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Examining the Efficacy of Integrating Assistive Technology Solution in Teaching And Learning of Literature in English in Nigeria

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Abstract:- Assistive technology has a significant role in the learning of literature since it has the potential to engage, motivate, deepen skills, enrich accelerated, and innovate the learners. Therefore, this paper analyses related literature, and methods of achieving the objectives and presents the results and discussions on the topic. The study adopted a qualitative approach that was characterized by interviews with the key informants (KII) in schools where assistive technology solutions are already in use. The paper confirms that assistive technologies are effective in improving the learning and teaching outcomes within the sampled learning institutions in Nigeria and in subject areas other than literature. Furthermore, the paper highlights attitudinal barriers, inadequate teacher preparations, and poor facilities development as adverse impediments to the integration of assistive technology solutions within the teaching institutions of Nigeria. This paper presents the findings and recommendations that are based on the best practices for integrating assistive technology solutions in the teaching and learning of literature in Nigeria. To address these barriers, it is imperative that the Nigerian government enact policies that will ensure proper monitoring and evaluation in the implementation of assistive technology solutions programmes within public institutions.

Keywords:- *Integrating Assistive Technology, Teaching, Learning, Literature in English.*

I. INTRODUCTION

Teaching and learning is an endeavour that has consistently been improved through research into problems and finding solutions to them. In the current dispensation, there are many supportive media that have evidently enhanced teaching and facilitated learning among which is Assistive Technology. Assistive technology refers to any items or devices that can be integrated into learning to maintain, increase, or even improve the learning capabilities of individuals (Sharpe, 2018). Assistive technology has a significant role in the learning of literature since it has the potential to engage, motivate, deepen skills, enrich, accelerate, and innovate learners. According to Crayton &Svihla (2015), much has been reported and said concerning the efficacy of integrating assistive technology solutions, more so, from computers in the learning and teaching of literature in Nigeria. For instance, Housego& Freeman (2020) report that assistive technology has been integrated into the literature curriculum of private institutions in Nigeria for more than two decades. Nonetheless, the same has not been replicated in public institutions since their inception.

Although presently, assistive technology has not fully been incorporated into the learning and teaching of literature in Nigeria, it is commonly accepted that the technology can better prepare learners for long-term career excellence (Osborne, Dunne, & Farrand, 2013). Therefore, this paper analyses related literature, and methods of achieving the objectives and presents the results and discussions on the topic. Finally, it provides conclusions based on the findings and recommendations that are based on the best practices for integrating assistive technology in the learning and teaching of literature. The aim is to establish the efficacy of incorporating assistive technology solutions alongside the modern teaching and learning of literature in Nigeria

II. LITERATURE REVIEW

- *Assistive Technology:*

The inclusion of disabled children in regular education necessitates modifications to meet their physical, social, and academic demands. Every type of assistive technology gadget can be an adaptation. Any piece of equipment, item, or product system used to increase, maintain, or improve a child with a disability's functional capacities is referred to as an assistive technology device. These items may have been developed or customized or purchased commercially off the shelf (Siyabi et al., 2022). According to Boot et al. (2018), assistive technology may be used to help people with a variety of impairments in obtaining social advantages and reducing the negative effects that their disabilities have on their well-being and community involvement. Others may view AT as including a broad range of devices, technical assistance, plans, services, and procedures, all of which have as their primary goal enhancing the quality of life for people with disabilities.

Assistive technology is a broad word that encompasses assistive, adaptive, rehabilitative, and associated services that are particularly created or customized to provide technological aid for those with impairments. In this instance, special education instructors and assistance personnel (An et al., 2017). Using technology to help students with disabilities learn and teach is known as assistive technology, and the

usefulness and quality of these tools vary greatly. Certain assistive technologies are employed to give people with impairments access to educational opportunities and to maximize their cognitive capacities. Some are employed to help teachers and curriculum accomplish their goals, while others include students as active learners(Chukwuemeka and Samaila, 2020).

According to Onivehu, Ohawuiro, and Oyeniran (2017), teachers' attitudes, backgrounds, and abilities influence how much assistive technology they utilize in the classroom. This will need familiarizing both instructors and learners with the assistive technology and software offered in their schools, which they might employ to make the necessary substitutions, adjustments, and adaptations to allow students with special needs access to the environment, curriculum, teaching, or assessment procedures. Thus, it is important to not undervalue the role that assistive technology plays in the special education environment (Shikden, 2015).

