expected to respond either as: basic skill, advanced skill and expert skill rated as 1, 2, 3, 4 and 5 respectively. Data collected with this instrument addressed research question one.

Validation and Reliabilities of Instruments

All the instruments were face validated by three experts in English Education and another expert in measurement and evaluation of the ranks of Senior Lecturer and above. Both WAT and RAT were trial tested for reliabilities. WAT's reliability was determined using Kudar Richardson 20 and the value was 0.93 while RAT was determined using inter rater of the writing assessment and the value was 0.85. grade 6 pupils were used for the trial testing and given their mental and chronological age they were able to address the questions. Besides, the comprehension passages were within their readability level and the questions in WAT reflected the same. Assessments using WAT and RAT was paper and pencil-based as the learners were not skilled enough for digitally based assessment. TORS was also paper based assessment as the respondents did not have sufficient training and mastery of ICT skills for the deployment of digital tools for assessment. Its reliability was 0.70 using Pearson correlation coefficient.

RAT was a multiple-choice test instrument where each item was scored one while WAT was an essay test with each writing assessment scored over 20 using a validated marking guide. A mean rating was used to determine level of satisfaction.

Data Collection Procedure

Fifteen schools were grouped into three through random assignment. These were the E-Portfolios and the I-BIT experimental groups as well as the conventional group. The intervention lasted for a full academic term of 12 weeks. Week one was for the introduction of the focus of the intervention and the administration of pre-test; weeks two to ten were used for teaching while week 12 was used for post-test and teachers and pupils' self-assessment protocols. Two weeks after the intervention, teachers in the experimental groups interacted in a focused group discussion to share their feelings, knowledge gained and underscore the prospects of the study.

Reading comprehension was taught at the 3 levels of comprehension - literal, inferential and critical. Since conventional method focuses on literal level, the study emphasised inferential and critical levels; main idea construction, vocabulary development using context clues and structural analysis. Other skills developed included: self-assessment and peer assessment, using background knowledge to construct meaning and questioning to deepen comprehension of materials.

The writing skills focused on discussion of topic, generating ideas, drafting, revising, editing, using think aloud to teach logical presentation of ideas and diction. In all group activities, assessment and prompt feedback were highlighted. Use of variety of online materials within learners' interest and readability levels was encouraged. To address the non-quantitative aspect, an additional instrument for interview and students' self-assessment protocols was introduced. It enlisted interview of students in conjunction with their portfolios to determine whether their assessments of themselves is expansive and criteria-based in ways that reflect the possibility that portfolios contribute to self-assessments. There was an interview of the teachers as to the benefits that E-Portfolios and I-BIT provided in terms of their students' learning in relation to their teaching.

Data Analysis Procedures

Descriptive and inferential statistics were used. Specifically mean and percentages were used along with bar graphs for all research questions. The t-Test and ANOVA were used on post test results to determine the significant level of the effects. Further effects of the strategies on gender were determined using ANCOVA statistic.

Results

Results are presented according to research questions. For details and a better understanding of the extent of the effects, differences and observations, hypotheses are tested so as to further strengthen the decisions that are made based on the findings from the research questions.

General Information

Figure 1 shows the sample distribution by strategies used for teaching reading comprehension and writing. The figure reveals that the E-Portfolio strategy was used to teach 291 grade six pupils, the digital Inquiry-Based Information Technology (I-BIT) strategy was used to teach 333 grade six pupils and the conventional strategy was used for 301 grade six pupils in public primary schools in Benue State, Nigeria.

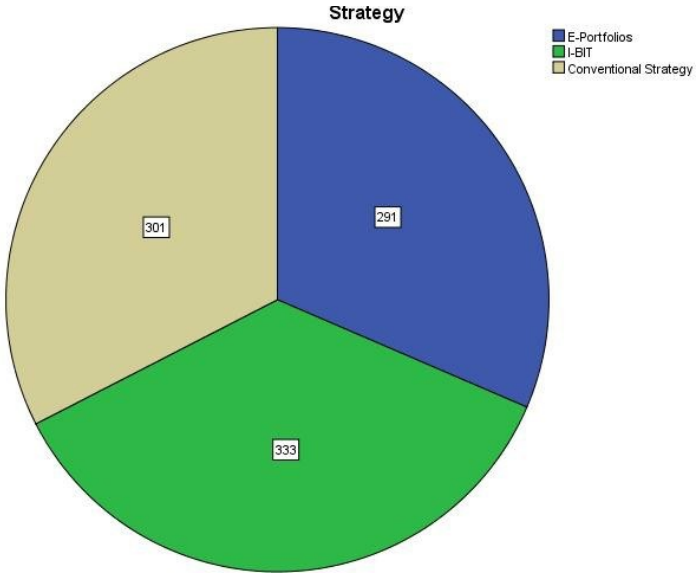


Figure 1: Pie Chart Showing Sample Distribution by Strategies used for Teaching Reading Comprehension and Writing

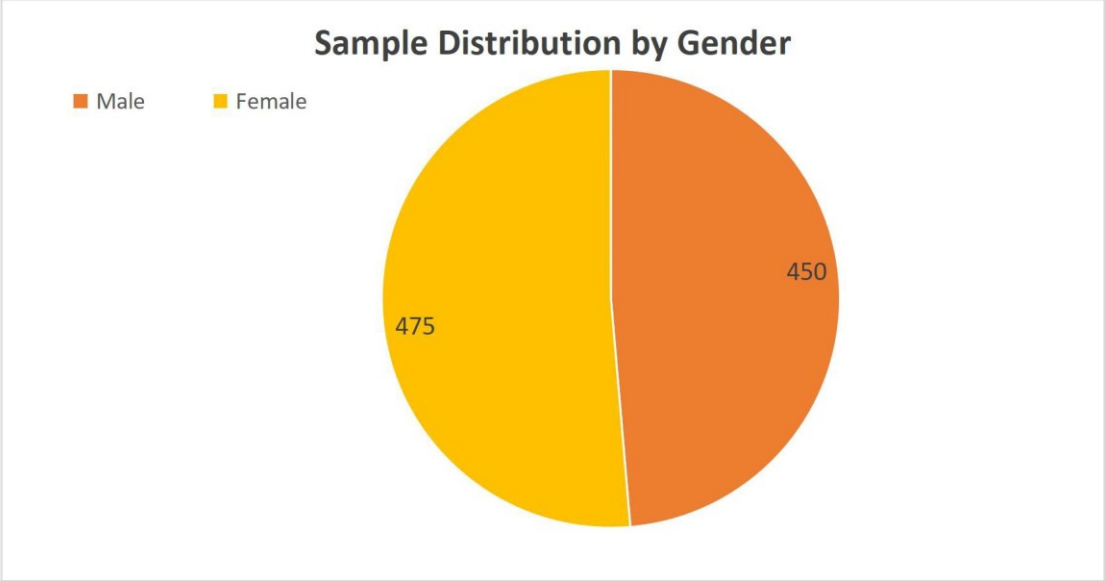


Figure 2: Pie Chart Showing Sample Distribution by Gender

Figure 2 shows the gender of grade six pupils taught reading comprehension and writing. The figures reveals that 450 male and 475 female grade six pupils in public primary schools in Benue State, Nigeria were taught reading comprehension and writing.

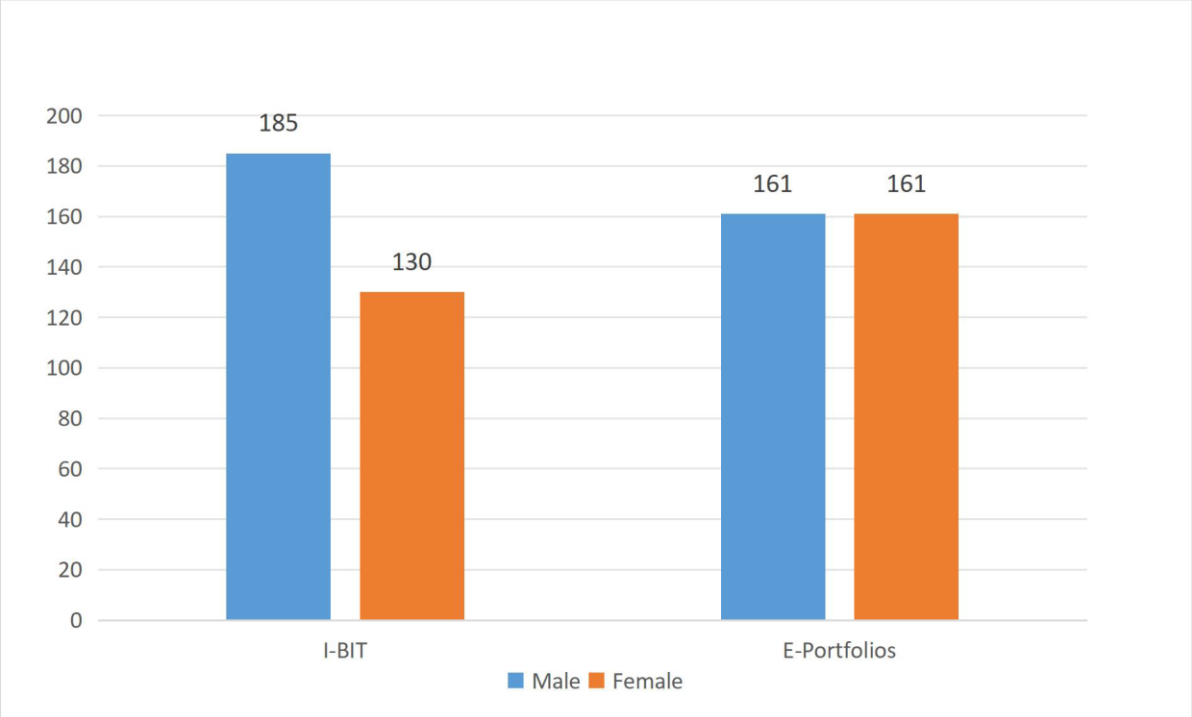


Figure 3: **Bar Chart Showing Distribution by Strategy and Gender of Grade VI Pupils taught Reading Comprehension and Writing**

Figure 3 shows the gender of grade six pupils taught reading comprehension and writing using E-Portfolios strategy. The figures reveal that 161 male and 161 female grade six pupils in public

primary schools in Benue State, Nigeria were taught reading comprehension and writing E-Portfolio strategy. Figure 3 further shows the gender of pupils taught reading comprehension and writing using the digital Inquiry-Based Information Technology (I-BIT) strategy. The figure further reveals that 185 male and 130 female pupils in public primary schools were taught reading comprehension and writing using a digital Inquiry-Based Information Technology (I-BIT) strategy.

Research Question One

What is the teachers' level of effectiveness in the use of ICT related gadgets to teach reading and writing before and after training?

Table 1: The Teachers' Level of Effectiveness in the Use of ICT Related Gadgets to Teach Reading and Writing before and after Training

S/No	Item-Skill Level	N	Pre-Training Mean Rating	Post Training Mean Rating	Mean Gain
1	Ability to use mobile devices like desktop, laptop, smartphones, tablets, e-readers in classroom situation	10	1.9	2.7	0.8
2	Ability to use web-based technologies in teaching of reading & writing	10	1.7	2.4	0.7
3	Ability to obtain information from the internet using an electronic device	10	2.1	2.6	0.5
4	Ability to type, edit text and documents	10	2.2	2.2	0.0
5	Ability to create files and folders to store and retrieve information like documents, pictures, videos	10	2.0	2.7	0.7
6	Ability to compose and send short messages through mobile devices	10	2.8	2.9	0.1
7	Ability to develop presentation files for teaching and to deliver a presentation	10	1.8	2.4	0.6
8	Ability to use collaborative tools like zoom, teams, etc	10	1.6	2.3	0.7
9	Ability to communicate through any of the social media platforms like WhatsApp, telegram, skype, etc	10	2.3	2.9	0.6

10	Ability to safely and responsibly use electronic devices to teach	10	2.3	2.5	0.2..
	Grand Mean		**2.05**	**2.56**	**0.49**

Keys: 1.00-1.49 No Skill, 1.50-2.49 Basic Skill, 2.50-3.49 Advanced Skill and 3.50-4.00 Expert Skill.

Table 1 shows the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies to teach reading and writing before and after training. The table reveals that before training the mean rating for all the teachers falls between 1.5 and 2.49. The grand mean of 2.05 for teachers before training implies that the teachers have some basic skills in all the items being measured before the training. The table further shows that items 2, 4, 7 and 8 had the after training mean rating between 1.5 and 2.49 which connotes that the teachers possess the basic skill of web-based technologies, type, edit text and document, develop presentation files and use collaborative tools like zoom, teams or Google classroom after the training. The table again reveals that items 1, 3, 5, 6, 9 and 10 had their after training mean rating between 2.5 and 3.49 which means that the teachers possess an advanced skill in using mobile devices, obtaining information from the internet using an electronic device, creating files and folders to store and retrieve information, composing and sending short messages through mobile devices, communicating through any of the social media platforms and safely and responsibly using electronic devices to teach after the training. The grand mean of 2.56 for teachers after training implies that the teachers have advanced skills in all the items measured after the training. Table 1 further reveals the mean gains for all the items being measured except for item 4. Therefore, teachers improved in their level of effectiveness in the use of E-Portfolios and I-BIT strategies to teach reading and writing after training by a grand mean of 0.49.

Question Two

What are the teachers' and pupils' assessment of themselves on the contributions of E-Portfolios and I-BIT to their teaching skills?

Teachers' Interview and Self-Assessment Protocols

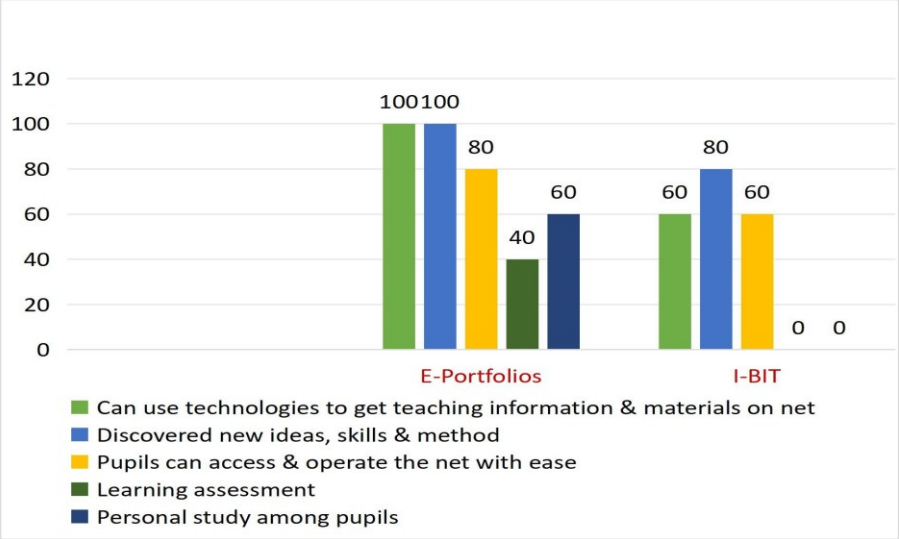


Figure 4: **Bar Chart Showing the Progress Teachers Made with the Use of the Strategies**

Figure 4 shows teachers' progress with the use of E-Portfolios and I-BIT in their assessment skills. The chart shows that 100 percent of teachers in E-Portfolio agree that they can use technologies to get teaching information and materials on net as well as to discover new ideas, skills and methods as compared to their counterparts in I-BIT with 60 (can use technologies to get teaching information & materials on net and pupils can access & operate the net with ease) and 80 (discovered new ideas, skills & method) percent of teachers making progress with the strategy respectively. Similarly, the chat shows that 80 percent of teachers in E-Portfolio agree that pupils with E-Portfolio empowerment can access and operate the internet with ease in E-Portfolios as compared to 60 percent in I-BIT strategy. The chart further shows that 40 and 60 percent of teachers in E-Portfolio agree that learning assessment and personal study among pupils contribute to their assessment skills and this is contrary to what the teachers in I-BIT expressed - that learning assessment and personal study among pupils do not contribute to their assessment skills.

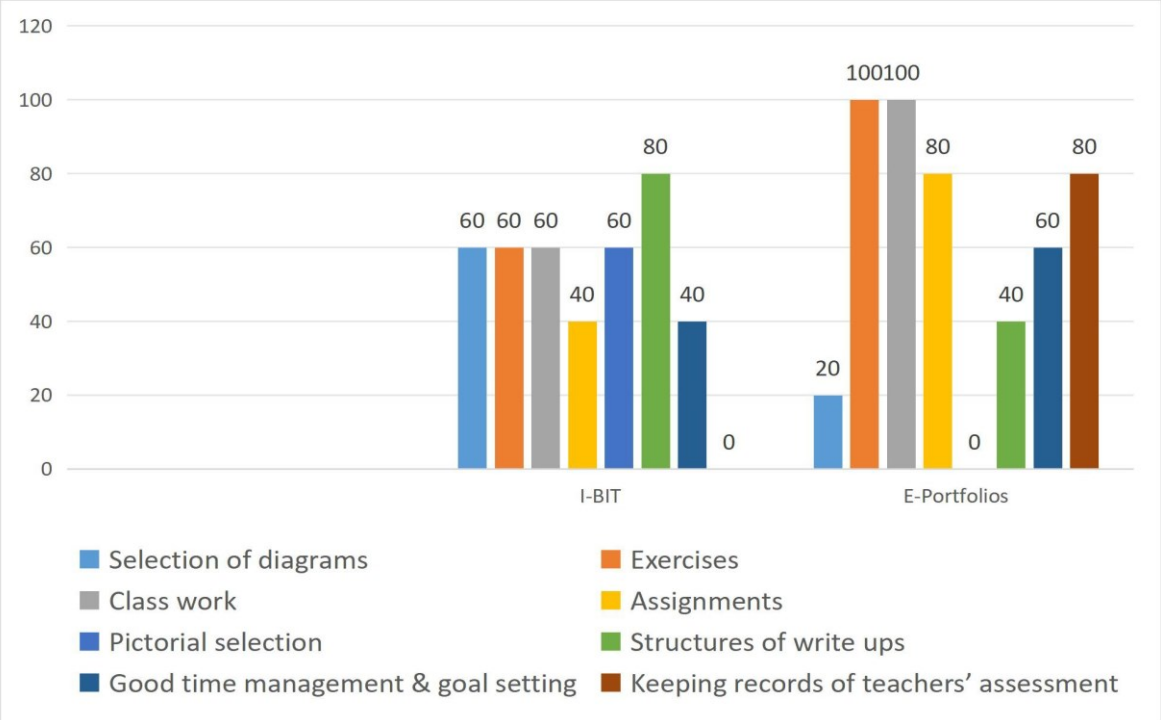


Figure 5: **Bar Chart Showing Ways the Strategies Help Teachers to Continue Further Teaching**

Figure 5 shows the ways E-Portfolios and I-BIT help to continue further teaching. The chart shows that 100 percent of teachers in E-Portfolio agree that exercise and class work help them to continue further teaching as compared to their counterparts in I-BIT with 60 percent respectively. Similarly, the chat shows that 20 percent of teachers in E-Portfolio agree that the selection of diagrams help them to continue further teaching as compared to 60 percent in I-BIT strategy. The chart further shows that 80 percent of teachers in E-Portfolio agreed that assignments they engaged learners in encouraged them to continue further teaching as compared to 40 percent in I-BIT strategy. Likewise, the chat shows that 60 and 80 percent of teachers in E-Portfolio agree

that the structure of write-ups by learners and good time management and goal setting sustained their interest to continue further teaching as compared to 80 and 40 percent in I-BIT strategy respectively. However, no teachers in E-Portfolio agree that pictorial selections help them to continue further teaching and as compared to 60 percent in I-BIT strategy. However, 80 percent of teachers in E-Portfolio agree that keeping records of assessment helps them to continue further teaching as compared to no teacher in I-BIT strategy.