Pedagogical change is necessary for classrooms where technology is viewed as both a tool and a catalyst for change, according to studies on inclusive education. (Wen et al., 2017). Although highlighting the essential role of technology, Waddell (2015) contends that "students should accept technology for them to benefit" and urges instructors to be open to incorporating technology into the classroom to improve and innovate their teaching approach. According to Rezaeian and Bagheri (2017), utilizing technology in the fields of knowledge networks and education may foster an environment that values research, dialogue, and imaginative discovery.

- *The Teaching of Literature in English in Nigeria*

Literature is one of the important subjects in the Nigerian education system from elementary to tertiary institutions. At the senior secondary level, the importance is reflected in the way the curriculum spells out the objectives which are general and specific. *General objectives*

- To broaden students' cultural awareness and knowledge of healthy human values to enhance their language skills.
- To expose them to the beauty and potential of language
- To equip them with the necessary skills for independent thinking and creative writing.
- To adequately prepare students for standardised examinations needed for work and for further studies.

- *Specific objectives*

- Literary appreciation is to help students develop critical sensitivity to literature and be able to independently assess prose, poetry, and drama.
- Through drama instruction, students learn basic dramatic techniques, develop the skills of acting, and become able to relate drama to real life.
- Poetry instruction is to expose students to the richness of poetic expression and to gain experience in writing their own poems.
- Prose is to enable learners to recognise the values embodied in fiction (NERDC 2009).

The focus of these objectives really reveals how much the subject is valued and therefore, its teaching and learning must be so carefully and diligently handled for the achievement of the objectives. To this, Ogunnaike, Adenuga &Olu-Dukiya (2022) alerted that its teaching should be handled with a tested method and not be done anyhow. Whereas Ogunnaike (2016) opined that classroom experiences in the last millennium have shown that literature has been shoddily handled by most Literature teachers at the secondary school level.

Pedagogy in the current educational dispensation continues to sporadically expand in terms of innovations in methods and strategies in order to make learning meaningful to the learners and teachers also become satisfied and successful. Hence researchers have experimented with different methods, techniques, and strategies with technologies to assist in the efficient delivery of educational content. Assistive technology solution has been used in some subject areas and found potent to enhance teaching and learning. Hence, the concern of this paper to explore how useful it could be in the teaching of literature in English in Nigeria.

- *Types of assistive technology solutions useful in teaching and learning*

According to Oliver (2011), Kurzweil is a type of assistive technology solution that is useful in scanning texts to computer-generated speech. This, he derived from a cross-sectional survey that involved 300 literature students in Australia. From the results, this tool was best used in supporting learners who best-understood information through multimodal experience. Similarly, Conole (2002) asserts that Kurzweil can be used in converting scanned texts into computer-generated speech. Console derived this assertion after observing the multimodal experience of 400 students in Liberia. The students demonstrated that the tool could decode letters, words, and sounds by listening and reading the texts aloud. Nonetheless, the recent improvement in the technology has led to the introduction of tablet and web-accessible versions hence making the software more accessible and portable (Riley, 2017). Further, Kurzweil's digital formats and formatted resources can directly be downloaded and used from the internet.

Gambari&Chike-Okoli (2017) have noted that various devices and programs are available to support fluency in writing and reading. For example, organisation, keyboarding, mobility, and fine motor coordination. This observation has been confirmed by Chiang & Liu (2011), who depict that most of the programs have been availed in tablets to ease fluency in reading and writing. For instance, Chiang & Liu confirm that organisation programs have been supported by assistive technology to improve organisational ability of students throughout the learning process. Similarly, Gambari & Chike-Okoli (2017) present the SMART Idea that has been used by the Nigerian Ministry of Education as a licensed option for organising learning information using interactive graphic organisers. Other organisational programs that Gambari & Chike-Okoli present include online graphic organisers and Spicy Nodes. From time immemorial, these

assistive technology tools have been used in providing literary-based support that includes developing concept maps.

Another assistive technology solution is the speech-to-text software that is used in translating spoken words into written texts. This software has been recommended by Obahiagbon & Osahon (2017), as helpful in bridging the gap for learners who are still struggling with fine motor skills, mobility issues, and writing skills. A further examination by Ramanujam (2011), in his cross-sectional survey, highlighted the example of Dragon Naturally Speaking as the best speech-to-text software. This is because the technology solution is armed with initial voice training, a headset, and a specialised microphone. As such, Jones &Czerniewicz (2011) suggests that learners can use technology in transcribing their ideas and thoughts into texts. Furthermore, the software can be used in iPads and Android devices by using a low-cost Swype application making it more convenient.

Finally, Cho (2018) and Tseng (2017) note another assistive technology solution known as the Co:Writer. The technology is Ministry-funded and can translate speech to text and support writing at the same time. As deduced in Cho's survey of 1000 ICT institutions in Ontario, the technology solution provides word predictions in a drop-down menu. This assertion has been supported by Harley, Jolivette, &McNall (2014), who describes the tool as unique in ''mousing over'' since it has the capability of predicting possibilities from a few typed-in words. Consequently, So &Kim, 2019), proceed to mention that the Co:Writer is capable of speaking the choice of words hence allowing the learner to identify the spoken word hence useful in correcting spelling or typing errors.

According to Siyabi et al. (2022), visually impaired students who enroll in courses at the Centre for Preparatory Studies and Sultan Qaboos University receive the technical resources they require. The participants highlighted a few technology tools that this group of students utilized as examples. For instance, these include magnifying glasses, audio materials, screen readers, and laptops with screen readers. Moreover, enlarged paper copies of instructional materials as well as digital versions are made available to low-vision pupils for use in instruction and learning. Copies may be magnified using a computer, smartphone, or digital magnifier because they are in PDF format. Students who are blind or visually handicapped are also entitled to various exam accommodations, including extra time and occasionally a scribe during assessment sessions.

- *Low-tech Assistive Technology*

Technology generally does not eliminate impairment; rather, it diminishes the effects of disability on those who have it. Nonetheless, certain straightforward technologies are seen to be crucial for people with impairments. These systems are referred to as low-tech. Low-tech AT refers to tools or apparatus that don't require much training, are perhaps more affordable, and don't have intricate mechanical elements. These technologies include roll-in showers, switches, switch-operated toys, ramps, communication boards, auto door openers, portable magnifiers, big print text, communicating with paper and pen, utilizing canes and walkers, customized pen or pencil grips, post-its, highlighters, squishy balls or other sensory input, manipulatives, tactile rulers, page protectors or coloured transparencies, and much more. (Zayyad, 2019).

- *Mid-tech Assistive Technology*

When compared to low-tech equipment, AT items that fall in the centre of the spectrum tend to be more costly, have more complicated functions, and work electronically or using batteries. Computerized organizers, Closed Caption Televisions (CCTV), manual wheelchairs, books on CD or E-Readers, amplifiers, environment control devices, alternative keyboards or mouse for computers, braille translation software, switch-adapted games, or toys, adapted switches, word prediction software, adapted seating, an electronic speller or dictionary, an adapted keyboard, a calculator, etc. are a few examples (Zayyad, 2019).

- *High-tech Assistive Technology*

This relates to the most advanced hardware or software that contains digital or electronic components, which could be computerized, and learning how to utilize them before using them will probably require some training. This is the most advanced and costly type of technology. Power wheelchairs and scooters, digital hearing aids, computers with specialized software like voice recognition or magnification software, electronic aids to daily living, voice-activated telephones, communication devices with voices, Bluetooth integration, digital drive technology, portable word processors, text-to-speech, speech-to-text, smart boards, alerting devices, digital hands-free headsets, and alerting devices are some examples of high-tech AT (Zayyad, 2019).
Intended benefits of assistive technology solutions to teaching and learning

According to Simpson (2010), assistive technology solutions can be beneficial to learners in helping them to complete tasks and in assisting them to bypass perceived areas of difficulty. Simpson proceeds with an example in his survey involving 400 students from Ghana. In this instance, students were reported to learn better by focusing on the computer screens that highlighted words when read aloud as opposed to listening to digital versions of books. Further, in the latter scenario, the students often bypassed areas of difficulty, unlike the assisted technology solution that enabled them to learn unfamiliar words. Similarly, Golonka, et al. (2018) assert that assistive technologies are intended to provide dynamic and immediate feedback to both the students and the teachers. This is because, the assisted technology solutions are capable of spelling and expressing writing skills, hence minimizing distractibility.

Researchers reflect on several advantages of utilizing AT to help students with disabilities since the IDEA 2014 requires that it be provided for all students with disabilities to meet their educational or functional requirements. Although every learner is unique, such advantages might include i) the provision of realistic options for supporting students with disabilities in their least restrictive environment, which could

be used to improve a student's communication skills; ii) the support of student access to academic instruction; iii) the creation of visual supports and systems that encourage good behaviour in students (Parish, 2017).