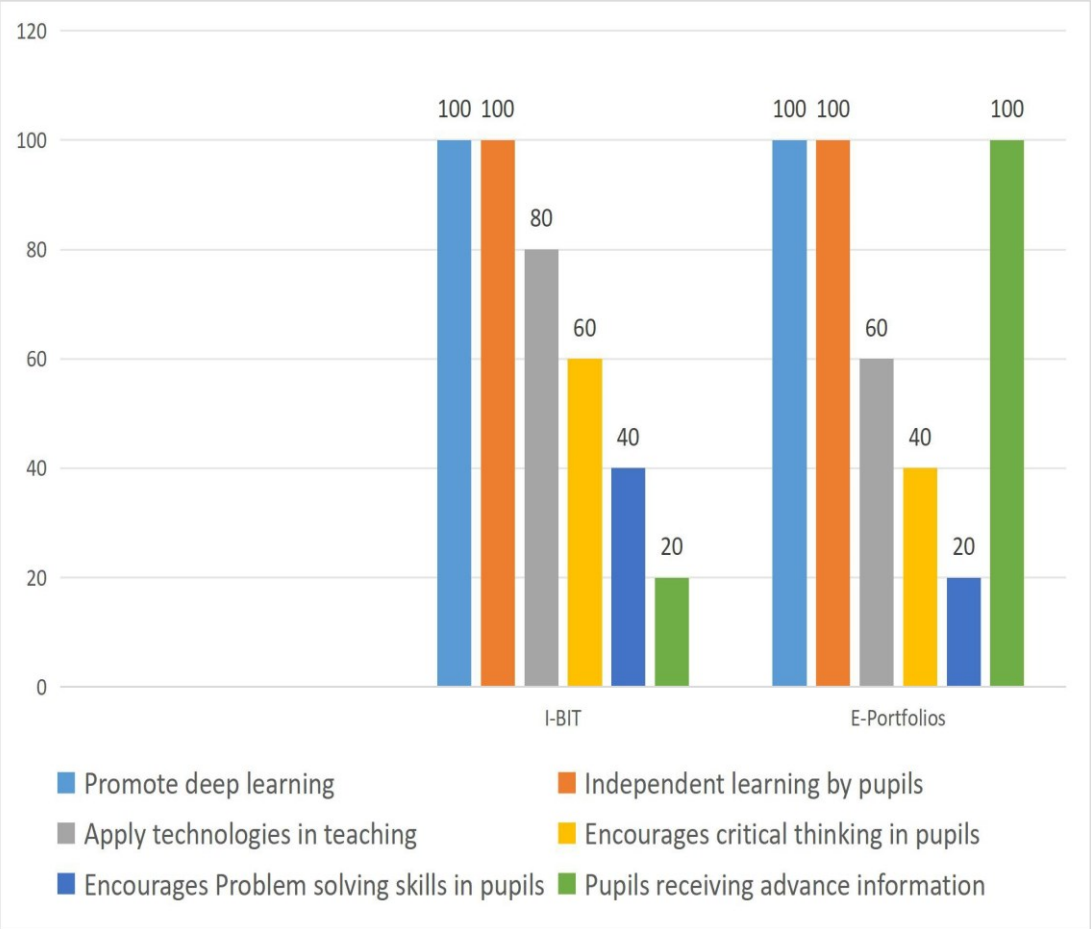


Figure 6: **Bar Chart Showing Ways Strategies Help Teachers to Improve Teaching Outcome**

Figure 6 shows the way E-Portfolios and I-BIT assisted to improve teaching outcome. The chart shows that 100 percent of teachers in E-Portfolio agree that promoting deep and independent learning are ways E-Portfolios and I-BIT help to improve teaching outcomes. The chart further shows that 60, 40, 20 and 100 percent of teachers in E-Portfolio agree that applying technologies in teaching, encourages critical thinking and problem-solving skills in pupils as well as helps pupils to receive advance information and improve teaching outcomes as compared to 80, 60, 40 and 20 percent respectively in I-BIT strategy.

Figure 7: **Bar Chart Showing Ways the Strategies Helped to Make Better Teacher**

Figure 7 shows the ways E-Portfolios and I-BIT help to make a better teacher. The chart shows that 100 percent of teachers in E-Portfolios agree that ensuring deep/wider learning and ease of lesson presentation are further shows that 80, 20, 100, 40, 80 and 40 percent of teachers in e-portfolio agree that extents E-Portfolios and I-BIT help to make better teachers. The chart appropriates the use of instructional materials, the use of pictures and diagrams, available options of resource materials, good time management, confidence and documentation of academic progress help to make better teachers as compared to 40, 40, 60, 80 and 20 percent respectively in I-BIT strategy.

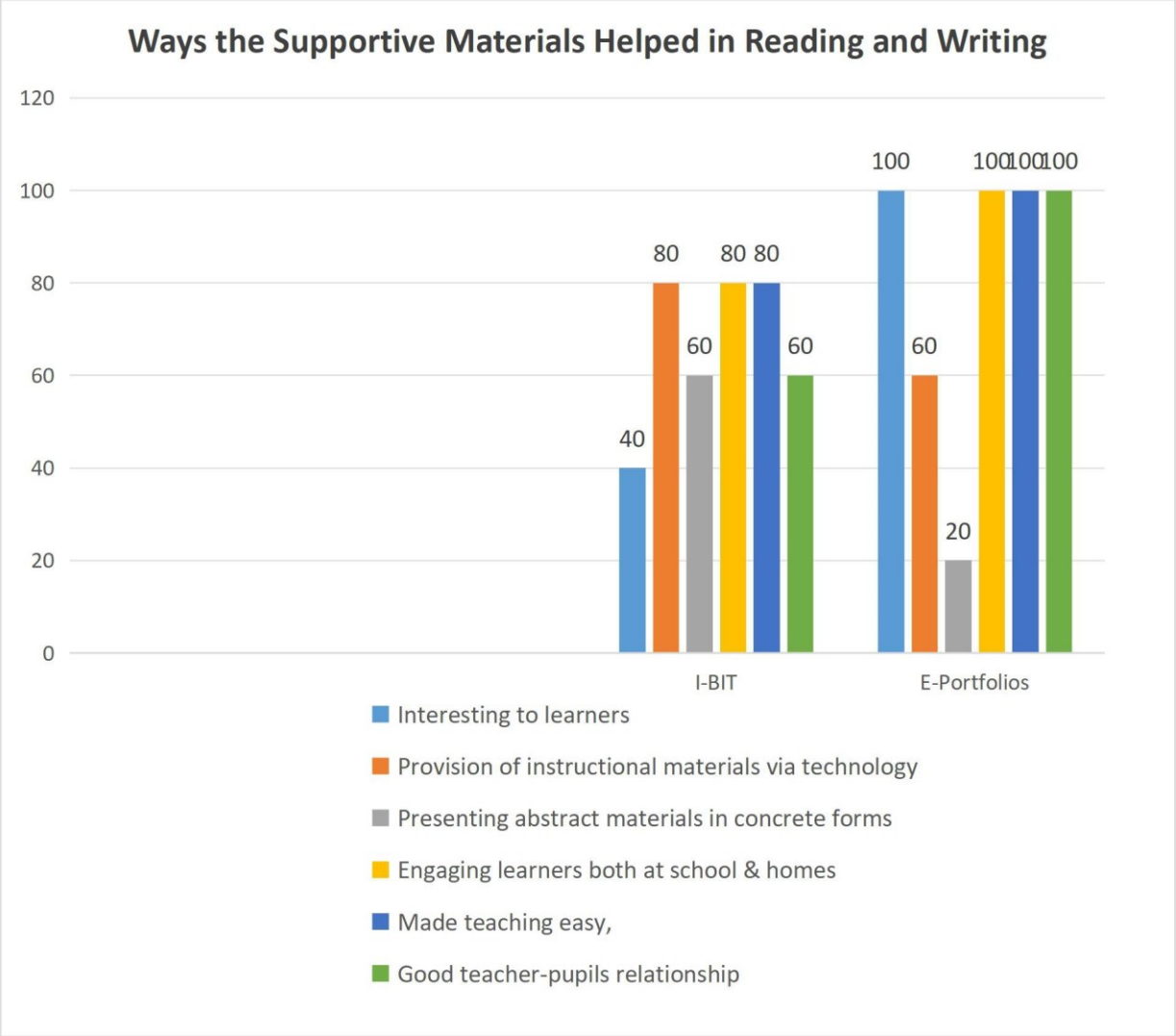


Figure 8: **Bar Chart Showing Ways the Supporting Materials Helped in Reading and Writing**

Figure 8 shows the ways supporting materials helped in reading and writing. The chart shows that 100, 60, 20, 100, 100 and 100 percent of teachers in E-Portfolio agreed that supporting materials make learning interesting, enhance provision of instructional materials via technology, presentation of abstract materials in concrete form, engage learners both at school and home, make teaching easy and ensures good teacher-pupils relationship which helped in reading and writing as compared to 40, 80, 60, 80, 80 and 60 percent respectively in I-BIT strategy.

Pupils' Interview and Self-Assessment Protocols

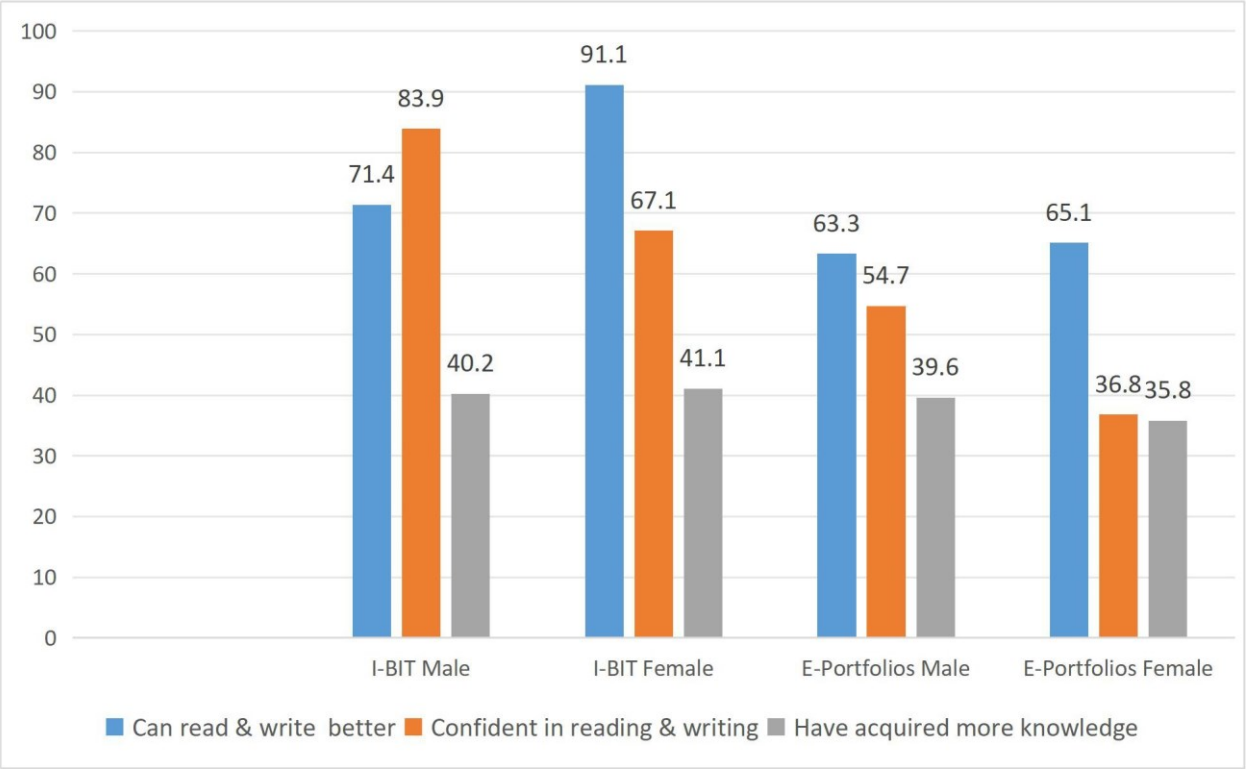
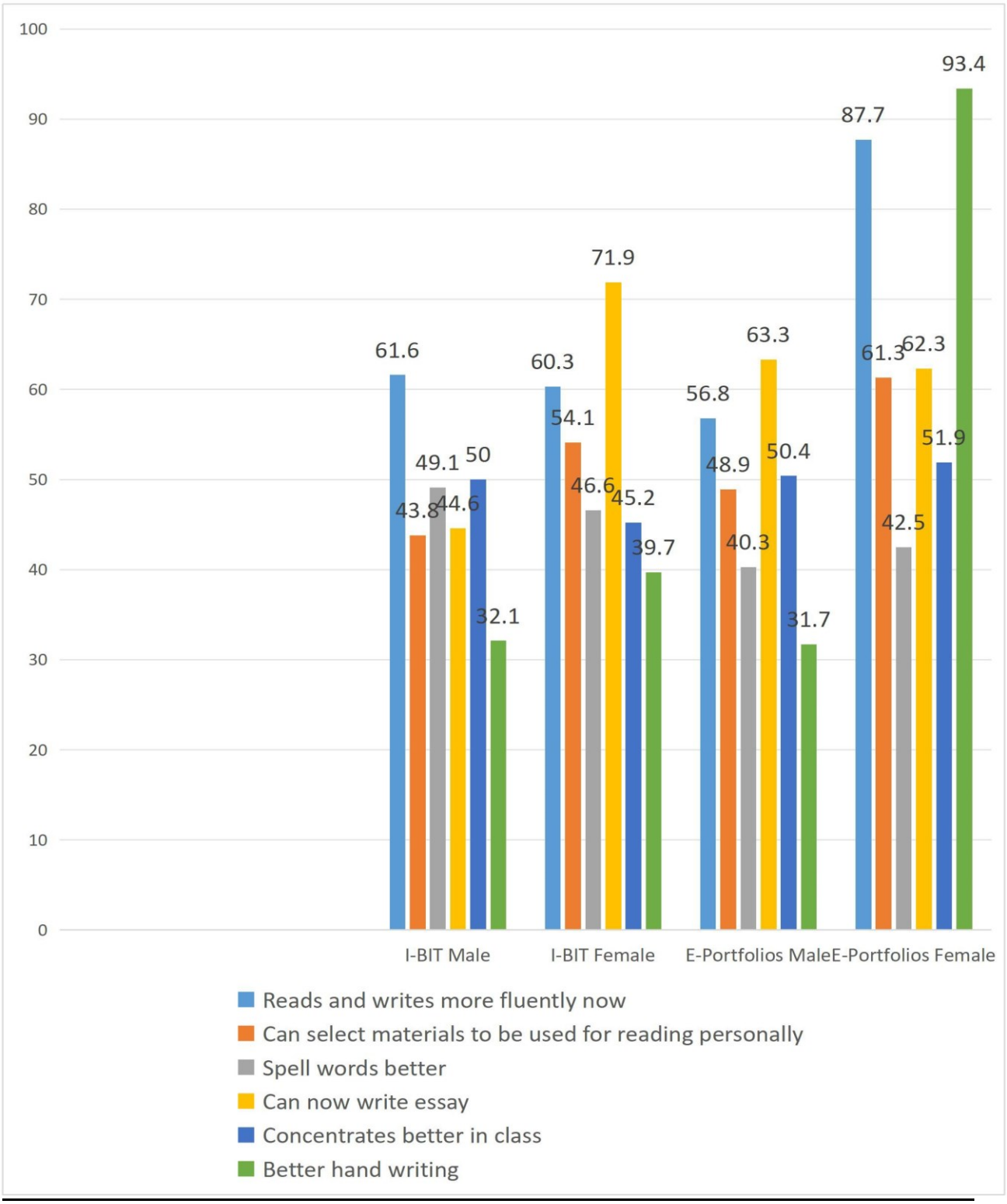


Figure 9: **Bar Chart Showing Progress Pupils Made with Use of the Strategies**

Figure 9 shows the ways the supporting materials helped in teaching and writing. The chart shows that 63.3 percent of male pupils can use E-Portfolio to read and write better as compared to 71.4 percent of male pupils that can use I-BIT to read and write better. Again, 54.7 percent of male pupils are confident in using E-Portfolios in reading and writing as compared to 83.9 percent of male pupils that are confident in using I-BIT in reading and writing; while 39.6 percent of male pupils acquired more knowledge in using E-Portfolios as much as 40.2 percent of male pupils acquired more knowledge in using I-BIT. The chart further shows that 65.1 percent of female pupils can use E-Portfolio to read and write better as compared to 91.1 percent of female pupils that can use I-BIT to read and write better. Again, 36.8 percent of female pupils are confident in using E-Portfolios in reading and writing as compared to 67.1 percent of female pupils that are confident in using I-BIT in reading and writing. While 35.8 percent of female pupils acquired more knowledge in using E-Portfolios 41.1 percent of female pupils acquired more knowledge in using I-BIT.


100
90
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45.2
39.7
56.8
48.9
40.3
63.3
50.4
31.7
87.7
61.3
42.5
62.3
51.9
93.4
I-BIT Male
I-BIT Female
E-Portfolios Male
E-Portfolios Female
Reads and writes more fluently now
Can select materials to be used for reading personally
Spell words better
Can now write essay
Concentrates better in class
Better hand writing

Figure 10: **Bar Chart Showing Nature of Progress Made in Reading and Writing Performance**

Figure 10 shows the nature of progress made with reading and writing performance. The chart shows that 56.8, 48.9, 40.3, 63.3, 50.4 and 31.7 percent of male pupils read and write more fluently now, can select reading materials to be used personally, spell words better, can now write essay and concentrate better in class as compared to 61.6, 43.8, 49.1, 44.6, 50 and 32.1 percent of male pupils in I-BIT. The chart further shows that 87.7, 61.3, 42.5, 62.3, 51.9 and 93.4 percent of female pupils now read and write more fluently; can personally select materials to be used for reading, spell words better, can now write essays and concentrate better in class as compared to 60.3, 54.1, 46.6, 71.9, 45.2 and 39.7 percent of female pupils in I-BIT.

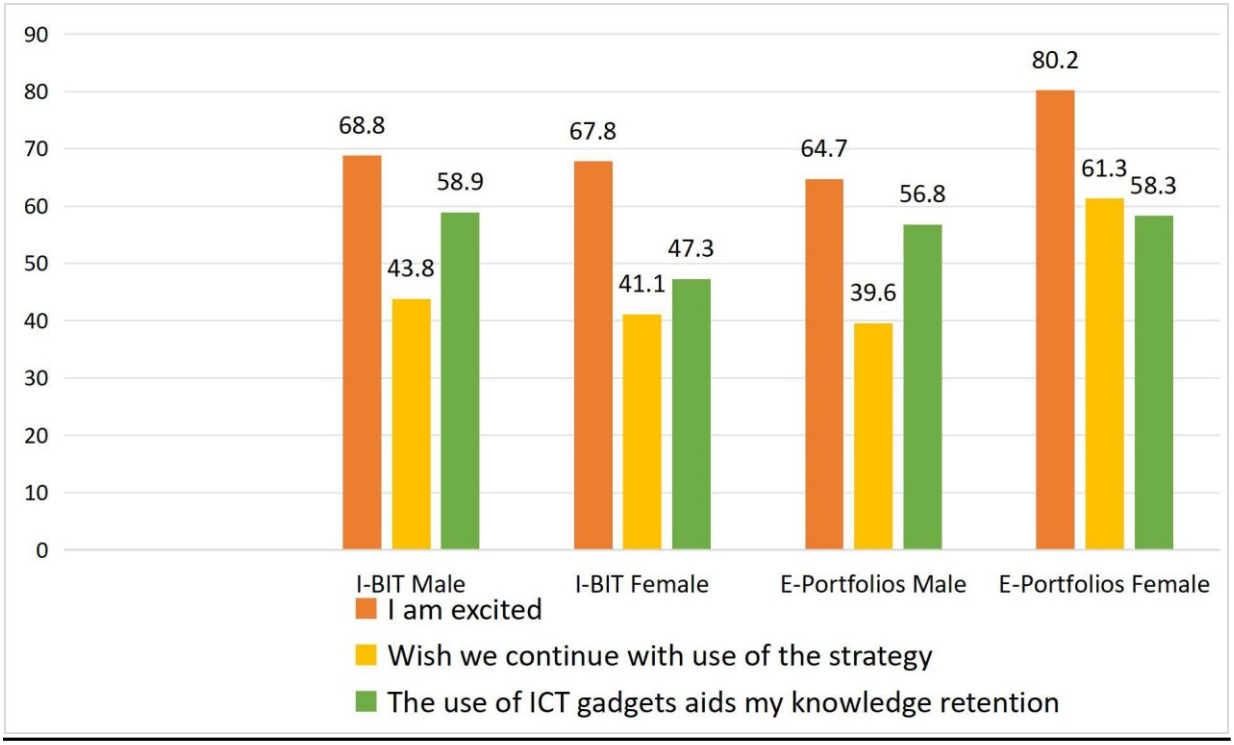

Figure 11: **Bar Chart Showing Expression of Pupils in Reading and Writing Activities Using the Strategies**

Figure 11 shows expression of pupils in reading and writing activities using the strategies. The chart shows that 64.7 percent of male pupils are excited with the use of E-Portfolio as compared to 68.8 percent of male pupils in I-BIT. The chart further shows that 39.6 percent of male pupils wish to continue with the use of E-Portfolio as compared to 43.8 percent of male pupils in I-BIT. The chart further shows that 56.8 percent of male pupils claimed that the use of ICT gadgets aids their knowledge retention as compared to 58.9 percent of male pupils in I-BIT. Similarly, the chart shows that 80.2 percent of female pupils are excited with the use of E-Portfolio as compared to 67.8 percent of female pupils in I-BIT. The chart further shows that 61.3 percent of female pupils wish to continue with the use of E-Portfolio as compared to 41.1 percent of female pupils in I-BIT. The chart adds that 58.3 percent of female pupils claimed that the use of ICT gadgets aids their knowledge retention as compared to 47.3 percent of female pupils in I-BIT.