Children with reading disabilities may gain from helpful technology in terms of their reading development process and an increased likelihood that they won't lag behind classmates, according to Chiang and Liu's (2011) research on the advantages of assistive reading software. Further, AT as in the form of smartphones and tablets may assist children with reading impairment to have an equal chance for learning in school as their peers without reading difficulties. Also, using Technology like smartphones and tablets might help students with reading disabilities have the same chance to study in class as their peers who don't have any problems with reading. The authors concluded by noting that while AT reduced stigmatizing circumstances when students with learning difficulties leave the classroom for special education and had beneficial impacts on family life, its users had wider effects.

The use of assistive technology may increase the academic engagement of students with impairments. This involves making it easier for students with disabilities to do routine academic tasks, giving them access to and participation in educational materials relevant to their courses, enhancing their learning, and encouraging better academic achievement. Several studies found that using assistive technology was advantageous for both students with impairments and those who did not, as well as for lecturers. Assistive technology was viewed concerning academic engagement as a facilitator but not as the change's cause; it facilitated participation rather than sparking it. With the use of assistive technology, students with impairments were able to accomplish typical academic work more quickly and effectively (Siyabi et al., 2022).

The use of assistive technology has been demonstrated to boost social interactions, offer chances for learning assistance, stimulate active participation with peers in class-related conversations, encourage involvement in clubs or organizations, and facilitate the formation of a social community of assistive technology users(Ashby and Causton-Theoharis, 2018), Yet another said that the usage of assistive technology allowed students with impairments to establish friends online (Foley and Masingila, 2015).

In the classroom practice, Chen, et al.(2019)observe that assistive technology solutions can be used in supporting learning in a variety of ways. For instance, the authors pose that the Dragon Dictate software has the potential of helping both the teacher and the learner to concentrate on ideas instead of keyboarding when capturing key thoughts during brainstorming sessions for projects. On a similar note, Newton & Schmidt (2014) reflects that Co:Writer, as a word prediction software, can benefit both the teacher and the student in keying information into a computer when he or she is unable to spell some words correctly. These indicate how scholarly researchers are increasingly appreciating the potential benefits of using assistive technology solutions in enhancing learning and teaching outcomes. Nonetheless, the main undoing of the integration of assistive technology solutions to learning and teaching is the lack of sufficient knowledge, among the teachers, to handle the software (Ezike, 2015).

III. METHODOLOGY

This paper adopted a qualitative approach that was characterised by interviews with the key informants in schools where assistive technology solutions are already in use in Nigeria. The institutions were The Federal University of Technology, Akure, The Federal University of Technology, Minna, and The Federal University of Technology, Owerri. The institutions are ICT compliant in their teaching and learning curriculum for over three decades and hence were more suitable for the survey. On the other hand, the qualitative method was suitable since it allows researchers to probe for information and get deep insight into the topic of interest from the study population. The study engaged three key informants who were special and general teachers with experience of integrating assistive technological solutions in the learning institution.

Further, the data was obtained through interview protocols that were divided into two sections. The first section collects the interviewee's demographic information and the second section assesses the knowledge and use of assistive technology in the learning institutions. The whole interview session lasted between 20 to 30 minutes. Before commencing the survey, the study participants were requested to voluntarily consent to participate in the survey as part of ethical requirements by signing the consent form. Consequently, after giving their consent, the researcher used the interviewing method to collect in-depth information to enable adequate data analysis. Additionally, phone interviews were used as a follow-up in getting clarity on information that was not captured correctly. Nonetheless, in maintaining the confidentiality of the study participants, the initials of names were used in coding the interviewees.

IV. FINDINGS AND DISCUSSIONS

The main interview questions were organised based on responses from the interview protocol (see appendix) and any comment or idea presented by more than a single interviewee was considered a theme. From this, the three main themes that emerged from the interviews were organised into three segments. These were, applied assistive technologies in Nigerian schools, the attitudes towards the use of assistive technologies, and the limiting factors towards the integration of assistive technology solutions.

- *Applied assistive technologies in Nigerian schools*

The teachers that were interviewed widely mentioned Kurzweil, Co:Writer, and graphic organiser technologies. This implies that the above-mentioned technologies are the ones that are commonly applied in their learning institutions.