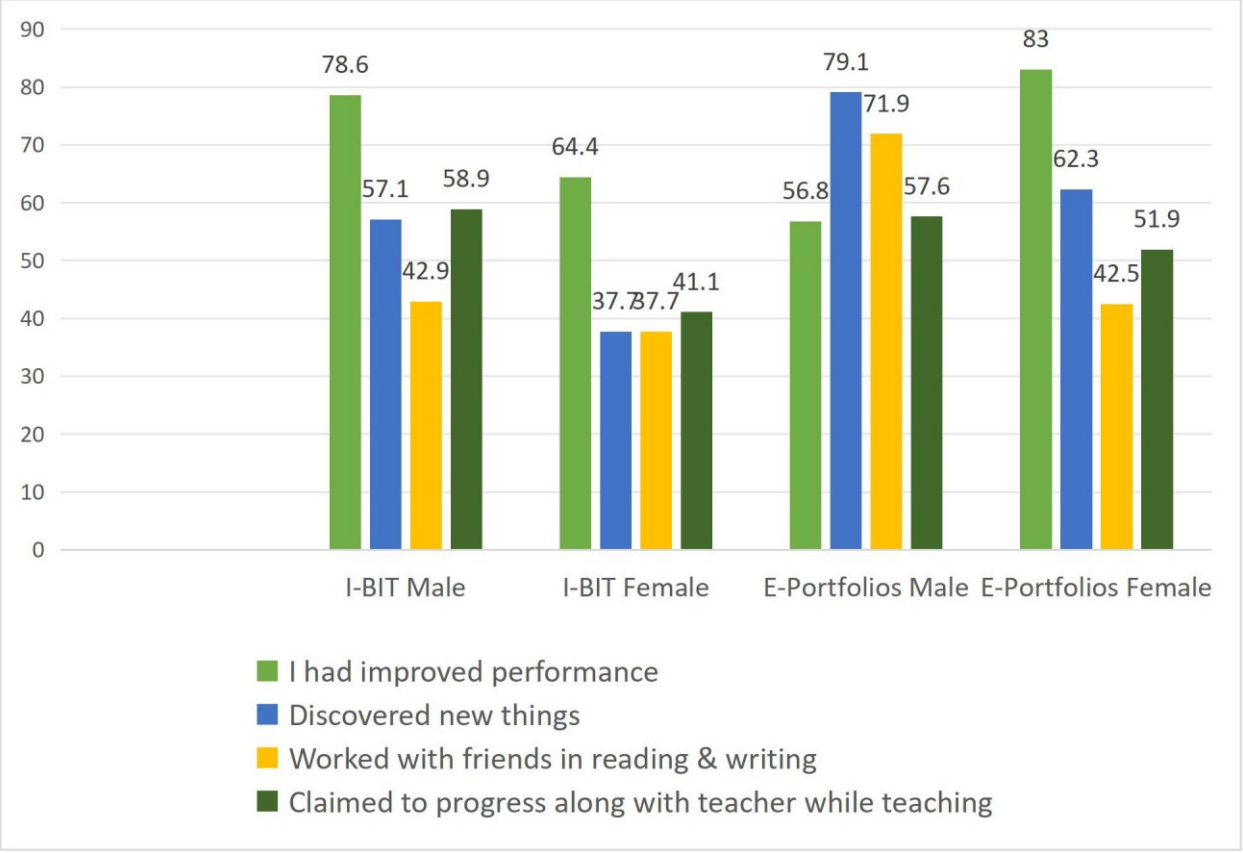

Figure 12: **Bar Chart Showing How Helpful the Strategies in Pupils' Reading and Writing**

Figure 12 shows how helpful the strategies were in pupils' reading and writing. The chart shows that 56.8 percent of male pupils in E-Portfolio had improved performance as compared to 78.6 percent of male pupils in I-BIT. The chart further shows that 79.1 percent of male pupils in E-Portfolio discovered new things as compared to 57.1 percent of male pupils in I-BIT. Again, 71.9 percent of male pupils in E-Portfolio can work with friends in reading and writing as compared to 42.9 percent of male pupils in I-BIT. Once more, 57.6 percent of male pupils in E-Portfolio claim to progress along with teachers while teaching as compared to 58.9 percent of male pupils in I-BIT. The chart shows that 80.0 percent of female pupils in E-Portfolio had improved performance as compared to 64.4 percent of female pupils in I-BIT. The chart further shows that 62.3 percent of female pupils in E-Portfolio discovered new things as compared to 37.7 percent of female pupils in I-BIT. Again, 42.5 percent of female pupils in E-Portfolio can work with friends in reading and writing as compared to 37.7 percent of female pupils in I-BIT. Once more, 51.9 percent of female pupils in E-Portfolio can move along with teachers while teaching as compared to 41.1 percent of female pupils in I-BIT.

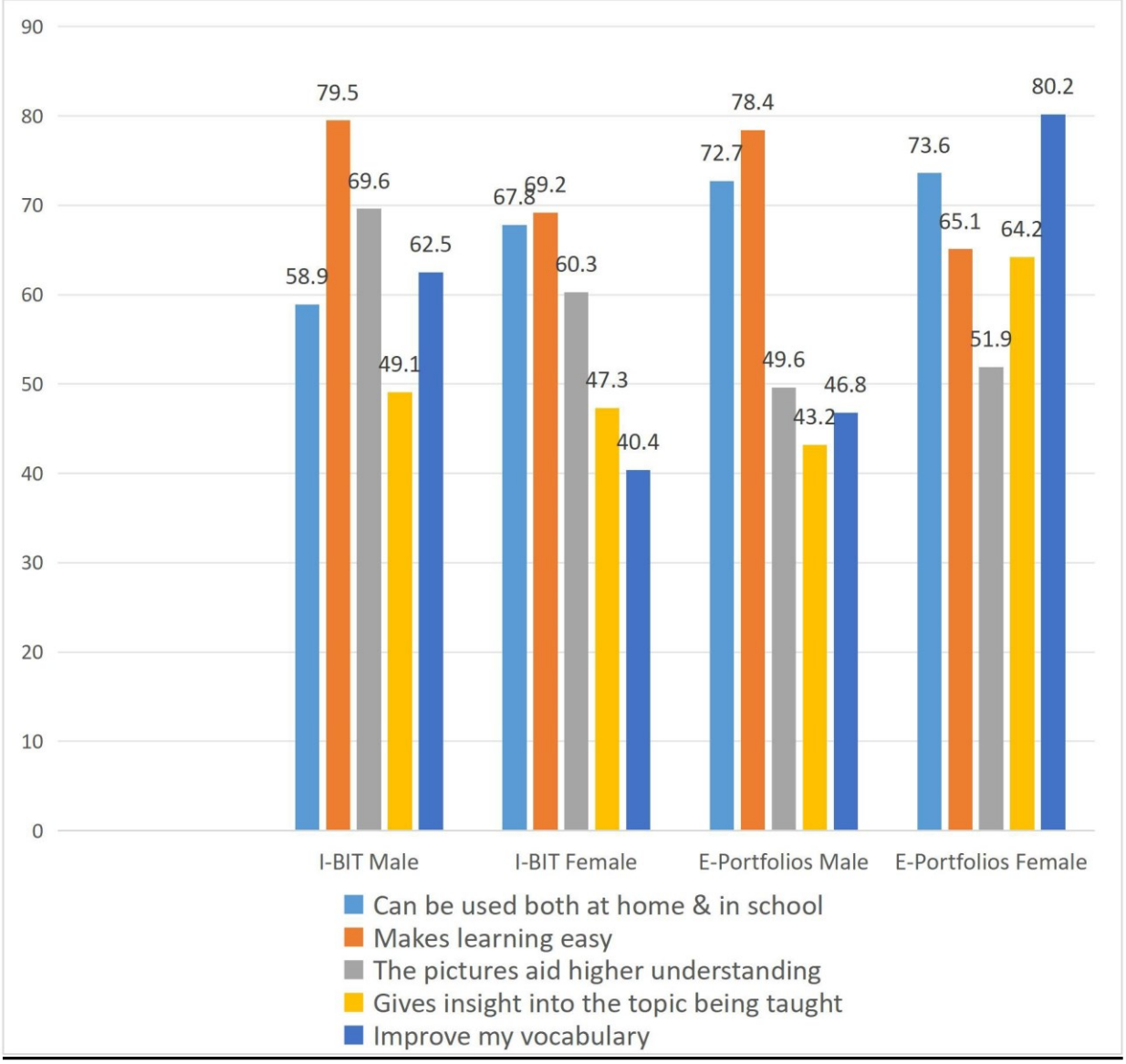

Figure 13: **Bar Chart Showing Assistance from Learning Materials in Reading and Writing Activities of Pupils**

Figure 13 shows how supportive learning materials are in pupils' reading and writing activities. The chart shows that 72.7, 78.4, 49.6, 43.2 and 46.8 percent of male pupils agreed that E-Portfolio can be used both at home and in the school. The materials make learning easy; the pictures aid higher understanding, give insight into the topic being taught and improve their vocabulary as compared to 58.9, 79,5, 69.6, 49.1 and 62.5 percent of male pupils in I-BIT. The chart shows that 73.6, 65.1, 51.9, 64.2 and 80.2 percent of female pupils agreed that E-Portfolio can be used both at home and in the school, makes learning easy, pictures aid higher understanding; gives insight into the topic being taught and improves their vocabulary as compared to 67.8, 69,2, 60.3, 47.3 and 40.4 percent of female pupils in I-BIT.

Research Question Four

What is the teachers' level of effectiveness in the use of E-Portfolios and I-BIT in their observed classroom practices?

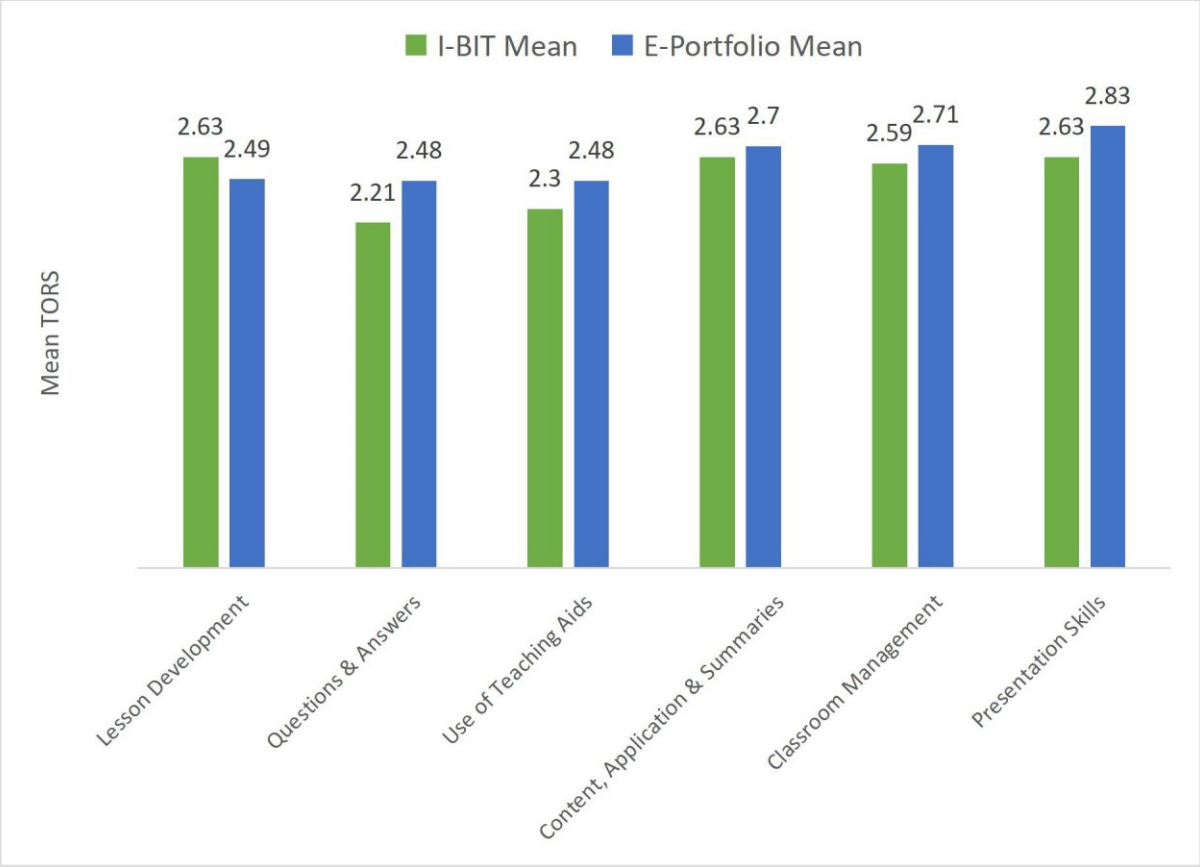

Figure 14: Bar Chart Showing Summary of Teacher Observational Scale by Sub-Sections

Figure 14 shows a mean rating of 2.63 for teachers' use of I-BIT for lesson development and a mean rating of 2.49 for teachers' use of E-Portfolios strategy for lesson development. The mean rating for teachers' use of I-BIT for questions and answers is 2.21 and the mean rating for teachers' use of E-Portfolios for questions and answers is 2.48. The mean rating for teachers' use of I-BIT in the use of teaching aids is 2.30 and the mean rating for teachers' use of E-Portfolios in the use of teaching aids is 2.48. The mean rating for teachers' use of I-BIT in content, application and summaries is 2.63 and the mean rating for teachers' use of E-Portfolios in content, application and summaries is 2.70. The mean rating for teachers' use of I-BIT in classroom management is 2.59 and the mean rating for teachers' use of E-Portfolios in classroom management is 2.71. The mean rating for teachers' use of I-BIT in presentation skills is 2.63 and the mean rating for teachers' use of E-Portfolios in presentation skills is 2.83.

Table 2: The Teachers' Level of Effectiveness in the Use of E-Portfolios and I-BIT Strategies in Lesson Development

Item	Description	I-BIT			E-PORTFOLIO		
	LESSON DEVELOPMENT	N	Mean	Remark	N	Mean	Remark
1	characters, props and graphics were relatable/relevant to the learners' experiences	5	2.8	E	5	2.9	E
2	maintained balance in stories and ensured they progressed logically to the end	5	3.0	E	5	3.0	E
3	demonstrated planful monitoring, or evaluating behavior	5	2.8	E	5	2.8	E
4	activated pupils' entry behavior	5	2.3	SWE	5	2.0	SWE
5	guiding learners' thinking process (e.g., verbal mediation).	5	2.6	E	5	2.9	E
6	implemented the objectives of the lesson	5	2.8	E	5	2.7	E
7	Helped learners work in pairs or groups	5	2.2	SWE	5	2.4	SWE
8	explored multiple interpretations.	5	2.8	E	5	2.6	E
9	explained central ideas through structured activities	5	2.8	E	5	2.6	E
10	demonstrated planful, monitoring, or evaluating behaviour	5	2.7	E	5	1.9	SWE
11	applied new learning.	5	1.8	SWE	5	1.2	I
12	demonstrated a high level of performance.	5	3.0	E	5	2.9	E
	Grand Mean	**5**	**2.63**	**E**	**5**	**2.49**	**SWE**

Scale: 3 – Effective(E), 2.50-3.0; Some What Effective (SWE)= 1.50- 2.49; Ineffective(I)= 0.50-1.49; Not Observed (NO) =0.0-0.49

Table 2 shows the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in lesson development. The table reveals the mean rating between 1.5 and 2.49 for items 4, 7 and 11 for teachers in I-BIT strategy class and items 4, 7 and 10 for teachers in E-Portfolio class. This means that the teachers were effective in the statements of these items with reference to lesson development. The table further shows that items 1, 2, 3, 5, 6, 8, 9, 10 and 12 had a mean rating between 2.5 and 3 for teachers in I-BIT strategy class and items 1, 2, 3, 5, 6, 8, 9, 11 and

12 had a mean rating between 2.5 and 3 for teachers in E-Portfolios strategy. This connotes that the teachers were effective in the statement of these items with reference to lesson development. The grand mean of 2.63 for teachers in I-BIT strategy class implies that the teachers were effective in the use of I-BIT for lesson development. However, the grand mean of 2.49 for teachers in E-Portfolios strategy class signifies that the teachers were *somewhat effective (ie, effective to some extent)* in the use of E-Portfolios for lesson development.

Table 3: The T-Test of Teachers' Level of Effectiveness in the Use of E-Portfolios and I-BIT Strategies in Lesson Development

	Strategies	N	Mean	Std. Deviation	df	t	Sig
Lesson Development	I-BIT	5	2.6300	.14459	8	1.461	0.182
	E-Portfolio	5	2.4900	.15811			

Table 3 shows the t-Test of difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in lesson development. The table reveals t = 1.461; df = 8 at P = 0.182 > 0.05. This connotes that there is no significant difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in lesson development.

Table 4: The Teachers' Level of Effectiveness in the Use of E-Portfolios and I-BIT Strategies in Questions and Answers

Item	Description	I-BIT			E-PORTFOLIO		
	Questions and Answers	N	Mean	Remark	N	Mean	Remark
13	solicited diverse levels of thinking.	5	2.5	E	5	2.3	SWE
14	engaged students in the exploration of diverse points of view to reframe ideas.	5	2.3	SWE	5	2.8	E
15	encouraged students to demonstrate open-mindedness and tolerance of imaginative, sometimes playful solutions to problems.	5	2.6	E	5	2.9	E
16	provided opportunities for students to develop and elaborate on their ideas.	5	2.2	SWE	5	2.6	E
17	explained central ideas through questions.	5	2.4	SWE	5	2.6	E
18	used words which were simple, clear and free from ambiguity	5	2.6	E	5	2.8	E
19	engaged students in comparing and contrasting ideas	5	1.8	SWE	5	2.7	E
20	Asked leading questions to prompt	5	2.7	E	5	2.9	E

	discussion						
21	Asked follow up questions to elicit more information	5	2.2	SWE	5	2.4	SWE
22	encouraged students to judge or evaluate situations, problems, or issues	5	1.8	SWE	5	1.9	SWE
23	provided opportunities for students to generalize from concrete data or information to the abstract.	5	1.2	I	5	1.4	I
	Grand Mean	**5**	**2.21**	**I**	**5**	**2.48**	**I**

Table 4 shows the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in questions and answers. The table reveals the mean rating between 1.5 and 2.49 for items 14, 16, 17, 19, 21 and 22 for teachers in I-BIT strategy class and items 13, 21 and 22 for teachers in E-Portfolio strategy class. This means that the teachers were *somewhat effective (ie, effective to some extent)* in the statements of these items with reference to questions and answers. The table further shows that items 13, 15, 18, 20 and 23 had a mean rating between 2.5 and 3 for teachers in I-BIT strategy class and items 14, 15, 16, 17, 18, 19, 20 and 23 had a mean rating between 2.5 and 3 for teachers in E-Portfolios strategy class. This connotes that the teachers were effective in the statements of these items with reference to questions and answers. The grand mean of 2.21 for teachers in I-BIT strategy class implies that the teachers were *somewhat effective (ie, effective to some extent)* in the use of I-BIT for questions and answers. Similarly, the grand mean of 2.48 for teachers in E-Portfolios strategy class signifies that the teachers were somewhat effective *(ie, effective to some extent)* in the use of E-Portfolios for questions and answers.

Table 5: The T-Test of the Teachers' Mean Level of Effectiveness in the use of E-Portfolios and I-BIT Strategies in Questions and Answers

	Strategies	N	Mean	Std. Deviation	df	t	Sig
Questions and Answers	I-BIT	5	2.2100	.07106	8	-7.321	0.00
	E-Portfolio	5	2.4800	.04183			

Table 5 shows the t-Test of the difference in the teachers' mean level of effectiveness in the use of E-Portfolios and I-BIT strategies in questions and answers. The table reveals $t = 7.321$; $df = 8$ at $P = 0.00 < 0.05$. This connotes that there is a significant difference in the teachers' mean level of effectiveness in the use of E-Portfolios and I-BIT strategies in questions and answers in favour of E-Portfolio strategy.

Table 6: The Teachers' Mean Level of Effectiveness in the Use of Teaching Aids in E-Portfolios and I-BIT Strategies

Item	Description	I-BIT			E-Portfolio		
Use of Teaching Aids		N	Mean	Remark	N	Mean	Remark
24	teaching aids were presented when appropriate	5	2.5	E	5	2.7	E
25	Easily accessed ICT based resources	5	2.1	SWE	5	2.3	SWE
26	Effectively used ICT tools	5	1.7	SWE	5	1.9	SWE
27	ensured gender representation in class	5	2.4	SWE	5	2.6	E
28	kept the lesson interesting to ensure adequate engagement	5	2.8	E	5	2.9	E
	Grand Mean	**5**	**2.30**	**SWE**	**5**	**2.48**	**SWE**

Table 6 shows the teachers' level of effectiveness in the use of teaching aids in E-Portfolio and I-BIT strategies. The table reveals the mean rating between 1.5 and 2.49 for items 25, 26 and 27 for teachers in I-BIT strategy class and items 25 and 26 for teachers in E-Portfolio strategy class. This means that the teachers were *somewhat effective* in the statements of these items with reference to the use of teaching aids. The table further shows that items 24 and 28 had a mean rating between 2.5 and 3 for teachers in I-BIT strategy class and items 24, 27 and 28 had a mean rating between 2.5 and 3 for teachers in E-Portfolio strategy class. This connotes that the teachers were effective in the statements of these items with reference to the use of teaching aids. The grand mean of 2.30 for teachers in I-BIT strategy class implies that the teachers were somewhat effective *(ie, effective to some extent)* in the use of teaching aids in I-BIT strategy. Similarly, the grand mean of 2.48 for teachers in E-Portfolio strategy class signifies that the teachers were *somewhat effective* in the use of teaching aids in E-Portfolio strategy.

Table 7: The t-Test of the Mean Difference in the Teachers' Level of Effectiveness in the Use of Teaching Aids in E-Portfolio and I-BIT Strategies

	Strategies	N	Mean	Std. Deviation	df	t	Sig
Use of Teaching Aids	I-BIT	5	2.300	.19039	8	-1.304	0.228
	E-Portfolio	5	2.4360	.13465			

Table 7 shows the t-test of the mean difference in the teachers' level of effectiveness in the use of teaching aids in E-Portfolio and I-BIT strategies. The table reveals $t = 1.304$; $df = 8$ at $P = 0.228 > 0.05$. This connotes that there is no significant mean difference in the teachers' level of effectiveness in the use of teaching aids in E-Portfolio and I-BIT strategies.

Table 8: The Teachers' Mean Level of Effectiveness in the Use of E-Portfolios and I-BIT Strategies in Content, Application and Summaries

Item	Description	I-BIT			E-PORTFOLIO		
Content, Application and Summaries		N	Mean	Remark	N	Mean	Remark
29	sustained expectations for pupil performance using formative evaluation	5	2.8	E	5	2.9	E
30	incorporated activities for students to apply new knowledge.	5	2.7	E	5	2.7	E
31	had students reflect on what they had learned.	5	2.4	SWE	5	2.5	E
	Grand Mean	**5**	**2.63**	**E**	**5**	**2.70**	**E**

Table 8 shows the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in content, application and summaries. The table reveals the mean rating between 1.5 and 2.49 for items 31 for teachers in I-BIT strategy class. This means that the teachers were somewhat effective *(ie, effective to some extent)* in the statements of these items with reference to content, application and summaries. The table further shows that items 29 and 30 had a mean rating between 2.5 and 3 for teachers in I-BIT strategy class and items 29, 30 and 31 had a mean rating between 2.5 and 3 for teachers in E-Portfolio strategy class. This connotes that the teachers were effective in the statements of these items with reference to content, application and summaries. The grand mean of 2.63 for teachers in I-BIT strategy class and 2.70 for teachers in E-Portfolio strategy class signify that the teachers were effective in the use of E-Portfolios and I-BIT strategies in the sub-section

Table 9: The t-Test of the Mean Difference in the Teachers' Level of Effectiveness in the Use of E-Portfolios and I-BIT Strategies in Content, Application and Summary

	Strategies	N	Mean	Std. Deviation	Df	t	**Sig**
Content, Application and Summaries	I-BIT	5	2.636	.08444	8	-1.405	0.198
	E-Portfolio	5	2.700	.05701			

Table 9 shows the t-test of the mean difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in content, application and summaries. The table reveals $t = 1.405$; $df = 8$ at $P = 0.198 > 0.05$. This connotes that there is no significant mean difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in the sub-section.

Table 10: The Teachers' Mean Level of Effectiveness in the Use of E-Portfolios and I-BIT Strategies in Classroom Management

Item	Description	I-BIT			E-PORTFOLIO		
	Classroom Management	N	Mean	Remark	N	Mean	Remark
32	provided opportunities for independent or group learning to promote depth in understanding content.	5	2.6	E	5	2.8	E
33	accommodated individual or subgroup differences (e.g., through individual conferencing, student or teacher choice in material selection and task assignments.)	5	2.3	SWE	5	2.5	E
34	allowed students to discover key ideas individually through structured activities and/or questions	5	2.6	E	5	2.5	E
35	Established good relationship with the pupils	5	2.6	E	5	2.8	E
36	maintained good eye contact throughout the lesson	5	2.8	E	5	2.9	E
37	explored diverse ways to think about a situation/object/event.	5	2.7	E	5	2.9	E
38	provided examples and illustrations of ideas.	5	2.5	E	5	2.6	E
	Grand Mean	**5**	**2.59**	**E**	**5**	**2.71**	**E**

Table 10 shows the teachers' mean level of effectiveness in the use of E-Portfolios and I-BIT strategies in classroom management. The table reveals the mean rating of 2.3 for items 33 for teachers in I-BIT strategy class. This means that the teachers were somewhat effective *(ie, effective to some extent)* in the statements of this item with reference to classroom management. The table further shows that items 32, 34, 35, 36, 37 and 38 had mean ratings between 2.5 and 3 for teachers in I-BIT strategy class and items 32, 33, 34, 35, 36, 37 and 38 had mean ratings between 2.5 and 3 for teachers in E-Portfolios strategy class. This connotes that the teachers were effective in the statements of these items with reference to classroom management. The grand mean of 2.59 for teachers in I-BIT strategy class and 2.71 for teachers in E-Portfolios strategy class signify that the teachers were effective in the use of E-Portfolios and I-BIT strategies in classroom management.

Table 11: The t-Test of the Teachers' Mean Level of Effectiveness in the Use of E-Portfolios and I-BIT Strategies in Classroom Management

	Strategies	N	Mean	Std. Deviation	df	t	Sig
Classroom	I-BIT	5	2.5900	.16217	8	-.883	0.403
Management	e-Portfolio	5	2.7140	.26885			

Table 11 shows the t-Test of the difference in the teachers' mean level of effectiveness in the use of E-Portfolios and I-BIT strategies in classroom management. The table reveals t = .883; df = 8 at P = 0.403 > 0.05. This connotes that there is no significant difference in the teachers' mean level of effectiveness in the use of E-Portfolios and I-BIT strategies in classroom management.

Table 12: The Teachers' Mean Level of Effectiveness in the Use of E-Portfolios and I-BIT Strategies in Presentation Skills

Item Description		I-BIT			E-PORTFOLIO		
Presentation Skills		N	Mean	Remark	N	Mean	Remark
39	engaged students in the exploration of diverse points of view to reframe ideas.	5	2.6	E	5	2.8	E
40	was audible enough for the easy listening of the entire class	5	2.6	E	5	2.8	E
41	had satisfactory clarity of expression, word articulation and sound diction	5	2.7	E	5	2.9	E
	Grand Mean	**5**	**2.63**	**E**	**5**	**2.83**	**E**

E- Effective

Table 12 shows the teachers' mean level of effectiveness in the use of E-Portfolios and I-BIT strategies in presentation skills. The table shows that items 39, 40 and 41 had mean ratings between 2.5 and 3 for teachers in I-BIT and E-Portfolios strategies. This connotes that the teachers were effective in the statements of these items with reference to presentation skills. The grand mean of 2.63 for teachers in I-BIT strategy class and 2.83 for teachers in E-Portfolios strategy class signifies that the teachers were effective in the use of E-Portfolios and I-BIT strategies in presentation skills.

Table 13: t-Test of the Teachers' Mean Level of Effectiveness in the Use of E-Portfolios and I-BIT Strategies in Presentation Skills

	Strategies	N	Mean	Std. Deviation	df	t	Sig
Presentation Skills	I-BIT	5	2.6280	.21241	8	-1.109	0.300
	E-Portfolio	5	2.8240	.33329			

Table 13 shows the t-Test of difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in presentation skills by teachers. The table reveals t = 1.109; df = 8 at P = 0.300 > 0.05. This connotes that there is no significant mean difference in the teachers' level of effectiveness in teachers' use of E-Portfolios and I-BIT strategies in presentation skills.

Research Question Five

Which of the low, moderate and high scorers among the pupils benefited more from the use of E-Portfolios and I-BIT strategies after teaching in reading comprehension and writing?

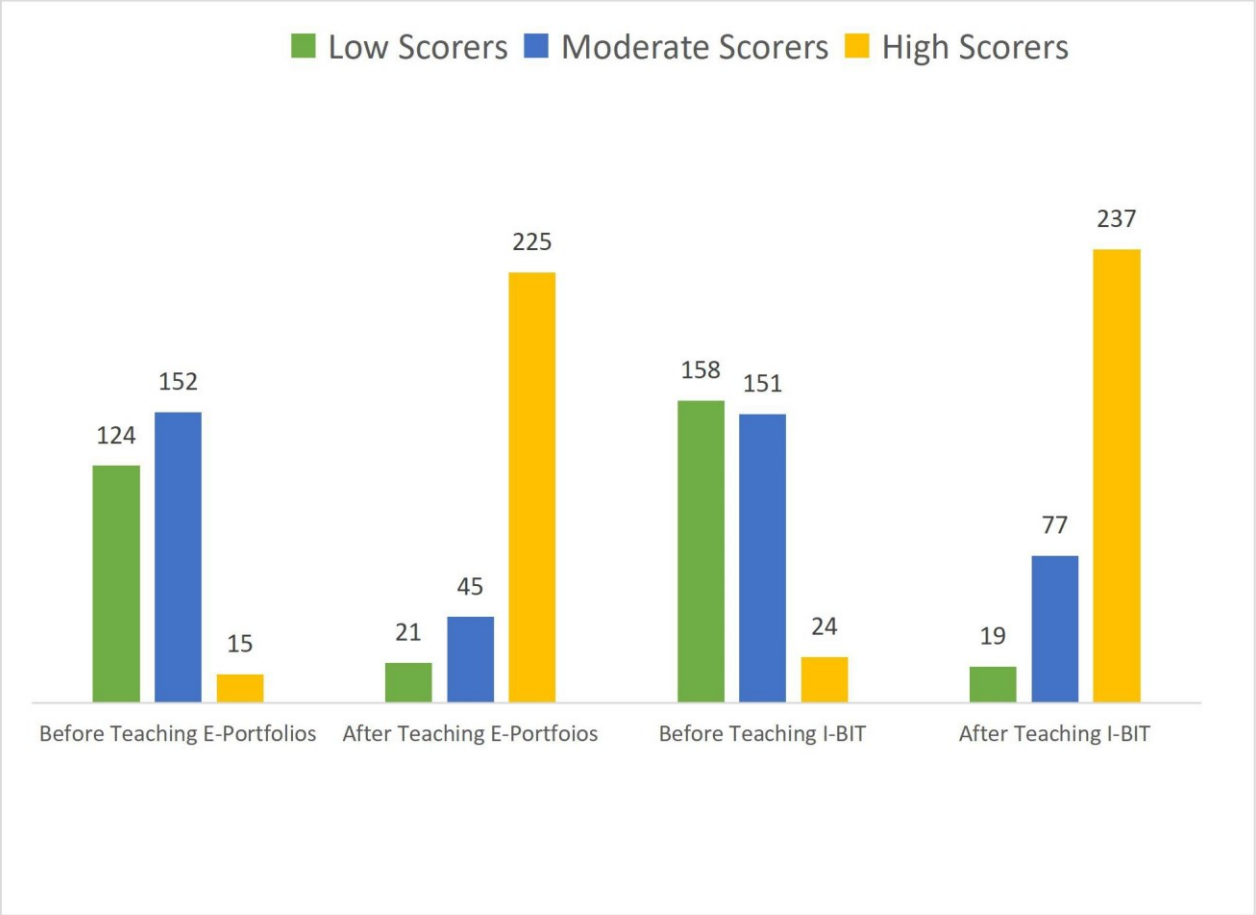

Figure 15: Bar Chart Showing Sample Distribution before and after Teaching Using E-Portfolios and I-BIT

Figure 15 shows the grade six low, moderate and high scorers before teaching reading comprehension and writing using E-Portfolios strategy. The figure reveals that 124 were low, 152 were moderate and 15 were high scorers' grade six pupils in public primary schools in Benue State, Nigeria before teaching reading comprehension and writing using E-Portfolios strategy. The figure also shows grade six low, moderate and high scorers after teaching reading comprehension and writing using E-Portfolios strategy. The figure reveals a reduction to 21 for low, 45 for moderate and increase of 225 high scorers' grade six pupils after teaching reading comprehension and writing using E-Portfolios strategy. Again, Figure 15 shows the low, moderate and high scorers in grade six pupils before using digital Inquiry-Based Information Technology (I-BIT) strategy. The figure reveals that 158 were low, 151 were moderate and 24 were high scorers' before using I-BIT strategy. After teaching using I-BIT the figure reveals a decrease to 19 for low, 77 for moderate and an increase to 237 for high scorers.

Table 14: The Mean Benefit of Low, Moderate and High Scorers' Pupils in E-Portfolios Strategy before and after Teaching Reading Comprehension

Scorers		Before	After	Mean Gain	% Gain
	Mean	11.04	12.71	1.67	7.95
Low	N	124	21		
	Std. Deviation	2.66	3.10		
	Mean	19.43	19.44	0.01	0.02
Moderate	N	152	45		
	Std. Deviation	2.89	3.18		
	Mean	28.27	35.88	7.61	26.92
High	N	15	225		
	Std. Deviation	2.60	8.07		

Table 14 shows the mean benefit of low, moderate and high scorer pupils in E-Portfolios strategy before and after teaching reading comprehension. The table reveals that before the use of E-Portfolios strategy in teaching reading comprehension there were 124 low scorers with the mean score of 11.04, 152 moderate scorers with the mean score of 19.43 and 15 high scorers with the mean score of 28.27. The table further shows that after the use of E-Portfolios strategy in teaching reading comprehension there were 21 low scorers with the mean score of 12.71, 45 moderate scorers with the mean score of 19.44 and 225 high scorers with the mean score of 35.88. The table advances that the low scorers have a mean gain of 1.67, moderate scorers have a mean gain of 0.01 and the high scorers, mean gain of 7.61. This mean gain shows that the high scorers benefited more from the use of E-Portfolios strategy in reading followed by the low scorers and the moderate scorers respectively.

Table 15: The ANOVA of the Mean Benefit of Low, Moderate and High Scorer Pupils from E-Portfolios Strategy before and after Teaching Reading Comprehension

		Sum of Squares	df	Mean Square	F	Sig.
Before	Between Groups	7071.469	2	3535.735	454.377	.000
	Within Groups	2241.074	288	7.782		
	Total	9312.543	290			
After	Between Groups	18259.510	2	9129.755	172.518	.000
	Within Groups	15241.157	288	52.921		
	Total	33500.667	290			

Table 15 shows the ANOVA of benefit of low, moderate and high scorers' pupils in E-Portfolios strategy before and after teaching reading comprehension. The table reveals $F(2,290) = 454.377$; $P = 0.000 < 0.05$ before the used of E-Portfolios strategy. This connotes that there is significant difference in the scores of low, moderate and high ability pupils' reading comprehension. The table further reveals the $F(2,290) = 172.518$; $P = 0.000 < 0.05$ after the use of E-Portfolios strategy. This implies that there is a significant mean difference in the benefit of low, moderate and high scorer pupils after the used of E-Portfolios strategy in teaching reading comprehension.

Table 16: The Multiple Comparisons of the Mean Benefit of Low, Moderate and High Scorer Pupils in E-Portfolios Strategy before and after Teaching Reading Comprehension

Bonferroni

Dependent Variable	(I) Low, Moderate and High Scorer in E-Portfolio	(J) Low, Moderate and High Scorer in E-Portfolio	Mean Difference (I-J)	Std. Error	Sig.
Before	Low Scorer	Moderate Scorer	-8.39389*	.33756	.000
		High Scorer	-17.22634*	.76258	.000
	Moderate Scorer	High Scorer	-8.83246*	.75496	.000
After	Low Scorer	Moderate Scorer	-6.73016*	1.92251	.002
		High Scorer	-23.16571*	1.65989	.000
	Moderate Scorer	High Scorer	-16.43556*	1.18795	.000

*. The mean difference is significant at the 0.05 level.

Table 16 shows the multiple comparisons of the mean benefit of low, moderate and high scorers' pupils from E-Portfolios strategy before and after teaching reading comprehension. The table reveals $P = 0.000 < 0.05$ for low scorers and moderate scorers, low scorers and high scorers, moderate scorers and high scorers before teaching reading comprehension. The table further reveals $P = 0.000 < 0.05$ for low scorers and high scorers, moderate scorers and high scorers and $P = 0.002 < 0.05$ low scorers and moderate scorers after teaching reading comprehension. This confirms that there is a significant mean difference in the benefit of low, moderate and high scorers' pupils in the use of E-Portfolios strategy in teaching reading comprehension.

Table 17: The Mean Benefit of Low, Moderate and High Scorers in E-Portfolios Strategy before and after Teaching Writing

Scorers		Before	After	Mean Gain	% Gain
	Mean	1.72	4.76	3.04	176.74
Low	N	124	50		
	Std. Deviation	1.32	2.71		
	Mean	1.99	5.22	3.23	162.31
Moderate	N	152	169		
	Std. Deviation	1.26	2.21		
	Mean	1.66	5.10	3.44	207.23
High	N	15	72		
	Std. Deviation	1.39	2.23		

Table 17 shows the mean benefit of low, moderate and high scorer pupils in E-Portfolios strategy before and after teaching writing. The table reveals that before the use of E-Portfolios strategy in teaching writing there were 124 low scorers with the mean score of 1.72, 152 moderate scorers with the mean score of 1.99 and 15 high scorers with the mean score of 1.66. The table further shows that after the use of E-Portfolios strategy in teaching writing there were 50 low scorers with the mean score of 4.76, 169 moderate scorers with the mean score of 5.22 and 72 high scorers with the mean score of 5.10. The table advances that the low scorers have a mean gain in writing of 3.04, moderate scorers have a mean gain in writing of 3.23 and high scorers have mean gain in writing of 3.44. This mean gain shows that the low scorers benefited more from the use of E-Portfolios strategy in writing followed by the moderate scorers and the high scorers being the least. Again, the low scorers benefited more from the strategy.

Table 18: The ANOVA of the Mean Benefit of Low, Moderate and High Scorer Pupils from E-Portfolios Strategy before and after Teaching Writing

		Sum of Squares	df	Mean Square	F	Sig.
Before	Between Groups	29.198	2	14.599	9.146	.000
	Within Groups	459.691	288	1.596		
	Total	488.888	290			
After	Between Groups	1187.812	2	593.906	571.113	.000
	Within Groups	299.494	288	1.040		
	Total	1487.306	290			

Table 18 shows the ANOVA of the mean benefit of low, moderate and high scorer pupils from E-Portfolios strategy before and after teaching writing. The table reveals $F(2,290) = 9.146$; $P = 0.000 < 0.05$ before the use of E-Portfolio strategy. This signifies that there is significant mean difference in the scores of low, moderate and high ability pupils before the use of E-Portfolios strategy in teaching writing. The table further reveals the $F(2,290) = 571.113$; $P = 0.000 < 0.05$ after the use of E-Portfolios in teaching writing. This implies that there is a significant mean difference in the benefit of low, moderate and high scorer pupils from the use of E-Portfolios strategy in teaching writing.

Table 19: The Multiple Comparison of the Mean Benefit of Low, Moderate and High Scorer Pupils from E-Portfolios Strategy before and after Teaching Writing

Bonferroni

Dependent Variable	(I) Low, Moderate and High Scorer in E-Portfolio	(J) Low, Moderate and High Scorer in E-Portfolio	Mean Difference (I-J)	Std. Error	Sig.
Before	Low Scorer	Moderate Scorer	.00953	.20339	1.000
		High Scorer	-.72667*	.23258	.006
	Moderate Scorer	High Scorer	-.73619*	.17780	.000
After	Low Scorer	Moderate Scorer	-3.49408*	.16417	.000
		High Scorer	-6.33333*	.18773	.000
	Moderate Scorer	High Scorer	-2.83925*	.14351	.000

*. The mean difference is significant at the 0.05 level.

Table 19 shows the multiple comparisons of the mean benefit of low, moderate and high scorer pupils in E-Portfolios strategy before and after teaching writing. The table reveals P = 1.000 < 0.05 for low scorers and moderate scorers. P = 0.000 < 0.05 for low scorers and high scorers, moderate scorers and high scorers before teaching writing. The table further reveals P = 0.000 < 0.05 for low scorers and moderate scorers, low scorers and high scorers, moderate scorers and high scorers after teaching writing. This confirms that there is a significant difference in the benefit of low, moderate and high scorer pupils in the use of E-Portfolios strategy in teaching writing.

Table 20: The Mean Benefit of Low, Moderate and High Scorers Pupils in I-Bit Strategy before and after Teaching Reading Comprehension

Scorers		**Before**	**After**	**Mean Gain**	**% Gain**
	Mean	11.05	12.63	1.58	14.3
Low	N	158	19		
	Std. Deviation	2.86	3.36		
	Mean	19.54	21.05	1.51	7.7
Moderate	N	151	77		
	Std. Deviation	2.96	2.68		
	Mean	28.12	37.44	9.32	33.3
High	N	24	237		
	Std. Deviation	2.25	8.10		

Table 20 shows the mean benefit of low, moderate and high scorers' pupils from I-BIT strategy before and after teaching reading comprehension. The table reveals that before the use of I-BIT strategy in teaching reading comprehension there were 158 low scorers with a mean score of 11.05, 151 moderate scorers with a mean score of 19.54 and 24 high scorers with a mean score of 28.12. The table further shows that after the use of I-BIT strategy in teaching reading comprehension there were 19 low scorers with a mean score of 12.63, 77 moderate scorers with a mean score of 21.05 and 237 high scorers with a mean score of 37.44. The table advances that the low scorers have mean gain in reading comprehension of 1.58, moderate scorers have a mean

gain in reading comprehension of 1.51 and high scorers have a mean gain in reading comprehension of 9.32. This mean gain shows that the high scorers benefited more from the use of E-portfolios strategy in reading comprehension followed by the low scorers and the moderate scorers respectively.

Table 21: The ANOVA of the Mean Benefit of Low, Moderate and High Scorer Pupils from I-BIT Strategy before and after Teaching Reading Comprehension

		Sum of Squares	Df	Mean Square	F	Sig.
Before	Between Groups	9295.321	2	4647.661	564.369	.000
	Within Groups	2717.597	330	8.235		
	Total	12012.919	332			
After	Between Groups	23380.392	2	11690.196	237.183	.000
	Within Groups			49.288		
		16264.905	330			
	Total	39645.297	332			

Table 21 shows the ANOVA of the mean benefit of low, moderate and high scorer pupils in I-BIT strategy before and after teaching reading comprehension. The table reveals $F(2,332) = 564.369$; $P = 0.000 < 0.05$ before the use of I-BIT strategy. This signifies that there is a significant difference in the scores of low, moderate and high ability pupils before the use of E-Portfolios strategy in teaching reading comprehension. The table further reveals the $F(2, 332) = 237.183$; $P = 0.000 < 0.05$ after the use of I-BIT in teaching writing. This implies that there is a significant difference in the benefit of low, moderate and high scorer pupils from the use of I-BIT strategy in teaching reading comprehension.