The use of word prediction software such as Co: Writer can help students with typing difficulties. Further, it minimizes handwriting and improves spelling accuracy when

writing. This agrees with Chen, et. al (2019)'s observation that the students enjoy when words are recommended to them hence being able to construct sentences with minimal worries about word choice and spelling. In Ramanujam's (2011) study, learners reported improved use of vocabulary, motivation to write, and productivity by using Co: Writer. While there exist numerous benefits from using the assistive technology solution, it requires basic phonological awareness and a foundation to its use hence teachers should be more trained in this field. Moreover, students who cannot identify the sound of beginning words may not benefit from its word prediction capabilities. This is because the software requires that users provide the initial letters of the words. Additionally, the prediction of words requires a high attention level in ensuring accurate usage of the suggested words (Chen, et al., 2019). Therefore, teachers should consider every learner as an individual in employing the best-assisted technology solution outcomes.

It is also important for the teachers to learn the value of using graphic organisers as assistive technology solution alternative. This technology provides organisational framework that can help the teachers to generate content and topics for projects, plan their lessons, and use it to improve the quantity and quality of their teaching materials (Crayton & Svihla, 2015) According to Crayton & Svihla (2015), teachers can use the procedural prompts to generate high quality and better organised teaching materials or teaching aids. By possessing the organisation and planning skills, the teachers will be able to improve the content delivery to the students. Furthermore, the assistive technology solution can help learners with difficulties in expressing their thoughts on paper.

Moreover, assistive technology solutions such as Kurzweil can minimize negative emotions since it provides the students with deeper text comprehension (Gambari &Chike-Okoli, 2017). Because of this, the teachers should be motivated, through training, to encourage text-to-speech programs during their interactions with the students. According to Conole (2002), learning entails low-level transcription and high-level transcription skills. The low-level skills include grammar, punctuation, spelling, and handwriting while the high-level skills include revising, generating content, and planning. These can best be achieved when the teachers employ assistive technology solutions as opposed to traditional learning approaches. For instance, Cho (2018) asserts that speech-to-text assistive software is capable of transcribing spoken words into computer texts hence allowing learners to bypass the typing demands or handwriting demands.

By freeing the learners from such effortful tasks, the teachers will be mentoring the learners into coming up with less complex and more accurate tasks. Newton & Schmidt (2014) note that accuracy in speech recognition can help learners in improving their grammatical accuracy. Nonetheless, it has its challenge in that, new users risk becoming frustrated during the process of training. Therefore, they may end up lacking the ability to edit the output of the program. As such, titles that include XpressLab can be used in improving the learners' expressive oral language (Simpson, 2010).

- *Attitudes toward the use of assistive technologies*

From the interview, it was evident that the critical issue in integrating assistive technology solutions into the teaching and learning process is a lack of skills and knowledge of using the technology. As such, the attitude of most of the teachers towards the integration of assistive technology solutions into the curricula was negative. It is, therefore, of concern that negative attitude is a great impediment to the implementation of assistive technologies in learning institutions (Oyelekan, Akinpelu, &Daramola, 2015). Further, the study findings imply the need for professional development and training for the teachers to influence them into embracing assistive technology within the classroom environments. This is because assistive technology solutions have been demonstrated to improve the learning abilities of students (So & Kim, 2019). For instance, using grammar features and spell check can assist learners in focusing on communicating their thoughts correctly. Moreover, the learners can confidently write considering that they can make changes easily and submit an assignment that is better organised, neater and that supports positive self-esteem (Voogt, et al. 2018). The text-to-speech, word prediction, and graphic organisers are examples of assistive technology solutions that can help students with language-based difficulties. All of these will help students to access the content of literature materials with ease and obtain deeper comprehension.

- *Limiting factors*

The interviewees identified some challenges that hinder the efficacy of integrating assistive technology solutions in the teaching of students. Nonetheless, these challenges are mild and can easily be addressed to realise the efficacy of the technology in learning. For instance, the teachers can be educated through training on using the various types of assistive technology solutions. Additionally, to help in addressing the challenge of obsolescence, the school administrations should ensure that the technologies are up to date and that their procurement departments dispose of any obsolete technologies. On the other hand, the licensing costs of some of the assistive technology solutions may be expensive for the institutions. In most occasions, the licensing cost for educational settings is a burden when compared to purchasing the license for specific lessons. Furthermore, perpetual licenses are always restrictive on how many updates the institution can access and install for learning. Nonetheless, by involving various stakeholders, including the government, these learning institutions can access adequate funding to afford the costs of assistive technology solutions in promoting learning.