Table 22: The Multiple Comparison of the Mean Benefit of Low, Moderate and High Scorers' Pupils from I-BIT Strategy before and after Teaching Reading Comprehension

Bonferroni

Dependent Variable	(I) Low, Moderate and High Scorer in I-BIT	(J) Low, Moderate and High Scorer in I-BIT	Mean Difference (I-J)	Std. Error	Sig.
Before	Low Scorer	Moderate Scorer	-8.49904*	.32659	.000
		High Scorer	-17.07437*	.62869	.000
	Moderate Scorer	High Scorer	-8.57533*	.63061	.000
After	Low Scorer	Moderate Scorer	-8.42037*	1.79838	.000
		High Scorer	-24.81990*	1.67393	.000
	Moderate Scorer	High Scorer	-16.39953*	.92090	.000

*. The mean difference is significant at the 0.05 level.

Table 22 shows the multiple comparisons of the mean benefit of low, moderate and high scorer pupils in I-BIT strategy before and after teaching reading comprehension. The table reveals $P = 0.000 < 0.05$ for low scorers and moderate scorers, low scorers and high scorers, moderate scorers and high scorers before teaching reading comprehension. The table further reveals $P = 0.000 < 0.05$ for low scorers and moderate scorers, low scorers and high scorers, moderate

scorers and high scorers after teaching reading comprehension. This confirms that there is a significant difference in the benefit of low, moderate and high scorer pupils in the use of I-BIT strategy in teaching reading comprehension.

Table 23: The Mean Benefit of Low, Moderate and High Scorers' Pupils in I-BIT strategy before and after Teaching Writing

Scorers		Before	After	Mean Gain	% Gain
	Mean	1.99	2.93	0.94	76.4
Low	N	158	19		
	Std. Deviation	1.03	0.24		
	Mean	2.03	4.94	2.91	46.8
Moderate	N	151	77		
	Std. Deviation	1.08	0.83		
	Mean	2.00	7.26	5.26	263.0
High	N	24	237		
	Std. Deviation	0.63	0.68		

Table 23 shows the mean benefit of low, moderate and high scorer pupils in I-BIT strategy before and after teaching writing. The table reveals that before the use of I-BIT strategy in teaching writing there were 158 low scorers with the mean score of 1.99, 151 moderate scorers with a mean score of 1.03 and 24 high scorers with a mean score of 2.00. The table further shows that after the use of I-BIT strategy in teaching writing there were 19 low scorers with a mean score of 2.93, 77 moderate scorers with a mean score of 4.94 and 237 high scorers with a mean score of 7.26. The table advances that the low scorers have the mean gain in writing of 1.52, moderate scorers a mean gain in writing of 2.98 and high scorers a mean gain in writing of 4.51. The order of the mean gain shows that the high scorers benefited more in writing from the use of I-BIT strategy followed by the moderate scorers and the low scorers.

Table 24: The ANOVA of the Benefit of Low, Moderate and High Scorer Pupils from I-BIT strategy before and after Teaching Writing

		Sum of Squares	df	Mean Square	F	Sig.
Before	Between Groups	.170	2	.085	.078	.925
	Within Groups	360.755	330	1.093		
	Total	360.925	332			
After	Between Groups	21.013	2	10.506	5.456	.005
	Within Groups	635.480	330	1.926		
	Total	656.492	332			

Table 24 shows the ANOVA of the benefit of low, moderate and high scorers' pupils from I-BIT strategy before and after teaching writing. The table reveals $F(2,332) = 0.078$; $P = 0.925 > 0.05$ before the use of I-BIT strategy. This signifies that there is no significant mean difference in the scores of low, moderate and high ability pupils before the use of E-Portfolios strategy in teaching writing. The table further reveals $F(2, 332) = 5.456$; $P = 0.005 < 0.05$ after the use of I-BIT in teaching writing. This implies that there is a significant mean difference in the benefit of low, moderate and high scorers' pupils in the use of I-BIT strategy in teaching writing.

Table 25: The Multiple Comparison of the Mean Benefit of Low, Moderate and High Scorer Pupils in I-BIT Strategy before and after Teaching Writing

Bonferroni

Dependent Variable	(I) Low, Moderate and High Scorer in I-BIT	(J) Low, Moderate and High Scorer in I-BIT	Mean Difference (I-J)	Std. Error	Sig.
Before	Low Scorer	Moderate Scorer	-.04606	.11899	1.000
		High Scorer	-.00633	.22906	1.000
	Moderate Scorer	High Scorer	.03974	.22976	1.000
After	Low Scorer	Moderate Scorer	.46822	.35547	.566
		High Scorer	-.13302	.33087	1.000
	Moderate Scorer	High Scorer	-.60124*	.18203	.003

*. The mean difference is significant at the 0.05 level.

Table 25 shows the multiple comparisons of the mean benefit of low, moderate and high scorer pupils from I-BIT strategy before and after teaching writing. The table reveals P = 1.000 > 0.05 for low scorers and moderate scorers, low scorers and high scorers, moderate scorers and high scorers before teaching reading comprehension. This confirms that there is no significant difference in the scores of low, moderate and high scorers' pupils before the use of I-BIT strategy in teaching writing. The table further reveals P = 0.566 > 0.05 for low scorers and moderate scorers, P = 1.000 > 0.05 for low scorers and high scorers, but P = 0.003 < 0.05 for moderate scorers and high scorers after teaching writing. This confirms that there is a significant difference in the mean benefit of moderate and high scorer pupils from the use of I-BIT strategy in teaching writing.

Research Question Four

What is the difference in the mean reading and writing achievement of grade 6 pupils when taught using E-Portfolios, I-BIT and Conventional strategies?

Table 26: The Mean Achievement of grade six Pupils in Reading when Taught Using to E-Portfolios, I-BIT and Conventional Strategies

Strategies		Before	After	Mean Gain	% Gain
E-Portfolios	Mean	16.31	32.24	15.93	97.67
	N	291	291		
	Std. Deviation	5.66	10.09		
I-BIT	Mean	16.13	32.24	16.11	99.88
	N	333	333		
	Std. Deviation	6.01	10.92		
Conventional	Mean	18.86	30.05	11.19	59.33
	N	301	301		
	Std. Deviation	6.26	7.46		

Table 26 shows the mean achievement of 291 grade 6 pupils in reading when taught using E-Portfolios, 333 in I-BIT and 301 in conventional strategies. The table reveals that the mean achievement of grade six pupils in reading is 16.31 before the use of E-Portfolios, 16.13 before the use of I-BIT strategy and 18.86 before the use of conventional strategy in teaching reading. The table shows the mean achievement of pupils in reading as 32.24 after the use of E-Portfolios, 32.24 after the use of I-BIT strategy and 30.05 after the use of conventional strategy in teaching reading. The table further reveals a mean gain in reading of 15.93 with a percentage gain of 97.67 for E-Portfolio strategy, 16.11 with a percentage gain of 99.88 for I-BIT strategy and 11.19 with a percentage gain of 59.33 for conventional strategy. The order of the percentage mean gain shows that the application of E-Portfolios better enhanced pupils' ability in reading followed by I-BIT strategy and the least was the application of conventional strategy.

Table 27: The ANCOVA of grade six Pupils' Mean Achievement in Reading when Taught Using E-Portfolios, I-BIT and Conventional Strategies

Dependent Variable: Post-RAT

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	26921.033[a]	3	8973.678	137.826	.000	.310
Intercept	31994.284	1	31994.284	491.396	.000	.348
Pre-RAT	25951.160	1	25951.160	398.581	.000	.302
Strategy	**3000.712**	**2**	**1500.356**	**23.044**	**.000**	**.048**
Error	59965.339	921	65.109			
Total	1006514.000	925				
Corrected Total	86886.372	924				

a. R Squared = .310 (Adjusted R Squared = .308)

Table 27 shows the ANCOVA of the respondents' mean achievement in reading with application of E-Portfolios, I-BIT and Conventional strategies. The table reveals $F(2,921) = 23.044$; $P = 0.000 < 0.05$. This means that there is a significant difference in the pupils' achievement in reading when taught using E-Portfolios, I-BIT and Conventional strategies. The partial eta square of 0.048 obtained means that only 4.8 percent of pupils' achievement in reading is attributed to the strategies applied.

Table 28: A Pairwise Comparison of grade six Pupils' Mean Achievement in Reading with Application to E-Portfolios, I-BIT and Conventional Strategies

Dependent Variable: Post-RAT

(I) Strategy	(J) Strategy	Mean Difference (I-J)	Std. Error	Sig.
E-Portfolios	I-BIT	-.155	.648	.993
	Conventional strategy	3.803*	.668	.000
I-BIT	Conventional strategy	3.957*	.648	.000

Table 28 shows the pairwise comparisons of pupils' mean achievement in reading when taught using E-Portfolios, I-BIT and Conventional strategies. The table reveals $P = 0.993 > 0.05$ for E-

Portfolios and I-BIT. P = 0.000 < 0.05 for E-Portfolios and Conventional strategy and I-BIT and Conventional strategies. This confirms that there is a significant mean difference in the pupils' achievement in reading when taught using E-Portfolios, I-BIT and Conventional strategies.

Table 29: The Mean Achievement of Pupils in Achievement in Writing with Application to E-Portfolios, I-BIT and Conventional Strategies

Strategies		Before	After	Mean Gain	% Gain
	Mean	1.86	5.09	3.23	173.66
E-Portfolios	N	291	291		
	Std. Deviation	1.29	2.26		
	Mean	2.01	5.03	3.02	150.25
I-BIT	N	333	333		
	Std. Deviation	1.04	1.40		
	Mean	2.40	4.46	2.06	85.83
Conventional	N	301	301		
	Std. Deviation	1.21	1.33		

Table 29 shows the mean achievement of 291 grade six pupils in writing with application to E-Portfolios, 333 in I-BIT and 301 in conventional strategies. The table reveals that the mean achievement of pupils in writing is 1.86 before the use of E-Portfolios, 2.01 before the use of I-BIT strategy and 2.40 before the use of conventional strategy in teaching writing. The table shows a mean achievement in writing of 5.09 after the use of E-Portfolios, 3.02 after the use of I-BIT strategy and 2.06 after the use of conventional strategy in teaching writing. The table further reveals a mean gain in writing of 3.23 with a percentage gain of 173.66 for E-Portfolio strategy, 3.02 with a percentage gain of 150.25 for I-BIT strategy and 2.06 with a percentage gain of 85.83 for conventional strategy. The order of the percentage mean gain shows that the application of E-Portfolio enhanced pupils' ability in writing highest followed by I-BIT strategy and the least is the application of conventional strategy.

Table 30: The ANCOVA of grade six Pupils' Mean Achievement in Writing with Application of E-Portfolios, I-BIT and Conventional Strategies

Dependent Variable: Post-WAT

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	469.311[a]	3	156.437	63.196	.000	.171
Intercept	3065.677	1	3065.677	1238.447	.000	.574
Pre-WAT	394.748	1	394.748	159.467	.000	.148
strategies	**148.037**	**2**	**74.019**	**29.901**	**.000**	**.061**
Error	2279.861	921	2.475			
Total	24680.000	925				
Corrected Total	2749.172	924				

a. R Squared = .171 (Adjusted R Squared = .168)

Table 30 shows the ANCOVA of grade six pupils' mean achievement in writing with application to E-Portfolios, I-BIT and Conventional strategies. The table reveals $F(2,921) = 29.901$; $P = 0.000 < 0.05$. This means that there is a significant mean difference in the pupils' achievement in writing with application of E-Portfolios, I-BIT and conventional strategies. The partial eta square of 0.061 obtained means that 6.1 percent of pupils' achievement in writing can be attributed to the strategies applied.

Table 31: A Pairwise Comparison of grade six Pupils' Mean Achievement in Writing with Application to E-Portfolios, I-BIT and Conventional Strategies

Dependent Variable: Post-WAT

(I) Strategy	(J) Strategy	Mean Difference (I-J)	Std. Error	Sig.
E-Portfolios	I-BIT	.140	.126	.606
	Conventional strategy	.935*	.132	.000
I-BIT	Conventional strategy	.795*	.126	.000

Table 31 shows the pairwise comparisons of grade six pupils' achievement in writing with application to E-Portfolios, I-BIT and conventional strategies. The table reveals $P = 0.606 > 0.05$ for E-Portfolios and I-BIT. But, $P = 0.000 < 0.05$ for E-Portfolios and Conventional Strategy and I-BIT and conventional strategies. This confirms that there is a significant difference in the pupils' achievement in writing with application of E-Portfolios, I-BIT and conventional strategies.

Research Question Six

What is the difference in the reading and writing mean achievement of the male and female pupils taught using E-Portfolios and I-BIT strategies

Table 32: The Mean Reading Achievement of Male and Female Pupils Taught Using E-Portfolio Strategy

Gender		Before	After	Mean Gain	% Gain
	Mean	15.81	31.66	15.85	100.25
Male	N	161	161		
	Std. Deviation	5.75	10.05		
	Mean	16.93	32.95	16.02	94.62
Female	N	130	130		
	Std. Deviation	5.51	10.13		
Mean difference				0.17	

Table 32 shows the mean reading achievement of 161 male and 130 female pupils with the use of E-Portfolio strategy. The table reveals that the reading achievement of male pupils is 15.81 before the use of E-Portfolios and 31.66 after the use of E-Portfolio strategy while the reading achievement of female pupils is 16.93 before the use of E-Portfolios and 32.95 after the use of E-Portfolio strategy. The table further reveals a mean gain of15.85 with a percentage gain of 100.25 for male pupils and a mean gain of 16.13 with a percentage gain of 94.62 for female

pupils. The difference in the mean reading achievement of male and female pupils with the use of E-Portfolio strategy is 0.17 in favour of female pupils.

Table 33: The ANCOVA of the Mean Reading Achievement of the Male and Female Pupils with the Use of E-Portfolio Strategy

Dependent Variable: Post-RAT

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	12177.516[a]	2	6088.758	101.049	.000	.412
Intercept	5674.854	1	5674.854	94.180	.000	.246
Pre-RAT	12057.965	1	12057.965	200.113	.000	.410
Gender	**.010**	**1**	**.010**	**.000**	**.990**	**.000**
Error	17353.646	288	60.256			
Total	332012.000	291				
Corrected Total	29531.162	290				

a. R Squared = .412 (Adjusted R Squared = .408)

Table 33 shows the ANCOVA of the mean reading achievement of the male and female pupils with E-Portfolio strategy. The table reveals F (1,288) = 0.000; P = 0.990 > 0.05. This means that there is a significant difference in the reading achievement of the male and female pupils in the E-Portfolio strategy. The partial eta square of 0.000 obtained means that the reading achievement of the male and female pupils with the use of E-Portfolio strategy is not a function of their gender.

Table 34: The Mean Writing Achievement of the Male and Female Pupils in the Use of E-Portfolios Strategy

Gender		Before	After	Mean Gain	% Gain
	Mean	1.77	5.03	3.26	184.18
Male	N	161	161		
	Std. Deviation	1.23	2.27		
	Mean	1.97	5.16	3.19	161.93
Female	N	130	130		
	Std. Deviation	1.36	2.26		
Mean difference				0.07	

Table 34 shows the mean writing achievement of 161 male and 130 female pupils with the use of E-Portfolio strategy. The table reveals that the writing achievement of the males is 1.77 before the use of E-Portfolios and 5.03 after the use of E-Portfolio strategy. The table reveals that the writing achievement of the females is 1.97 before the use of E-Portfolios and 5.16 after the use of E-Portfolio strategy. The table further reveals a mean gain writing achievement of 3.26 with a percentage gain of 184.18 for male pupils and a mean gain reading achievement of 3.19 with a percentage gain of 161.93 for female pupils. The difference in the mean writing achievement of male and female pupils with the use of E-Portfolio strategy is 0.07 in favour of male pupils.

Table 35: The ANCOVA of the Mean Writing Achievement of the Male and Female Pupils with the Use of E-Portfolio Strategy

Dependent Variable: Post-WAT

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	83.074[a]	2	41.537	8.519	.000	.056
Intercept	1754.562	1	1754.562	359.851	.000	.555
Pre-WAT	81.821	1	81.821	16.781	.000	.055
Gender	**.188**	**1**	**.188**	**.039**	**.844**	**.000**
Error	1404.232	288	4.876			
Total	9045.000	291				
Corrected Total	1487.306	290				

a. R Squared = .056 (Adjusted R Squared = .049)

Table 35 shows the ANCOVA of the mean writing achievement of the male and female pupils with the use of E-Portfolio strategy. The table reveals F. (1,288) = 0.039; P = 0.844 > 0.05. This means that there is no significant difference in the writing achievement of male and female pupils with the use of E-Portfolio strategy. The partial eta square of 0.000 obtained means that gender is not a factor in writing achievement of the male and female pupils with the use of E-Portfolio strategy.

Table 36: The Mean Reading Achievement of the Male and Female Pupils with the Use of I-BIT Strategies

Gender		**Before**	**After**	**Mean Gain**	**% Gain**
	Mean	15.71	31.02	15.31	97.45
Male	N	148	148		
	Std. Deviation	5.96	10.68		
	Mean	16.47	33.22	16.75	101.70
Female	N	185	185		
	Std. Deviation	6.04	11.04		
Mean difference				1.44	

Table 36 shows the mean reading achievement of 148 male and 185 female pupils with the use of I-BIT strategy. The table reveals that the reading achievement of male pupils is 15.71 before the use of I-BIT and 31.02 after the use of I-BIT strategy. The table reveals that the reading achievement of female pupils is 16.47 before the use of I-BIT and 33.22 after the use of I-BIT strategy. The table further reveals a mean gain in reading achievement of 15.31 with a percentage gain of 97.45 for male pupils and a mean gain in reading achievement of 16.75 with a percentage gain of 101.70 for female pupils. The difference in the mean reading achievement of male and female pupils with the use of I-BIT strategy is 1.44 in favour of female pupils.

Table 37: The ANCOVA of the Mean Reading Achievement of the Male and Female Pupils with the Use of I-BIT Strategies

Dependent Variable: Post-RAT

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	11507.347[a]	2	5753.674	67.479	.000	.290
Intercept	11183.408	1	11183.408	131.158	.000	.284
Pre-RAT	11108.903	1	11108.903	130.284	.000	.283
Gender	**178.143**	**1**	**178.143**	**2.089**	**.149**	**.006**
Error	28137.950	330	85.267			
Total	385841.000	333				
Corrected Total	39645.297	332				

a. R Squared = .290 (Adjusted R Squared = .286)

Table 37 shows the ANCOVA of mean reading achievement of the male and female pupils with the use of I-BIT strategy. The table reveals F. (1,330) = 2.089; P = 0.149 > 0.05. This means that there is no significant difference in the reading achievement of male and female pupils with the use of I-BIT strategy. The partial eta square of 0.006 means that only 0.60 percent of reading achievement of the male and female pupils with the use of I-BIT strategy can be accounted for by gender.

Table 38: The Mean Writing Achievement of the Male and Female Pupils with the Use of I-BIT Strategies

Gender		**Before**	**After**	**Mean Gain**	**% Gain**
	Mean	1.96	5.04	3.08	157.14
Male	N	148	148		
	Std. Deviation	0.98	1.48		
	Mean	2.05	5.03	2.98	145.37
Female	N	185	185		
	Std. Deviation	1.08	1.34		
Mean difference				0.1	

Table 38 shows the mean writing achievement of 148 male and 185 female pupils with the use of I-BIT strategy. The table reveals that the writing achievement of male grade six pupils is 1.96 before the use of I-BIT and 5.04 after the use of I-BIT strategy. The table reveals that the writing achievement of female grade six pupils is 2.05 before the use of I-BIT and 5.03 after the use of I-BIT strategy. The table further reveals a mean gain in writing achievement of 3.08 with a percentage gain of 157.14 for male pupils and a mean gain in writing achievement of 2.98 with a percentage gain of 145.37 for female pupils. The difference in the mean writing achievement of male and female pupils with the use of I-BIT strategy is 0.10 in favour of male pupils.

Table 39: The ANCOVA of the Mean Writing Achievement of the Male and Female Pupils with the Use of I-BIT Strategy

Dependent Variable: Post-WAT

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	109.721[a]	2	54.860	33.111	.000	.167
Intercept	1083.383	1	1083.383	653.868	.000	.665
Pre-WAT	109.720	1	109.720	66.221	.000	.167
Gender	**.215**	**1**	**.215**	**.130**	**.719**	**.000**
Error	546.772	330	1.657			
Total	9112.000	333				
Corrected Total	656.492	332				

a. R Squared = .167 (Adjusted R Squared = .162)

Table 39 shows the ANCOVA of the mean writing achievement of the male and female pupils with the use of I-BIT strategy. The table reveals F (1,330) = 0.130; P = 0.719 > 0.05. This means that there is no significant difference in the writing achievement of male and female pupils with the use of I-BIT strategy. The partial eta square of 0.000 obtained means that gender is not a factor in writing achievement of the male and female pupils with the use of I-BIT strategy.

Discussion of Findings

Discussions in this section are according to the research questions which now form basic subheads. Thus, from the research questions, six basic subheads are created to enable us to have a focused discussion of the findings.

Pre- and Post Training Evaluation of Teachers' Level of Effectiveness in the Use of ICT Related Gadgets in E-Portfolios and I-BIT Strategies

The findings revealed that the teachers' mean gain in the level of effectiveness in the use of ICT related gadgets to teach reading and writing before and after training was 0.49. This implies that the teachers in both groups possess both basic and advance knowledge, attitudes and skills in the use of E-Portfolios and I-BIT strategies to teach reading and writing. Specifically, the teachers' level of effectiveness in the use of ICT related gadgets to teach reading and writing, before training mean rating for all the teachers fall between 1.5 and 2.49. The grand mean of 2.05 for teachers before training implies that the teachers have some basic knowledge, attitudes and skills in all the items being measured before the training. Furthermore, the result shows that the teachers possess basic knowledge, attitude and skills of web-based technologies, type, edit text and documents, develop presentation files and use collaborative tools like zoom, Microsoft teams after the training. It is found that after the training, the teachers acquired advanced knowledge, attitude and skills in the use of mobile devices such as, obtaining information from the internet, using an electronic device, creating files and folders to store and retrieve information, composing and sending short messages through mobile devices, communicating through any of the social media platforms safely and efficiently using electronic devices to teach. The grand mean of 2.56

for teachers after training implies that the teachers have advanced knowledge, attitude and skills in all the items measured after the training. Therefore, teachers improved in their level of effectiveness using E-Portfolios and I-BIT strategies to teach reading and writing after training. The reason may have been that the teachers were curious and anxious to transfer knowledge from what they know to the problem at hand with the aid of ICT in language class. These made them to understand faster as they formed mental pictures of the concepts correctly. Their high interest must have contributed immensely to the high mean gain after the training. Lytras et al. (2018) affirm that present-day students are more used to absorbing information from the screen than from the printed page, and that they find teachers who use technology to be more reliable and knowledgeable than those teachers that do not use digital technology during teaching and learning. In the same vein, Achor, Kyado and Ityobee (2020) found that the ICT literacy level of Basic Science Teachers in Benue State was above the average mean of 2.5. By implication teachers in the study area are familiar and use basic ICT related gadgets which are also relevant in teaching using E-Portfolios and I-BIT strategies. Similarly, the findings are in agreement with that of Abraham, et al (2022), who found that training in ICT-assisted English Language teaching significantly improved teachers' knowledge and skills of ICT tools for teaching English and their practice of using ICT tools in teaching English.

Teachers' Level of Effectiveness in the Use of E-Portfolios and I-BIT Strategies to Teach Reading and Writing

The findings in this study reveal that teachers in I-BIT strategy class were effective in the use of I-BIT for lesson development. Similarly, teachers were *somewhat effective (ie, effective to some extent)* in the use of E-Portfolios for lesson development. The findings further reveal that there was a significant difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in lesson development in favour of I-BIT. This implies that the effectiveness of E-Portfolios and I-BIT strategies in enhancing teachers' lesson development differs significantly.

The teachers' ability to recognise, create, transform and disseminate students' knowledge and skills, as well as provide them with access to opportunities to do so, can have a significant impact on students' ability to learn and on teachers' ability to function as effective teachers. It is also proven to be a useful tool for the training of teachers to know how to utilise ICTs, enabling them to learn the most recent techniques for creating, and engaging successful lessons for their pupils. I-BIT facilitates learning by ensuring that teachers have access to the fundamentals of ICT necessary to improve instruction through the use of cutting-edge tools and techniques. It is a way to figure out what each student needs to succeed academically, what they are capable of doing, what they want to learn (in terms of knowledge, talents, and so on), and how they want to study (in terms of their own motivation and approach). The use of I-BIT and E-Portfolios strategies for lesson development is a 'game changer' in the way we teach and learn in the modern era. For instance, by integrating ICT tools and strategies into the classroom, educators can create a more engaging, effective, and accessible learning environment for students of all ages. Thus, I-BIT enhanced engagement and interaction, personalised learning, fostering collaboration, communication, and gamification in education. It also enabled effective assessment and feedback, and promoted digital literacy skills, among others. The findings are in agreement with that of Abraham, et al (2022), who found that training in ICT assisted English

Language teaching significantly, and improved teachers' knowledge and application of ICT tools in teaching English Language

The findings reveal that the teachers in I-BIT strategy class were effective in the use of I-BIT in asking and answering questions. The findings also reveal that there was significant difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in asking and answering questions. This implies that the effectiveness of E-Portfolios and I-BIT strategies in enhancing teachers' questions and answers diverges.

Teachers' access to professional development opportunities aids their quest for knowledge and strengthens their pedagogical abilities which are both crucial to a productive classroom. It has been identified as a significant factor of teachers' classroom ICT utilization effectiveness in questioning and answering (Avalos, 2011) and the present study agrees with this finding. In order to better educate pupils, teachers need to have access to professional development opportunities that help them to acquire or refine the information, skills, and attitudes necessary to teach their subjects. Fortunately, the way teachers were trained in the present study produced positive results. This may be responsible for the significant difference found in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in asking and answering questions. Similarly, though both the teachers in E-Portfolios and I-BIT had the same content during training, the manner and frequency of questions and answers witnessed in the classroom which were unique and strategy-specific must have accounted for the significant difference observed.

The findings also reveal that the teachers in the I-BIT strategy class were somewhat effective *(ie, effective to some extent)* in integrating teaching aids in the use of the strategy. Teachers in E-Portfolios strategy class were equally somewhat effective in integrating teaching aids in the use of E-Portfolios strategy. The findings further reveal that there was no significant difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies when teaching aids were integrated. This implies that the effectiveness of E-Portfolios and I-BIT strategies in enhancing teachers' use of teaching aids show no discrepancies. This is consistent with the position of Uchechi (2021), who stated that in the present and future system of education, the workplace, home, community, 'on-the-move' (mobile) offer powerful sites for flexible learning compared to just the school environment. Learning activities are no longer done in the classrooms alone as the demands for educational service delivery is increasingly independent of location and strategy used but more or less on the on-the-move gadgets. The availability of smartphones and broadband networks allow people to access learning irrespective of the time, location and teaching strategy used by the teachers.

There is a need for the necessary training facilities to ensure that teacher trainers are able to effectively utilise these teaching aids, as the current availability of such facilities is insufficient to fulfil the needs of students. Teachers' use of computer technology in the classroom is still in its infancy, and more training is needed to help them overcome the challenges they confront.

The findings also reveal that teachers in E-Portfolios and I-BIT strategies class were effective in the use of the strategies in content, application and summary. The findings further reveal that there was no significant difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in content, application and summary This implies that the

effectiveness of E-Portfolios and I-BIT strategies in enhancing teachers' content, application and summar~~ies~~ do vary between the two strategies. The findings disagree with that of Yonghai, Di and Yingying (2023) that in terms of subject differences of teachers, there were significant differences in resource suitability (RS) among teachers of different subjects. This could have arisen from the fact that the teachers received same training in content, duration and application in addition to being experienced professionals in the discipline.

Teachers are struggling to meet pupils' needs in the classroom because they lack the necessary information and communication technology (ICT) instructional abilities. Time constraints, rigid curricula, and a lack of information and communication technology (ICT) and ancillary staff services were pedagogical constraints the teachers were exposed to in the use of E-Portfolios and I-BIT strategies in content, application and summar~~ies~~ which may be responsible for the no significant difference found in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in content, application and summar~~ies~~.

The findings reveal that the teachers in E-Portfolios strategy class were effective in the use of E-Portfolios and I-BIT strategies in classroom management. However, the findings further reveal that there was no significant difference in the teachers' level of effectiveness in use the of E-Portfolios and I-BIT strategies in classroom management. This implies that the effectiveness of E-Portfolios and I-BIT strategies in enhancing teachers' classroom management show no disparity. The findings disagree with that of Yonghai, Di and Yingying (2023) whose results showed that teachers' online teaching satisfaction was at a high level but that there was a significant difference in teachers' subject and educational level on online teaching satisfaction.

Classroom management is a best practice that could enhance pupils' ability in reading and writing. Teachers' effectiveness in creating an organized and orderly E-Portfolios and I-BIT classroom was found to not vary. The most obvious reason for this assertion could be that, effective class management sets the stage for teaching and learning to improve pupils' ability. The teacher's ability to ensure class management could create an environment in the classroom where the different categories of learners in the classroom are not easily distracted. This is seen as a necessity for effective teaching and learning to ensure that there is improvement in pupils' ability in both strategies.

The findings reveal that the teachers were effective in the use of E-Portfolios and I-BIT strategies in presentation skills. The findings further reveal that there was no significant difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in lesson presentation. This implies that the effectiveness of E-Portfolios and I-BIT strategies in enhancing teachers' presentation skills do not vary. These findings are in agreement with that of Ozdemir and Tekin (2016) who found that there were inconsistent findings as the scores of some groups of pre-service students decreased, some increased while there is no significant change in some of them in their presentation skills.

The primary parameters that impact ICT integration in education and training have been identified in presentation skills. Important prerequisites for classroom usage of ICT include adequate ICT infrastructure, student access to ICT, sufficient time, and curriculum adaptability. Teachers who have used ICT tools for professional development already know the benefits. It

broadens their understanding of the role of technology in the classroom and this may be responsible for the no significant difference found in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in presentation skills.

Impact of E-Portfolios and I-BIT on Teachers and Pupils' Self-Assessment Skills

It is found that teachers with the use of E-Portfolios and I-BIT in their assessment skills show that the teachers agree that they can use technologies to get teaching information and materials on net as well as to discover new ideas, skills and methods. Similarly, the teachers in both groups agree that their pupils can access and navigate the net with ease, learning assessment and personal study among pupils contribute to their assessment skills. However, teachers in I-BIT strategy did agree that formative assessment and personal study among pupils contributed to their assessment skills. Considering the ways E-Portfolios and I-BIT could help teachers to continue further teaching, the teachers agree that exercise and class work, selection of diagrams and frequency of assignment would help them to continue teaching even after the intervention. However, no teachers in E-Portfolio agreed that pictorial selection helped them to continue further teaching and as compared to those in I-BIT strategy. Similarly, teachers in both strategies agreed that keeping records of assessment helped them to continue further teaching. This result is consistent with that of Quddus, Khalid, and MKhan (2019) who found that the respondents viewed that teachers' self-assessment helped them understand their strengths and weaknesses. It establishes teachers' involvement in self-learning. By doing self-assessment, teachers can adjust their classroom instructional and assessment practices. Whether self-assessment or experts' assessment, what is important which is common to both studies is that there is feedback which gave them room for adjustment. It is also notable that except in two cases, learning assessment and personal study among pupils contribute to their assessment skills and that pictorial selection help them to continue further learning. There were disagreements between assessment reports from the two groups of teachers. There was consensus on relevance, progress, contribution of the strategies to their professional growth and continuity and record keeping. This implies that as professional teachers who also went through the same training, given the same topics to be taught using strategies that involve use of ICT related gadgets may not differ in their teaching outcomes. This may have accounted for the no difference in findings. For the areas of disagreement, it could be that familiarity with those activities offline may have accounted for the difference. For instance, one may not need ICT to select pictures, assessment of learning which is a usual practice for English Language teachers and personal study which can be done without reference to ICT related gadgets.

Looking at ways E-Portfolios and I-BIT helped to improve teaching outcomes, all the teachers in both strategies agreed that promoting deep and independent learning are ways both can help to improve teaching outcomes. Teachers are also in agreement that applying technologies in teaching, encouraging critical thinking and problem-solving skills in pupils as well as pupils receiving advance information can improve teaching outcomes. Examining the ways E-Portfolios and I-BIT help to make better teachers, teachers in both groups agreed that ensuring deeper learning and ease of lesson presentation are ways the strategies make better teachers. Further, teachers in both groups agreed that appropriate use of instructional materials, use of pictures and diagrams, available options of resource materials, good time management, confidence and documentation of academic progress help to make a better teacher. Concerning how the

supporting materials helped in teaching and writing, teachers in in both groups agreed that supporting materials provision of instructional material via technology, presenting abstract materials in concrete form, engaging learners both at school and home, made teaching easy and good teacher-pupils relationship helped in reading and writing. This is consistent with the finding that ICT integration is effective for both teachers and students. It was also found that teachers are well equipped in preparation for ICT tools and facilities and that professional development training programmes for teachers played a key role in enhancing students' learning. The finding is in agreement with the work of Bai, et al (2016) who found that when ICT tools were integrated into the teaching programme of a class, it was effective in improving students' test scores relative to the control schools. When ICT tools were not integrated with teaching, they only raised the educational performance of English Language students who were performing better during the baseline. The finding is also in agreement with that of Tiwari, et al (2022) who found that teachers who took part in professional development are more likely to utilise computers in the classroom, to place a higher priority on the development of students' ICT abilities, and to have a higher opinion of their own competence in the use of ICT.

Pupils

On the way the supporting materials helped pupils in reading and writing, male and female pupils from both groups read and wrote better. Again, male pupils are confident in using E-Portfolio and I-BIT in reading and writing. While male pupils were found to have acquired more knowledge in using E-Portfolio as compared to male pupils in the I-BIT, the female pupils agreed that E-Portfolio and I-BIT strategies helped them to read and write better. There was high difference in the number of female pupils who said that using E-Portfolio in reading and writing made them more confident as compared to the female pupils that are confident when I-BIT was used for reading and writing in favour of I-BIT group. While less female pupils claimed to have acquired more knowledge using E-Portfolio as compared to the female pupils that acquired more knowledge using I-BIT, as regards the progress made with reading and writing performance, male pupils read and write more fluently after the intervention, can select materials to be used for personal reading, spell words better, can now write easily and concentrate better in class in similar manner as the male pupils in I-BIT. Also, both female pupils in E-Portfolio and I-BIT strategies read and wrote more fluently, can select materials to be used for reading personally, spell words better, can write easily and concentrate better in class in a similar manner. These findings are consistent with the finding that ICT integration has great effectiveness for both teachers and students. The findings are in agreement with the work of Bai, et al (2016) who found that when ICT tools were integrated into the teaching programme of a class it was effective in improving students' test scores relative to the control schools. No intervention impact, however, was found when the ICT tools were not integrated into the teaching programme. It was also found that when ICT tools were integrated into teaching, the interventions worked similarly for students that have either high or low initial (or baseline) levels of English Language competency. When ICT programmes were not integrated with teaching, they only raised the performance of English Language students who were performing better during the baseline.

Looking at the pupils' feeling about reading and writing activities using the strategies, both male pupils in E-Portfolios and I-BIT wished to continue with the use of the two strategies. Furthermore, both groups' male and female pupils claimed that the use of ICT gadgets aided their knowledge retention and are excited with the use of the strategies and wished to continue

with them. On the gain from the use of the two strategies in teaching reading and writing, both male and female pupils in the two strategies had improved performance, discovered new ways of approaching literacy acquisition, worked with friends in reading and writing, and followed the instructional process. Male and female pupils in both strategies agreed that the supportive learning materials can be used both at home and in the school to make learning easy; that pictures enhanced understanding, gave insight into the topic being taught and improved their vocabulary. These findings are in agreement with the work of Bai, et al (2016) who found that when ICT was integrated into teaching in a class, it was effective in improving students' test scores relative to the control schools. No intervention impact, however, was found when the ICT was not integrated into teaching. It was also found that when technologies were integrated into teaching, the intervention worked similarly for students that have either high or low initial (or baseline) levels of English competency. When technologies were not integrated with teaching, they only raise the educational performance of English students who were performing better during the baseline.

It is evident that when pupils are excited with learning materials, they tend to develop interest in working with them, have higher attention span and are ready to discuss freely about them; including asking questions and seeking further assistance. These reasons may have accounted for the similar findings in the present study even when different ICT related strategies were used.

Focus Group Discussion (FGD) with the Teachers

Two weeks after the exercise, the teachers from E-Portfolios and I-BIT were gathered for interaction about their feelings concerning the experience, knowledge gained, prospects of the study and their thinking going forward. The reports according to the topics of discussion are presented hereunder:

(a) What is your impression about the programme?

Celestine (E-Portfolios): The learner could read and get meaning from what is being read and also relate it or put it into writing

Elizabeth(I-BIT): Children were interested in learning. They were eager to learn and this encouraged me to extend the strategy to Primary 4 class. In general, it gave me a better level and method of teaching.

Eardoo(I-BIT): Pupils have much interest in receiving their lesson because of the use of computers and internet. They were open to the use of internet and discovered much information on their own. It also improved pupils' reading, exposure, expression during the lesson and became active in reading and writing generally.

Dorcas (E-Portfolios): The programme improved my teaching skill. The pupils were always eager to learn and were bold in expressing themselves because of their participation in all the activities involved.

Mary (I-BIT): The project has tremendously helped the learner to be eager to learn and they can now interact with one another and the teacher freely. There is improvement in the learners' reading and writing skills.

Conclusion: There was a consensus from the discussion on the teachers' impression about the programme generally that the learners could read and get meaning from what is being read and could also relate it or put it into writing. Children were interested in learning; they were so eager to learn that it was an encouragement to the teacher to extend the strategy to other classes. Pupils were open to the use of internet and discovered much information on their own, thus improving their reading, exposure, expression during the lesson and became active in reading and writing generally. The learners could interact with one another and the teacher freely.

(b). What enabled the change in attitude of the children towards reading and writing?

Celestine (E-Portfolios): The learners participated more in classes; from fetching of artifacts by themselves, answering questions and then getting some opportunities to explore the internet. The excitement in choosing suitable topics in the writing classes was also a key factor.

Elizabeth(I-BIT): Their use of computer and their ability to get information on their own using gadgets were quite exciting to the pupils. Also, the understanding that apart from textbooks, there are other ways of getting information was thrilling to them.

Erdoo (I-BIT): Their use of a computer was one of a kind; pupils were open to the general use of computers, view and getting information in pictures of different kinds, and knowing what is called factual answers while reading.

Dorcas (E-Portfolios): The children had access to the internet and could make researches before the lesson; their discussions in the class and new words learnt made reading and writing easier.

Mary (I-BIT): The pupils were able to discover information on their own through computer tablets. Learners could write assignments by themselves and were very inquisitive to ask questions.

Conclusion: The change in the attitude of the learners observed in the E-Portfolios and I-BIT classes was facilitated by the fact that the learners participated more in classes; from fetching of the artifacts by themselves, answering questions and then getting much of opportunity to explore the internet. Furthermore, the excitement in choosing suitable topics in the writing classes was also a key factor in addition to the understanding that apart from textbooks, there are other ways of getting information such as viewing and getting information in pictures of different kinds, know what is called factual answers while reading, making researches before the lesson, their discussions in the class and new words learnt which made reading and writing easier. Learners could write assignments by themselves and were very inquisitive to ask questions.

(c). What is your impression about the future of the acquired experience?

Celestine (E-Portfolios): This experience will last the test of time because the strategy can continually create new experience when used. It is easy to use.

Elizabeth(I-BIT): It is a worthwhile experience because it makes teaching and learning easy and interesting for both the teacher and the learners. Therefore, more teachers should be trained on this.

Erdoo(I-BIT): The strategy has transformed the reading and writing styles of pupils, so more pupils should be exposed to this.

Dorcas (E-Portfolios): The programme is worth being used and therefore it should be sustained by training more teachers.

Mary (I-BIT): The programme should be sustained so as to enable the pupils to learn more especially in reading and writing and able to operate computers on their own. So, more teachers should be trained.

Conclusion: The impression of the teachers on the future of the acquired experience included among others that the experience will last the test of time because the strategy can continually create new experiences whenever used. It is a worthwhile experience because it makes teaching and learning easy and interesting for both the teacher and the learners; therefore, the strategies have transformed the reading and writing styles of pupils, so more pupils should be exposed which by implication calls for more teachers to be trained.

(d). What do you think about your colleagues who did not participate in the training?

Celestine (E-Portfolios): Since the programme is worth continuing, other teachers need to be trained to expand the network of this strategy.

Elizabeth(I-BIT): I recommend that other teachers be trained to get the experience of teaching and learning using the gadgets or computer because it is easy and motivates children to be eager to contribute during lesson.

Erdoo(I-BIT): My colleagues who did not participate in this study should be trained so that they can use the strategy to teach pupils.

Dorcas (E-Portfolios): Since the programme has been beneficial to the pupils, other teachers should be trained to improve their teaching skills.

Mary (I-BIT): My colleagues who did not participate in the programme should also be trained, so that they could have the same experience. This way, the pupils from their classes will also benefit.

Conclusion: The thinking of the teachers regarding both strategies about their colleagues that did not participate in the programme was that since the strategies are worth to be continued with, other teachers need to be trained to expand the network of these strategies. Thus, they need the experience of teaching and learning using the gadgets or computer because it is easy and motivates children to be eager to contribute during lesson.

(e). What is your impression about what Benue State government should do to sustain this programme?

Celestine (E-Portfolios): The government of Benue State should make provisions for computers and other gadgets that can facilitate this programme. Also, electricity or solar power system should be installed along with security to safeguard them. This will ensure sustainability.

Elizabeth(I-BIT): Government should equip or provide schools with gadgets or computers. Also, government should provide electricity to enable appropriate use and there should be security to safe guard them.

Erdoo(I-BIT): That government should provide the gadgets, electricity and a secured environment and then train other teachers for effective use of the strategy.

Dorcas (E-Portfolios): Government should train other teachers, provide the needed gadgets and also secure the environment.

Mary (I-BIT): There is the need to sustain the programme by providing the needed gadgets, internet sources, electricity with security measures and finally train more teachers to use the strategy.