- *Barriers to Effective Use of Assistive Technology*

According to Mason (2017), there are implementation and accessibility challenges that prevent instructors from using AT, such as enough wifi connectivity for mobile technology, time for instructors to prepare and collaborate, methods to check out equipment for students, troubleshooting help for broken technology, and a curriculum-wide integrated

approach. Teachers frequently have the student's best interests in mind as their top priority, thus even when a learner has an Individual Education Plan outlining the specific resources needed to meet their requirements, regulations requiring the use of assistive technology may still be necessary. When instructors notice that obstacles to deploying assistive technology interfere with students' education, they are likely to stop using it. This is a fundamental reason why removing these obstacles is crucial.

Another major obstacle to the successful usage and deployment of assistive technology in the classroom is teacher training. According to research by Bausch and Ault (2018) on the use of assistive technology in the classroom, 41% or even higher education teachers lacked the necessary training and competence. This demonstrates how unprepared those instructors are who are more likely to employ assistive technology. Moreover, these teachers lacked device usage experience and were ignorant of the various assistive technologies available in the educational sector.

Another barrier to the employment of assistive technology is a lack of resources (Alharbi, 2016). Research by Barfurth and Michaud (2018) examined the opinions of 600 K–18 special education teachers about the challenges of utilizing assistive technology. Older computers and equipment were cited as a barrier to using assistive technology by 70% of respondents. Another crucial resource that isn't being used well or adopted sufficiently in assistive technology is technical assistance (Alharbi, 2016). Technical issues, such as computer malfunctions, sluggish internet connections, and teachers using out-of-date computers, were identified to be major obstacles for research instructors conducted by Rohaan et al. (2019).

- *Efficacy of Integrating Assistive Technology Solutions in Teaching and Learning of Literature in English in Nigeria*

The paper confirms that assistive technology solutions are effective in improving the learning and teaching outcomes within the sampled learning institutions in Nigeria and in subject areas other than literature. These assistive technology solutions have the potential of assisting the students in revising and monitoring their assignments. In essence, hearing the reading of the texts aloud would assist in identifying unnoticed grammatical errors in the assignments. Examples of the technological solutions, as identified in the study, include Kurzweil and Co: Writer which helps in scanning texts and correcting grammatical errors in language. Since literature is a language-based subject, assistive technology solutions like Kurzweil and Co: Writer will enhance its teaching and learning outcomes if integrated.

Nonetheless, a majority of the teachers interviewed had inadequate skills and knowledge levels to ensure effective outcomes in their teaching prospects. The lack of knowledge in assistive technological solutions is not novel since the present study confirms that most of the teachers were not conversant with the usage of the technology. Part of the reasons identified in the paper's findings includes a lack of training and knowledge in the area. Additionally, the study agrees that skills and knowledge in using assistive technology solutions are essential in the special and general education of learners. Therefore, changing the perception of the teachers concerning assistive technological solutions is paramount in influencing how best it is integrated within learning institutions. It is even encouraging that most of the study participants expressed their interest in training and professional development in using assistive technology. Hence Literature teachers should be encouraged and given the opportunity to acquire skills and knowledge in assistive technology solutions for better results in their teaching and students' achievement in learning literature.

V. CONCLUSION

Assistive technology has a significant role in the learning of literature since it has the potential to engage, motivate, deepen skills, enrich accelerated, and innovate the learners. The article asserts that assistive technologies are effective in improving learning and teaching outcomes in model educational institutions in Nigeria and in subjects other than literature. In conclusion, the integration of assistive technology solutions in teaching and learning literature in English in Nigeria can have a significant impact on the efficacy of the educational process. By improving access to literary texts, enhancing engagement with the material, increasing independence, providing personalized learning opportunities, and improving academic performance, assistive technology solutions can help to create a more inclusive and effective learning environment.

RECOMMENDATION

From the analysis above, the paper recommends formalization of training for the teachers concerning assistive technological solutions for professional development. This was reflected by the interviewees when asked what could be done to make the assistive technology solutions more efficient in teaching. Here most of the teachers expressed willingness to improve their knowledge in the area through workshops and training. These should integrate personal contact and hands-on opportunities among educators.

On the other hand, it is paramount that the government and relevant stakeholders join hands in creating awareness and improving resources for the training and implementation of assistive technology solutions in learning institutions. As such, when recommending assistive technological solutions to learning institutions, the stakeholders must consider the need for the teachers and the students to become more competent in technology. As such, funding comes in handy for the teachers' training in using the technology. This will ensure that all educators supporting the students are more willing, informed, and updated with the use of assistive technology hence boosting their confidence and enthusiasm to deliver.