Conclusion|: On what the Benue State government should do to sustain the use of the strategies, the teachers unanimously agreed that the government of Benue State should make provisions for computers and other gadgets that can facilitate this programme in addition to electricity or solar power system that should be installed along with security to safeguard them. The final step towards sustainability will be to train more teachers to be able to use the strategy to teach.

(f). What were the challenges faced during the study?
Celestine (E-Portfolios): Challenges faced included inadequate gadgets, lack of power supply and classes were too large for the strategy.

Elizabeth(I-BIT): Challenges faced are over population of the class, shortage of gadgets, absence of electricity and difficulty in using the gadgets at early stage.

Erdoo(I-BIT): The basic challenges were in adequate supply of the gadgets, large class size, in adequate power supply and insufficient number of trained teachers.

Dorcas (E-Portfolios): The major challenge was in adequate gadgets for the teaching and learning.

Mary (I-BIT): The lack of electricity, lack of adequate gadgets and large class size were the challenges faced.

Conclusion: Irrespective of the strategy used in teaching (either E-Portfolios or I-BIT), the teachers were unanimous on the challenges faced during the programme, which are in adequate gadgets, lack of source of power or electricity, difficulty in using the gadgets at the early stage and some classes were too large for the strategy to deliver its best.

(g). What is your impression about the pupils who participated in the programme?

Celestine (E-Portflios): The pupils have progressed greatly in recent time because of the interest they developed from the strategy. The strategy is designed with a lot that will interest every learner that is engaged in it due to their deep involvement in every step.

Elizabeth(I-BIT): The pupils are better by all standards than those that were not involved in the programme, they can work as a team, develop in them a spirit of healthy competition and raise their level of interest and anxiety.

Erdoo(I-BIT): The pupils were open to reading, having in mind that what they are reading about to see at the end if the question can give them factual, inferential and critical reasoning.

Dorcas (E-Portfolios): The programme assisted the pupils to be able to make researches; they could use the gadgets to some extent; they learnt new words and could discuss in class to some extent. These helped them greatly in the understanding of passages.

Mary (I-BIT): The pupils that participated became more enlightened, experienced and were able to discover new information on their own.

Conclusion: The teachers' impression about the pupils who participated in the programme was that they have progressed greatly in recent time because of the interest they developed from the strategies. Since the strategies were designed with a lot that will interest every learner that is engaged in it due to their deep involvement in every step, the pupils are better by all standards than those that were not involved in the programme; they can work as a team, developed in them a spirit of healthy competition and raised their level of interest and anxiety. The pupils were also open to reading proper having in mind what they are reading about to see at the end if the question can give them factual, inferential and critical reasoning. The programme assisted the pupils to be able to make researches, use the gadgets to some extent, learn new words and could discuss in class to some extent on their own. The pupils that participated became more enlightened and experienced and were able to discover new information on their own. Besides, they freely interacted among themselves.

The Academic Performance of Low, Moderate and High Scorer Pupils in Reading and Writing after the Intervention

The finding reveals that 124 pupils were low, 152 were moderate and 15 were high among grade six pupils in public primary schools in Benue State, Nigeria before teaching reading comprehension and writing using E-Portfolios strategy. However, the finding further reveals a reduction to 21 for low, 45 for moderate and increase of 225 high scorers' grade six pupils after teaching reading comprehension and writing using E-Portfolios strategy. This connotes that the use of E-Portfolios strategy is effective in enhancing the ability of grade six pupils.

The finding also reveals that 158 were low, 151 were moderate and 24 were high scorers' grade six pupils before using digital Inquiry-Based Information Technology (I-BIT) strategy. However, a finding further reveals a decrease to 19 for low, 77 for moderate and an increase to 237 for high scorers' grade six pupils after using digital Inquiry-Based Information Technology (I-BIT) strategy. This connotes that the use of I-BIT-strategy is effective in enhancing ability of grade six pupils. The findings are in agreement with that of Abraham, et al (2022), who found that training in ICT-assisted English Language teaching significantly improved teachers' knowledge and skills of ICT tools for teaching English and their practice of using ICT tools in teaching English. The basic training given to the teachers before the commencement of the study enabled them to teach effectively and may be responsible for more pupils migrating from low and moderate groups to higher scorer status.

The findings reveal that the low scorers had a mean gain of 1.67, moderate scorers had a mean gain of 0.01 and high scorers had a mean gain of 7.61. This showed that the low scorers benefited more from the use of E-Portfolios strategy in reading followed by the moderate scorers and the high scorers respectively. The findings further reveal a significant difference in the benefit of low, moderate and high scorers' pupils before and after the used of E-Portfolios strategy in teaching reading comprehension. The multiple comparisons of benefits of low, moderate and high scorers in E-Portfolios strategy before and after teaching reading comprehension confirmed that there was significant difference in the benefit of low, moderate and high scorer pupils before and after the used of E-Portfolios strategy in teaching reading comprehension. This implies that students' performance in reading comprehension differed across ability levels when E-Portfolios strategy was used.

The test results of the low, moderate and high scorers before and after the application of E-Portfolios have shown that there was a slight difference between these groups. The results indicate that low and moderate scorers could increase their reading ability when instructed with E-Portfolios. This was understandable that, to some extent, pupils have gained advantages from studying with E-Portfolios with the high mean gain found among high scorers. The application of E-Portfolios helped to foster pupils' intrinsic motivation, ownership of the processes involved in reading and writing and take responsibility towards their learning. This as well enhanced teacher-pupil classroom interaction. The use of E-Portfolios also recognizes the individuality and uniqueness of every pupil, thus promoting their critical thinking skills, self-assessment abilities, and encouraging collaborative work during learning.

The findings reveal that the low scorers had the mean gain in writing of 3.04, moderate scorers 3.23 and high scorers 3.44. This showed that the high scorers benefited more from the use of E-Portfolios strategy in writing followed by the moderate scorers and the low scorers. The findings further reveal that there was a significant difference in the benefit of low, moderate and high scorer pupils in the use of E-Portfolios strategy in teaching writing. The multiple comparisons of benefit of low, moderate and high scorers in E-Portfolios strategy before and after teaching writing confirmed and upheld that there was a significant difference in the benefit of low, moderate and high scorers in the use of E-Portfolios strategy in teaching writing. This implies that the use of E-Portfolios strategy is ability sensitive. These findings are consistent with that of Achor and Ejeh (2019) who found that students with low cognitive ability level benefited more from cognitive ability training package (CATP) and that there was no significant difference in the mean gains in cognitive ability and achievement scores among low, moderate and high cognitive ability students exposed to cognitive acceleration training program.

The primary findings of the study reveal that pupils of multi-levels (ability levels) also obtained higher scores when using E-Portfolios. The use of E-Portfolios strategy was found to relatively encourage pupils to write quality essay. The pupils are aware of what they need and what to do to improve their writing; hence, more effort and time were invested in writing. This was responsible for the substantial lift of low and moderate scorers to high scorers. Although E-Portfolios used in this study were based on technology, it seems the atmosphere of the classroom shifted into a more dynamic learning environment, in which pupils were encouraged to be active English as a Second Language (ESL) learners rather than passive students in the traditional language classrooms.

The findings reveal that the low scorers have a mean gain of 1.58 in reading comprehension, moderate scorers 1.51 and high scorers 9.32. This mean gain shows that the low scorers benefited more from the use of I-BIT strategy in reading comprehension followed than the moderate scorers and the high scorers respectively. The findings further reveal that there was a significant difference in the benefit of low, moderate and high scorers–in the use of I-BIT strategy in teaching reading comprehension. The multiple comparisons of benefit of low, moderate and high scorer pupils in I-BIT strategy before and after teaching reading comprehension confirmed and upheld the rejected null hypothesis. This implies that the use of I-BIT strategy is ability sensitive-with respect to mean scores in reading comprehension of pupils in public primary schools. The finding agrees with Achor, et al (2015) who found that achievement of high and low reasoning ability level students significantly differ in favor of high ability students.

The findings reveal that the low scorers have a mean gain in writing of 1.52, moderate scorers 2.98 and high scorers 4.51. The pattern of the mean gain shows that the high scorers benefited more in writing from the use of I-BIT strategy followed by the moderate scorers and the low scorers. The findings further reveal that there was no significant difference in the scores of low, moderate and high ability pupils before the use of I-BIT strategy in teaching writing. However, there was a significant difference in the benefit of low, moderate and high scorers in the use of I-BIT strategy in teaching writing. The multiple comparisons of the benefit of low, moderate and high scorers' pupils from I-BIT strategy before and after teaching writing confirms and upholds that there was a significant difference in the benefit of moderate and high scorers' pupils from the use of I-BIT strategy in teaching writing. This implies that the use of I-BIT strategy is ability sensitive with reference to mean scores in writing of pupils in public primary schools in Benue State, Nigeria. These results are consistent with that of Adeleke and Akere (2023), who found that there was a positive significant relationship between classroom practices and academic performance of students and that there was a significant relative contribution of classroom practices (teaching method, instructional materials and class control/management) to academic performance of students. Thus, when a strategy is effective, improved performance in academic work is expected and this must have accounted for the majority of pupils moving into higher scorer group after treatment.

Reading and Writing Achievement of grade six Pupils with Application of E-Portfolios, I-BIT and Conventional Strategies

The study investigated the impact of E-Portfolio, I-BIT and the conventional strategies on grade six pupils' achievement in reading and writing. The findings reveal that the order of the percentage mean gain shows that the application of E-Portfolio enhanced pupils' ability more in reading followed by I-BIT strategy than the application of conventional strategy. The findings further reveal that there was a significant difference in the pupils' achievement in reading with application to E-Portfolios, I-BIT and conventional strategies. However, only 4.8 percent of the pupils' achievement in reading is attributed to the strategies applied. Likewise, the pairwise comparisons of pupils' achievement in reading with application to E-Portfolios, I-BIT and conventional strategies confirmed and upheld that there was a significant difference in the pupils' achievement in reading with application to E-Portfolios, I-BIT and conventional

strategies. This implies that the application of E-Portfolios, I-BIT and conventional strategies vary in their improvement of the respondents' ability to read.

The finding agrees with Merta (2019) on students' English learning achievement. Focusing on dialogue texts and congratulatory expressions shows that the application of Inquiry-Based learning affected students' achievement. The finding also agrees with Ramasari (2020) that Inquiry-Based learning can improve students' reading comprehension since with this method, students are motivated and inspired to be active in the learning process. The finding agrees with Tran and Nguyen (2023) that the application of electronic portfolios significantly improved the writing ability of English as a Foreign Language (EFL) students. The finding also agrees with Aguilar, et al (2024) that there was a significant difference between the students' reading comprehension proficiency and academic performance, as the results showed that most of the respondents struggled in comprehending

The finding reveals that the order of the percentage mean gain shows that the application of E-Portfolio enhanced pupils' ability in writing most, followed by I-BIT strategy and the least is conventional strategy. The finding further reveals that that there was a significant difference in the pupils' achievement in writing with application of E-Portfolios, I-BIT and conventional strategies with only 6.1 percent of pupils' achievement in writing being attributed to the strategies applied. The pairwise comparisons of pupils' achievement in writing with application of E-Portfolios, I-BIT and conventional strategies confirmed and upheld that there is a significant difference in the pupils' achievement in writing with application of E-Portfolios, I-BIT and conventional strategies. This implies that the application of E-Portfolios, I-BIT and conventional strategies vary in their enhancement of the respondents' ability in writing. This result disagrees with that of Anyawu, et al (2014) who found that there is a significant difference in the post-test mean score of students exposed Animation with Text (AT) and Animation with Narration (AN) and the conventional groups in favour of the students in the AN group. Also, no significant difference was found in the post-test mean scores of high, medium and low ability students taught using AT. The use of E-Portfolios and I-BIT were in principle not too different from the use of ICT and therefore the similarity in the findings from the two studies is justifiable.

The learning process with the help of technology makes writing easier for teachers and pupils. The application of E-Portfolios and I-BIT strategies enabled teachers to deliver the material easily to their pupils. The present study found that pupils in E-Portfolios and I-BIT strategies benefited more from the technology provided. The E-Portfolios and I-BIT strategies employed improved pupils learning outcomes because the strategies enabled them to be more cognitively aware of the processes involved in idea generation and organisation. This may be responsible for the significant difference found in the respondents' achievement in writing. The finding agrees with Bhattacharjee and Deb (2016) that using different information and communication technology (ICT) related teaching tools in the classroom helped students to learn. The finding agrees with Zahra and Soleimani (2020) that there was a significant difference in scores among the experimental group exposed to E-Portfolio and control group that is, the writing accuracy, fluency and complexity of the experimental group was significantly more than that of the control group in post-test.

The Reading and Writing Achievement of the Male and Female Pupils with the Use of E-Portfolios and I-BIT Strategies

This study has shown that the difference in the mean reading achievement of male and female pupils with the use of E-Portfolio strategy is 0.17 in favour of female pupils. The finding further reveals that there was a significant difference in the reading achievement of the male and female pupils with the use of E-Portfolio strategy. This implies that the use of E-Portfolios strategy is gender sensitive, since the females outperformed the males with reference to reading achievement which agrees with Lekyong and Muodumogu (2022) who find that female students exposed to reading comprehension using computer aided instruction achieved significantly better than their male counterparts. The finding is due to the fact that the strategy is activity-orientated and involved learners in collaboration and hands-on-activities in the learning process which is preferred learning styles of the females (Feng, 2023).

The finding reveals that the difference in the mean writing achievement of male and female pupils with the use of E-Portfolio strategy is 0.07 in favour of male pupils. The finding further reveals that there is no significant difference in the writing achievement of male and female pupils with the use of E-Portfolio strategy. This implies that the use of E-Portfolio strategy is not gender sensitive with reference to writing achievement of male and female pupils This finding is in agreement with that of Karami et.al. (2019). who found that application of E-Portfolios had significant effect on students' writing proficiency but gender had no significant impact on the use of E-Portfolios.

Gender stereotype exists with reference to reading and writing achievement with the use of E-Portfolios in teaching. The present study found no significant difference between male and female pupils' achievement when taught using E-Portfolios. This is because the integration of technology into teaching encouraged collaboration and peer interaction and promoted students' development of reading and writing skills such as activation and application of prior knowledge and meta-cognition irrespective of gender.

The finding reveals that the difference in the mean reading achievement of male and female pupils with the use of I-BIT Strategy is 1.44 in favour of female pupils. The study further reveals that there was no significant difference in the reading achievement of male and female pupils exposed to I-BIT strategy. Only 0.60 percent of the reading achievement of the male and female pupils with the use of I-BIT strategy can be accounted for by gender. This implies that the use of I-BIT strategy enhanced the reading achievement of male and female pupils. The finding agrees with that of Al-Sereidi (2021) who also found that female students obtained higher mean scores for reading practices with lower-level thinking skills and experienced inferential and critical reading practices more than male students, but there was no significant difference in their reading practices.

The finding reveals that the mean gain in writing achievement of 3.08 with a percentage gain of 2.08 for male pupils and a mean gain in writing achievement of 2.98 with a percentage gain of 1.61 for female pupils. The difference in the mean writing achievement of male and female pupils with the use of I-BIT strategy is 0.10 in favour of male pupils. The finding further reveals no significant difference in the writing achievement of male and female pupils with the use of I-

BIT strategy. This implies that the use of I-BIT strategy enhanced the performance of male and female pupils in writing.

Gender stereotype exists with reference to reading and writing achievements with the use of I-BIT in teaching. The present study found no significant difference between male and female pupils' achievement when taught using I-BIT strategy. This is because the integration of technology into the teaching and learning encouraged active participation among learners and promoted their development of reading and writing skills such as peer and self-assessment as well as application of vocabulary attack skills irrespective of gender. Thus, gender influence on the result is negligible.

Summary of Findings

Based on the data collected, analysed and discussed, the following findings emerged:

1. **Teachers' Level of Effectiveness in the Use of E-Portfolios and I-BIT Strategies to Teach Reading and Writing**

A. Teachers improved in their level of effectiveness in the use of E-Portfolios and I-BIT strategies in teach reading and writing after training. Teachers in I-BIT strategy class were effective in the use of I-BIT for lesson delivery but those in E-Portfolios classes were somewhat effective *(ie, effective to some extent)* in the use of E-Portfolios in lesson delivery. There was a significant difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in lesson delivery in favour of I-BIT strategy. This implies that the effectiveness of E-Portfolios and I-BIT strategies in enhancing teachers' lesson delivery differs significantly.

B. The teachers in the I-BIT strategy class were somewhat effective in the use of I-BIT in asking and answering questions. The findings further reveal that there was a significant difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in asking and answering questions.

C. Both teachers in the I-BIT and E-Portfolios strategy classes were somewhat effective *(ie, effective to some extent)* in integrating teaching aids in the use of the strategies. The findings further reveal that there was no significant difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies when teaching aids were integrated.

D. Teachers in E-Portfolios and I-BIT strategies were effective in the use of strategies in content, application and summary. Furthermore, there was no significant difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in content, application and summaries.

E. It was found that the teachers in the E-Portfolios and I-BIT classes were effective in the use of E-Portfolios and I-BIT strategies in classroom management. However, there was no significant difference in the teachers' level of effectiveness in the use of E-Portfolios and I-BIT strategies in classroom management.

F. Teachers were found to be effective in the use of E-Portfolios and I-BIT strategies in presentation of skills. Furthermore, there was no significant difference in the teachers' level of

effectiveness in the use of E-Portfolios and I-BIT strategies in lesson delivery. This implies that the effectiveness of E-Portfolios and I-BIT strategies in enhancing teachers' presentation skills do not vary much.

2. Impact of E-Portfolios and I-BIT on Teachers and Pupils' Self-Assessment Skills

A *Teachers*

I. Teachers trained in the use of E-Portfolios and I-BIT could employ technologies to obtain instructional materials as well as discover new ideas, skills and methods from the net. Teachers in both groups agree that their pupils could: access and navigate the net with ease, self-assess their learning and monitor their personal study. Teachers in the I-BIT strategy submitted that formative assessment and personal study among pupils enhanced their assessment skills. The teachers were in agreement that exercise and class work, selection of diagrams and frequency of assignments would help them to continue teaching even after the intervention. Teachers in the E-Portfolio group did not agree that pictorial selection could help them to continue further teaching as compared to those in the I-BIT strategy. Teachers in both strategies agreed that keeping records of assessments helped them to continue further teaching.

II. It was found that all the teachers in both strategies agreed that promoting deep and independent learning are ways the strategies can help to improve teaching outcomes. Teachers were also in agreement that applying technologies in teaching, encouraging critical thinking and problem-solving skills in pupils as well as pupils receiving advanced information can improve teaching outcomes. Further, both groups agreed that ease of lesson presentation and ensuring deeper understanding are ways the strategies can make better teachers. Also, teachers in both groups agreed that appropriate use of instructional materials, use of pictures and diagrams, available options of resource materials, good time management, confidence and documentation of academic progress help to make better teachers. Teachers in both strategies agreed that provision of instructional materials via technology, presenting abstract materials in concrete form, engaging learners in school and at home and good pupil teacher relationship made teaching and learning of writing easy.

B *Pupils*

III. Male and female pupils from both groups read and wrote better after the intervention. Male pupils were confident in using E-Portfolio and I-BIT in reading and writing. While male pupils were found to have acquired more knowledge in using E-Portfolio as compared to male pupils in the I-BIT, the female pupils agreed that E-Portfolio and I-BIT strategies helped them to read and write better. There was a difference in the number of female pupils who affirmed that using E-Portfolio in reading and writing made them more confident as compared to the female pupils that are confident when I-BIT was in favour of the I-BIT group. Less female pupils claimed to have acquired more knowledge using E-Portfolio as compared to their counterparts that acquired more knowledge using I-BIT. Concerning the progress made with reading and writing performance, male pupils exposed to E-Portfolio read and wrote more fluently after the intervention, could select materials to be used for personal reading, spell words better, write easily and concentrate better in class in similar manner as the male pupils in I-BIT. Also, both female pupils in E-

Portfolios and I-BIT strategies read and wrote more fluently, could select materials for personal reading, spell words better, write easily and concentrate better in class in similar manner.

IV. Concerning reading and writing activities using the strategies, both male pupils in E-Portfolios and I-BIT classes wished to continue with the use of the two strategies. Furthermore, both groups' male and female pupils claimed that the use of ICT gadgets aided their knowledge retention and were excited with the use of the strategies and wished to continue with them. On the gain from the use of the two strategies in teaching reading and writing, both male and female pupils in the two strategies had improved performance, discovered new ways of approaching literacy acquisition, worked with friends in reading and writing, and followed the instructional process. Male and female pupils in both strategies agreed that the supportive learning materials could be used both at home and in the school to make learning easy; that pictures enhanced understanding, gave insight into the topic being taught and improved their vocabulary.

3. **Academic Performance of Low, Moderate and High Scorer Pupils in Reading and Writing after the Intervention**

A. There was a significant difference in the benefit of low, moderate and high scorer pupils before and after the use of E-Portfolios strategy in teaching reading comprehension. The multiple comparisons of benefits of low, moderate and high scorers in E-Portfolios strategy before and after teaching reading comprehension confirmed that there was a significant difference in the benefit of low, moderate and high scorer pupils' before and after the use of E-Portfolios strategy in teaching reading comprehension.

B. It was found that the high scorers benefited more from the use of E-Portfolios strategy in writing followed by the moderate scorers and the low scorers. The finding further reveals that there was a significant difference in the benefit of low, moderate and high scorer pupils in the use of E-Portfolios strategy in teaching writing. The multiple comparisons of benefit of low, moderate and high scorers in E-Portfolios strategy before and after teaching writing confirmed and upheld that there was a significant difference in their benefit in teaching writing across ability levels.