Additionally, the paper highlights attitudinal barriers, inadequate teacher preparations, and poor facilities development as adverse impediments in the integration of assistive technology solutions in the teaching and learning

institutions of Nigeria. Therefore, to address these barriers, it is imperative that the Nigerian government enact policies that will ensure proper monitoring and evaluation in the integration of assisted technological solutions programmes within public institutions. This can be supported with the constant support of staff through adequate provision of assistive technology solutions within the learning institutions. As such, the support is expected to refine the attitudes of the teachers in providing all-inclusive assistive technological solution training. Further, the constant supply of electricity is expected to ensure the effective use of the assisted technological solution devices in updating the knowledge of the learners and maintaining the devices.

REFERENCES

[1]. Ajuwon, P. M., &Chitiyo, G. (2016). Survey of the use of assistive technology in schools in Nigeria. The Journal of the International Association of Special Education, 16(1),4-13.
[2]. Al-Ani, W., Al Musawi, A., Al-Hashmi, W. & Al-Saddi, B. (2020). Status of using assistive technology by students with disabilities at Sultan Qaboos University. International Journal of Technology and Inclusive Education (IJTIE), 9 (2), 1606-1619.
[3]. Al-Busaidi, S., &Tuzlukova, V. (2018). Teachers' perceptions of practices and challenges of innovating for the inclusion of special needs university English language learners in Oman. Journal of Educational and Psychological Studies, 12, (4), 659-671. Retrieved January 21, 2021, from https://journals.squ.edu.om/index.php/jeps/article/view/2796/2499.
[4]. Alharbi, S. (2016). Benefits and barriers: incorporating assistive technology in an inclusive setting for primary school students with learning disabilities in language arts. American Research Journal of Humanities and Social Sciences, 2(1), 1-1.
[5]. An, F., Sharif, S., Wong, W. K., &Marriappan, M. (2014). Innovation of assistive technologies in special education: A review. IJERED: International Journal of Enhanced Research in Educational Development, 2(3), 25-38. Retrieved from www.erpublications.com.
[6]. Anderson, C. L., Anderson, K. M., & Cherup, S. (2009). Investment vs. Return: Outcomes of special education technology research in literacy for students with mild disabilities. Contemporary Issues in Technology and Teacher Education, 9(3), 337–355.
[7]. Ashby CE, Causton-Theoharis J. "Moving quietly through the door of opportunity": perspectives of college students who type to communicate. Equity Excell Educ. 2012;45: 261–282.
[8]. Ashby CE, Causton-Theoharis J. "Moving quietly through the door of opportunity": perspectives of college students who type to communicate. Equity Excell Educ. 2012;45: 261–282.
[9]. Atanga, C., Jones, B. A., Krueger, L. E., & Lu, S. (2019). Teachers of Students with Learning Disabilities: Assistive Technology Knowledge, Perceptions, Interests, and Barriers. Journal of Special Education Technology, 0162643419864858.
[10]. Barfurth, M. A., & Michaud, P. (2008). Digital video technologies and classroom practices. International Journal of Instructional Media, 35(3), 301–315.
[11]. Bausch, M., & Ault, M. (2008). Assistive Technology Implementation Plan. Teaching Exceptional Children, 41(1), 6–14.Bhardwaj RK, Kumar S. A comprehensive digital environment for visually impaired students: user's perspectives. Libr Hi Tech. 2017;35:542–557.
[12]. Boot, F. H., Owuor, J., Dinsmore, J., & MacLachlan, M. (2018). Access to assistive technology for people with intellectual disabilities: a systematic review to identify barriers and facilitators. Journal of Intellectual Disability Research, 62(10), 900-921.
[13]. Chen, F., Looi, C., & Chen, W. (2019). Integrating technology in the classroom: a visual conceptualization of teachers' knowledge, goals and beliefs. *Journal Of Computer Assisted Learning*, *25*(5), 470-488.
[14]. Chen, F., Looi, C., & Chen, W. (2019). Integrating technology in the classroom: a visual conceptualization of teachers' knowledge, goals and beliefs. *Journal Of Computer Assisted Learning*, *25*(5), 470-488.
[15]. Chiang, H. & Liu, C. (2011). Evaluation of the Benefits of Assistive Reading Software: Perceptions of High School Students With Learning Disabilities. *Assistive Technology*, *23*(4), 199-204.
[16]. Cho, J. (2018). Personal Reflection: "Joy Ride" with SoTL Practice: The Investigation of the Effectiveness of Assistive Technology Course Contents on Student Learning. *International Journal For The Scholarship Of Teaching And Learning*, *6*(1).
[17]. Conole, G. (2002). The evolving landscape of learning technology. *Research In Learning Technology*, *10*(3).
[18]. Crayton, J. &Svihla, V. (2015). Designing for Immersive Technology: Integrating Art and STEM Learning. *STEAM*, *2*(1), 1-7.
[19]. Dr. P.G. Ramanujam, D. (2011). Blended Learning - Integrating Technology InEducation.*IJAR*, *1*(1), 38-40.
[20]. Ezike, C. (2015). Adoption of Social Networking Technology in Teaching and Learning Process in Nigeria Tertiary Institutions. *AFRREV STECH: An International Journal Of Science And Technology*, *4*(1), 79.
[21]. Gambari, A. &Chike-Okoli, A. (2017). Availability and utilization of Information and Communication Technology (ICT) facilities in Higher Institutions in Niger state, Nigeria. *Information Technologist (The)*, *4*(1).
[22]. Golonka, E., Bowles, A., Frank, V., Richardson, D., &Freynik, S. (2018). Technologies for foreign language learning: a review of technology types and their effectiveness. *Computer Assisted Language Learning*, *27*(1), 70-105.
[23]. Harley, D., Jolivette, K., &McNall, R. (2014). Speeding Up Learning: Accelerated Distance Learning in Rehabilitation Education. *Assistive Technology*, *16*(2), 184-134.
[24]. Housego, S. & Freeman, M. (2020). Case studies: Integrating the use of web based learning systems into student learning. *AJET*, *16*(3).
[25]. Jones, C. &Czerniewicz, L. (2011). Theory in learning technology. *Research In Learning Technology*, *19*(3).