C. The findings of the study reveal that pupils of multi-levels (diverse learning and ability levels) also obtained higher scores when using E-Portfolios. The use of E-Portfolios strategy was found to relatively encourage pupils to write qualitatively. The pupils became aware of what they need and what to do to improve their writing; hence, they invested more effort and time in writing.

D. It was found that the high scorers benefited more from the use of I-BIT in reading comprehension followed by the low scorers and moderate scorers. The finding further reveals that there was a significant difference in the benefit of low, moderate and high scorers in the use of I-BIT strategy in teaching reading comprehension. The multiple comparisons of the benefit of low, moderate and high scorers in I-BIT strategy before and after teaching reading comprehension confirmed and upheld the finding.

E. The pattern of the mean gain shows that the high scorers benefited more in writing from the use of I-BIT strategy followed by the moderate scorers and the low scorers. The finding further reveals that there was no significant difference in the scores of low, moderate and high ability pupils before the use of I-BIT strategy. However, there was significant difference in the benefit

of low, moderate and high scorers in the use of I-BIT strategy in teaching writing. The multiple comparisons of the benefit of low, moderate and high scorer pupils from I-BIT strategy before and after teaching writing confirmed and upheld that there was a significant difference in the benefit in writing among the three ability levels.

4. Reading and Writing Achievement of grade six Pupils with Application of E-Portfolios, I-BIT and Conventional Strategies

The pattern of the percentage mean gain shows that the application of E-Portfolio enhanced pupils' ability most in reading followed by I-BIT strategy than the application of conventional strategy. It was also found that there was significant difference in the pupils' achievement in reading with application to E-Portfolios, I-BIT and Conventional strategies. The pairwise comparisons of pupils' achievement in reading with application of the strategies confirmed and upheld that there was significant difference in the pupils' achievement in reading.

The pattern of the percentage mean gain shows that the application of E-Portfolio enhanced pupils' ability in writing most, followed by I-BIT strategy and the least is conventional strategy. Further, there was significant difference in pupils' achievement in writing with application of E-Portfolios, I-BIT and conventional strategies with only 6.1 percent of pupils' achievement in writing attributable to the strategies applied. The pairwise comparisons of pupils' achievement in writing with the application of the strategies confirmed and upheld that there was significant difference in the pupils' achievement in writing.

5. **Reading and Writing Achievement of the Male and Female Pupils with the Use of E-Portfolios and I-BIT Strategies**

A. The difference in the mean reading achievement of male and female pupils with the use of E-Portfolio strategy is in favour of female pupils. Furthermore, there was a significant difference in the reading achievement of the male and female pupils with the use of E-Portfolio strategy.

B. The difference in the mean writing achievement of male and female pupils with the use of E-Portfolio strategy is in favour of male pupils. There was no significant difference in the mean writing achievement of male and female pupils with the use of E-Portfolio strategy.

C. It was found that the difference in the mean reading achievement of male and female pupils with the use of I-BIT strategy is in favour of female pupils. The study further revealed that there was no significant difference in the mean reading achievement of male and female pupils exposed to I-BIT strategy.

D. The difference in the mean writing achievement of male and female pupils with the use of I-BIT strategy is in favour of male pupils. The finding further reveals no significant difference in the mean writing achievement of male and female pupils with the use of I-BIT strategy.

6 Focus Group Discussion (FGD) with the Teachers

A. The teachers from E-Portfolios and I-BIT had interactions about their feelings concerning the experience, knowledge gained, prospects of the study and their thinking going forward to online sources of information. There was a consensus from the discussion on the teachers' impression about the programme that the learners could read and get meaning from what was read and could also put it into writing. The children were so eager to learn that it was an encouragement to some

teachers to extend the strategy to other classes. Pupils were open to the use of internet and discovered much information on their own, thus improving their reading, exposure expression during the lesson and active participation and interaction among learners, teachers and materials in reading and writing. The learners could interact with one another and the teacher freely.

B. The change in the attitude of the learners observed in the E-Portfolios and I-BIT classes was facilitated by the fact that the learners participated more in classes; from collection of artefacts by themselves, answering questions and then getting the opportunity to explore the internet. Furthermore, the excitement in choosing suitable topics in the writing classes was also a key factor in addition to the understanding that apart from textbooks, there are other ways of getting information such as from pictures of different kinds, distinguishing among factual, inferential and critical levels of answers while reading and making researches before the lesson. The teachers also observed that the students' vocabulary improved which made reading and writing easier and that learners could undertake assignments by themselves.

C. The impression of the teachers on the future of the acquired experience included among others, that the experience will be sustainable because the strategy can continually create new experiences. It is a worthwhile experience because it makes teaching and learning easy and interesting for both the teacher and the learners. Therefore, the strategies have transformed the reading and writing styles.

D. The thinking of the teachers regarding both strategies which their colleagues did not participate in the programme was that since the strategies are sustainable, other teachers need to be trained to expand the application of these strategies.

E. On what the Benue State government should do to sustain the use of the strategies, the teachers unanimously agreed that the government should make provision for computers and other gadgets that can facilitate this programme like electricity or solar power system, and security to safeguard installations. The final step towards sustainability will be to train more teachers to be able to use the strategies.

F. Irrespective of the strategy used in teaching (either E-Portfolios or I-BIT), the teachers were unanimous on the challenges faced during the programme which are: inadequate gadgets, lack of source of power or electricity, difficulty in using the gadgets at the early stage and some classes being too large for the strategies to thrive.

G. The teachers' impression about the pupils who participated in the programme was that they improved in their awareness and application of ICT gadgets and in their reading and writing skills because of the interest they developed in the strategies. The pupils worked as a team, developed the spirit of healthy competition and raised their level of interest and curiosity. The pupils were also open to reading properly, monitoring and interrogating reading to ensure understanding at the three levels of comprehension.

Conclusion

This study concludes that the effectiveness of E-Portfolios and I-BIT strategies in enhancing teachers' lesson delivery and asking and answering questions differs. However, the effectiveness of E-Portfolios and I-BIT strategies in enhancing teachers' classroom management and presentation skills show no disparity.

Teachers are comfortable using E-Portfolios and I-BIT in their assessment skills practices, gathering instructional materials as well as discovering new ideas and methods. Pupils can access and navigate the net with ease, and self-assess their learning and personal study via formative assessment. Class activities, exercises, frequency of assignments and keeping of records assessments would help teachers to continue using the strategies beyond the intervention. Such activities can ensure teacher effectiveness for practice makes perfection.

The study also concludes that both strategies affirm that deep and independent learning, applying technologies in teaching, encouraging critical thinking and problem-solving skills are ways of improving teaching outcomes. Furthermore, ensuring deeper understanding and ease of lesson presentation are ways the strategies could make better teachers. The appropriate use of instructional materials, pictures, diagrams, online sources of materials, good time management, confidence and documentation of academic progress were identified as factors that could make better teachers. The teachers in both groups agreed that supporting materials, provision of instructional materials via technology, presenting abstract materials in concrete form, engaging learners both at school and home, made teaching easy and good teacher-pupils relationship helped in reading and writing.

The study concludes that male and female pupils from both groups read and wrote better, were confident in using E-Portfolio and I-BIT in reading and writing after the intervention. While male pupils acquired more knowledge in using E-Portfolios as compared to male pupils in the I-BIT, female pupils in E-Portfolios and I-BIT strategies read and wrote better. Using I-BIT strategy made more female pupils confident in reading and writing compared to the female pupils in the E-Portfolios strategy. For the progress made in reading and writing, female pupils in the I-BIT strategy acquired more knowledge than their counterpart in the E-Portfolios strategy. Male pupils in the E-Portfolios strategy read and wrote more fluently, selected reading materials easily, spelt words better, wrote easily, and concentrated better in class in similar manner as their counterparts in I-BIT strategy. Also, female pupils in both E-Portfolios and I-BIT strategies read and wrote more fluently, selected reading materials easily, spelt words better, wrote easily and concentrated better in class.

Students' performance in reading comprehension differed across ability levels when E-Portfolios strategy was used. The use of I-BIT strategy in reading comprehension of pupils across different ability levels in public primary schools was effective.

The application of E-Portfolios, I-BIT and conventional strategies vary in their improvement of the respondents' ability in reading and writing. The application of E-Portfolios, I-BIT and conventional strategies vary in its enhancement of the respondents' ability in writing. The study further concludes that the use of E-Portfolios and I-BIT strategies enhanced the reading and writing achievement of male and female pupils in public primary schools in Benue State, Nigeria.

The teachers' general impression about the programme is that learners could read and get meaning from print and could express their understanding in writing and were so eager to learn which encouraged some teachers to extend the strategy to other classes. Pupils were motivated to use the internet and so discovered much information on their own, which enriched their literacy skills and enhanced their classroom participation and interaction.

E-Portfolios and I-BIT strategies brought changes in the attitude of the learners which manifested in their ability to explore the internet and to participate actively in the learning process. Furthermore, the realization that there are other sources of information apart from textbooks and that they could choose topics to write on themselves increased the pupils' interest and engagement in reading and writing.

The teachers' impression about the pupils who participated in the programme was that there was improvement in their knowledge and use of ICT gadgets. This improvement leads to enhanced better performance in learning literacy in a collaborative learning environment. Besides, this has developed in them a spirit of healthy competition. It raised their level of interest and curiosity and enabled them to decode and encode texts at the three levels of comprehension.

Recommendations

Based on the findings on the study, the following recommendations are made:

1. Teachers should be trained in the use of E-Portfolios and I-BIT strategies for teaching reading and writing. This can be achieved through intervention by government, donor agencies, and the private sector.
2. Learning support system, mentorship programmes and guided digital learning resources should be encouraged by parents and teachers for male and female pupils.
3. Policy statements should be made by government on provision of Digital devices (tablets) in public primary schools to augment the acute shortage of ICT gadgets required for teaching and learning.
4. Electricity should be made available in all primary schools in Benue State to facilitate the use of technologies in teaching and learning of reading and writing. This can be achieved through public private partnerships.
5. Government and educational institutions should provide E-libraries with repositories in primary schools where pupils can create artefacts for learning.
6. Schools should adopt assessment strategies that align with digital literacy instruction such as the E-Portfolios-based evaluation that underscores Portfolio-based assessment for learning in place of the traditional assessment of learning.

Challenges of the Study

1. The Challenge of Limited Access to Technology among Public primary Schools in Benue State: Not all schools had the required infrastructure to support E-Portfolios and digital learning strategies. This made random selection of schools impossible and purpose sampling very difficult because there were very few schools that met the criterion of having ICT gadgets.

2. The Teachers' Limited Knowledge in Integrating Digital Tools into Literacy Instruction: Teachers had low knowledge of the internet and application of information and communication technology (ICT) to teaching. Most teachers had to be trained on even the basic ICT skills and some still needed assistance in the course of the study.

3. The Lack of Electricity/ Power Supply: There was no electricity/ power supply in most of the schools, the study was carried out. Alternative arrangements were made by hiring and fueling generators. Ad hoc wiring of classrooms was made so that generators could be used in some schools.

4. The Uncooperative Attitude of a Head Teacher: In one of the schools, the head teacher denied the research assistant access to ICT gadgets after the selection of the school and the training of the research assistant. An alternative arrangement was made to ensure the success of the intervention.

Implications for Teaching Reading and Writing

The findings imply that adopting digital tools and strategies into teaching reading and writing can improve pupils' literacy skills. Therefore, using E-Portfolios and digital inquiry-based learning, increases pupils' interest and curiosity in learning and enhances their reading and writing proficiency. It is evident from the study that technology-driven instruction promotes interactive learning experiences, enabling pupils to develop reading comprehension and writing skills. The use of the strategies enhanced the literacy abilities of pupils, making literacy instruction more effective. The strategies enabled pupils to take control of their learning, become more autonomous and regulate their learning. Therefore, teachers should be trained in the use of the strategies for teaching reading and writing. To this effect, literacy instructional practices should address active participation and interaction of both male and female pupils in collecting digital resources for learning, making reference to the resources collected and promoting peer assessment among the pupils.

Plan for Sharing the Results

We hope to seek for grant or approval from the state government and its development partners like the World Bank, DFID, ActionAid, UNESCO, UNICEF among others to train other teachers subsequently. Thus, we shall hold a seminar for primary school teachers in the state to update them on the findings and also wet their appetite on large scale training on the use of the two strategies. More importantly, school-based, school-cluster, teacher/teacher retraining paradigm which the Literacy Promotion Association of Nigeria (LiPAN) successfully pilot-tested and validated in its Literacy Enhancement and Achievement Projects (LEAP) which was fully funded by World Bank in Anambra and Ekiti States would be adopted. The schools in Benue State will be grouped into clusters of four or five. The schools in each cluster will be a walking distance from each other. The most centrally positioned school in a cluster shall be used as the training center of all teachers in the cluster. We shall select at least three teachers from each cluster and pool together all the selected teachers and for about eighteen days, train them in a selected school. At the end of the eighteen-day intensive training of the teachers, they will all return to their respective schools. The trained teachers will have to train all the other teachers in their respective clusters. In this way the teachers would acquire the knowledge, attitudes and skills regarding the elements of this study. We hope to publish four papers from the work which will constitute a wider dissemination of the findings to the stakeholders in literacy education. We shall hold research finding dissemination seminar at the Faculty of Education at Benue State University, Makurdi. Where the CODE cannot help financially, for these publications and seminars, we shall provide the fund but may have to reduce the scale of the seminars and the number of publications.

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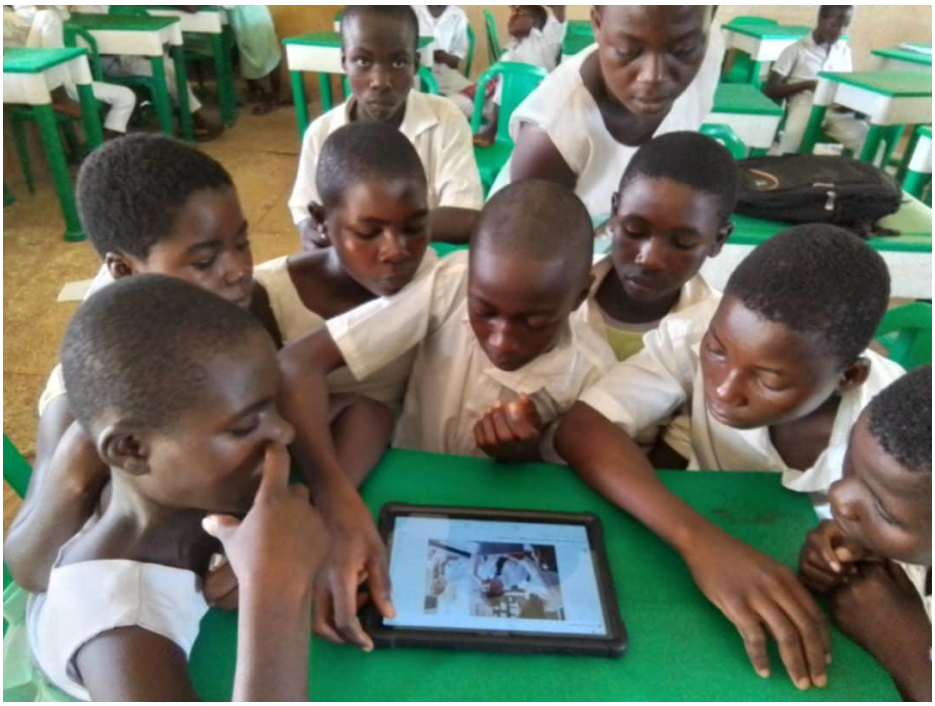
Sampled Teachers that Attended Training Along with Resource Persons Seated

Training/Activity Session

Micro Teaching Sessions



Teaching Session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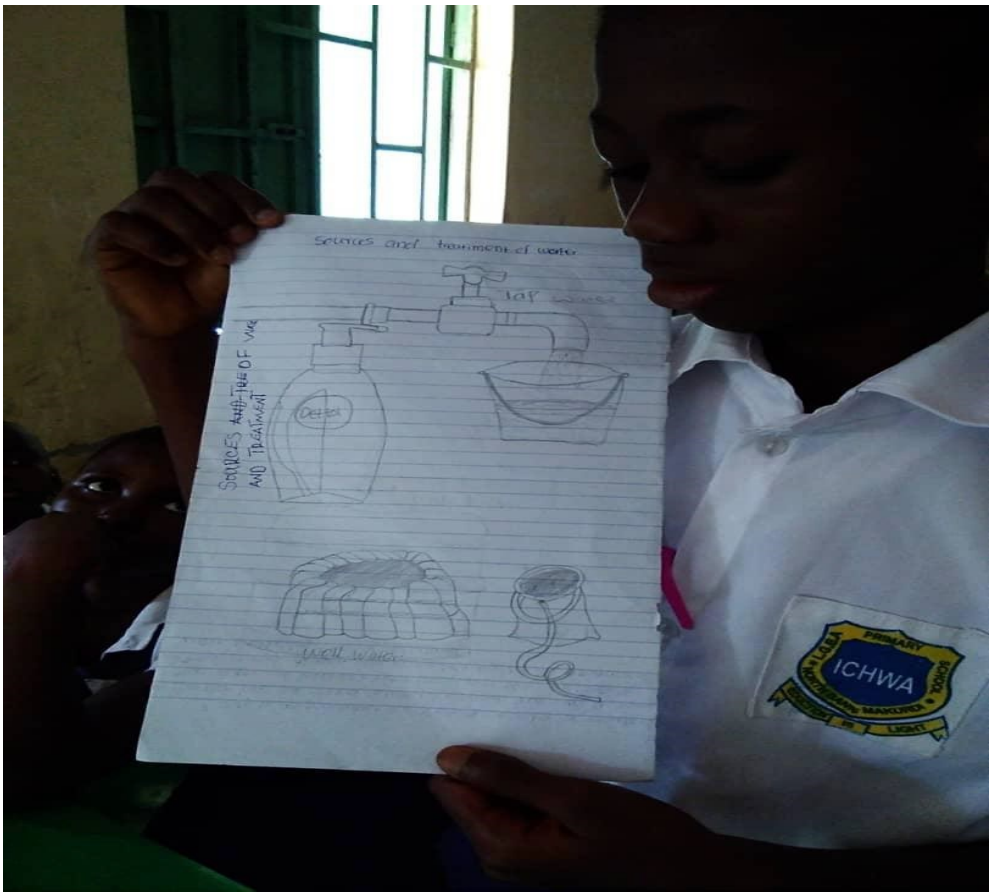
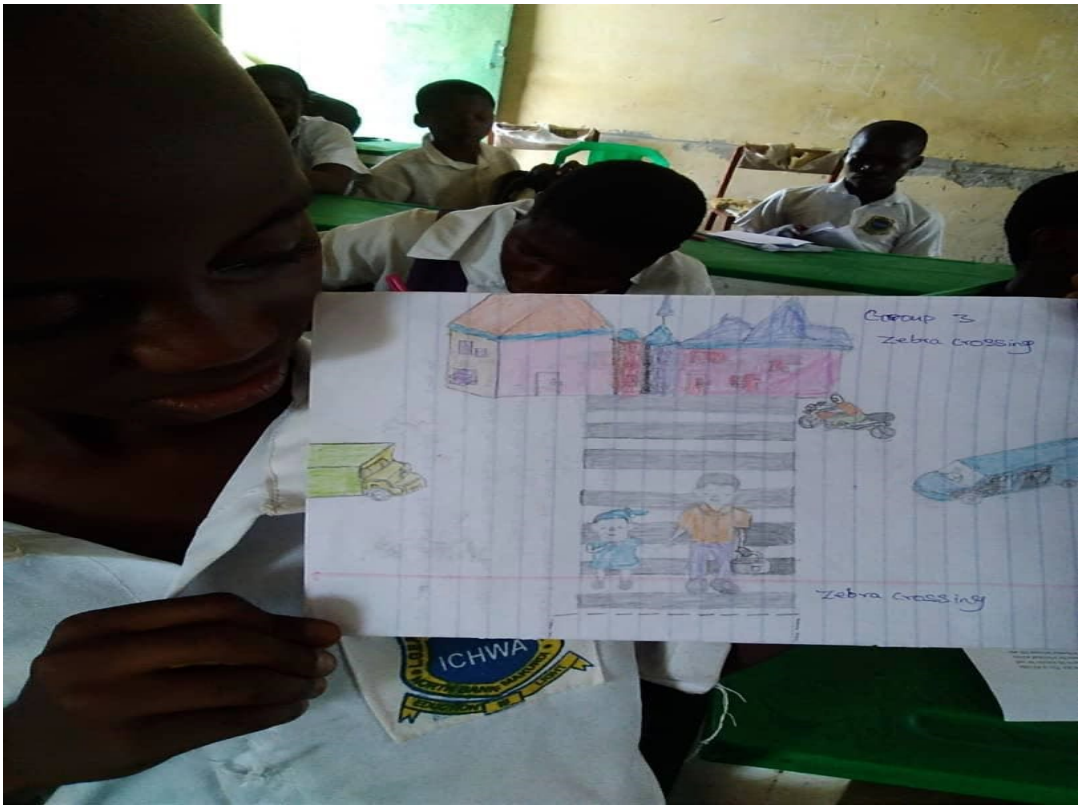

Sources and treatment of water
SOURCES AND TREATMENT OF WATER
ICHWA


Group 2
Reservoir


Group 3
Zebra crossing
Zebra crossing
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