[26]. Newton, K. & Schmidt, E. (2014). Learning and Growing: Integrating Technology Undergraduates Into the Development of an Industrial Case Study. *JOTS*, *30*(2).
[27]. Obahiagbon, K. & Joseph Osahon, O. (2017). Information and Communication Technology (ICT) Key Tool for Enhancing Teaching and Learning in Nigeria: A Study of Two Tertiary Institutions in Benin Metropolis. *EDUCATION*, *2*(18), 1857-1859.
[28]. Ogunnaike, M. J. (2016) . Enhancing Students' Performance in Literature in English at the senior secondary school level in Nigeria – An appraisal of some instructional strategies. Revue des Scieces du language et de la communication (ReSciLac) Journal de Faculte De Letters, Art et Sciences Humanities. Universited'AbomeyCalavi, Republique de Benin, Numero 37/2016/2ndSemestre. 142-165.
[29]. Ogunnaike, M. J. Adenuga, F. T.&Olu-Dukiya, D. (2022). Integrating ICT into English Language and Literature in English Pedagogy. Journal of International Association of Language Educators, 3, 33-44
[30]. Oliver, M. (2011). Technological determinism in educational technology research: some alternative ways of thinking about the relationship between learning and technology. *Journal Of Computer Assisted Learning*, *27*(5), 373-384.
[31]. Osborne, R., Dunne, E., &Farrand, P. (2013). Integrating technologies into "authentic" assessment design: an affordances approach. *Research In Learning Technology*, *21*(0).
[32]. Oyelekan, O., Akinpelu, G., &Daramola, F. (2015). Science Students' Use of the Internet for Learning in Higher Institutions in Osun State, Nigeria. *International Journal Of Information And Communication Technology Education*, *11*(4), 67-82.
[33]. Riley, C. (2017). Incorporating Interactive Teaching Approaches in the Tertiary Science Classroom; Benefits, Challenges and Deterrents to Use in a Jamaican University. *Science Journal Of Education*, *2*(5), 146.
[34]. Sharpe, R. (2018). Accessibility: the killer app of learning technology?.*Research In Learning Technology*, *20*(0).
[35]. Simpson, A. (2010). Integrating technology with literacy: using teacher-guided collaborative online learning to encourage critical thinking. *Research In Learning Technology*, *18*(2).
[36]. So, H. & Kim, B. (2019). Learning about problem based learning: Student teachers integrating technology, pedagogy and content knowledge. *AJET*, *25*(1).
[37]. Tseng, J. (2017). Developing an instrument for assessing technological pedagogical content knowledge as perceived by EFL students. *Computer Assisted Language Learning*, *29*(2), 302-315.
[38]. Voogt, J., Fisser, P., ParejaRoblin, N., Tondeur, J., & van Braak, J. (2018). Technological pedagogical content knowledge - a review of the literature. *Journal of Computer Assisted Learning*, *29*(2), 109-181.