

## Selection of Appropriate Instructional Media in Revamping Technology Education in Osun State, Nigeria

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**Article DOI:**

10.48028/iiprds/ijsreth.v9.i1.05

**Keywords:**

Revamping,  
Selection,  
Instructional,  
Appropriate,  
Technology.

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**Abstract**

The study examines the selection of appropriate instructional technology in revamping technology education in Osun State, Nigeria. The study employed descriptive survey research design where questionnaires were used to acquire necessary data for the research work. Simple random sampling technique was utilized to select a sample of one hundred (100) respondents from secondary schools in Osun State. Two (2) research questions were raised and answered in this study. Reliability of the instrument was determined using Cronbach Alpha and data collected were analyzed using simple percentage statistical tool. The research findings revealed that, using appropriate instructional media will help in the teaching and learning of students that will enhance in revamping educational sector of Osun State and the country as a whole. Findings also revealed that, the assessment of how students are using the provided learning resources to address the identified needs may be a process that is highly dynamic, multifaceted and challenging as well. This is because the latter may need a broader focus and critical analysis, rather than just classifying their use of the specific resources as either effective or ineffective. In order to achieve this, the teachers must first have set milestones and deliverables in every milestone. Therefore, it is highly recommended that school management should allow teachers and students to access and use school technological materials for easy teaching and learning. Government should assist school authorities in providing sufficient technological materials for teaching and learning among secondary school students in order to attain greater academic goals. And also, school authority should ensure appropriate technological materials are provided in order not to allow students inculcate bad behavior through the use of inappropriate technology.

### **Background to the Study**

Education and technology have always been strongly related. This is demonstrated by the many technologies, old and new, that are used in classrooms everyday by teachers and students alike. In her book, "Teaching as a Designed Science", Laurillard (2012), makes the interesting observation that education does not drive technological invention. Instead, education tends to be beholden to the inventiveness of other fields such as business and leisure. There are now a wide array of different "educational" technologies available (laptops, iPads, projectors, etc.), yet very few have their origins specifically within the classroom context.

Appropriate technology in an educational setting should therefore be assessed for its potential to meet educational aims. The full potential of educational technology is only realized when it supports creativity and critical thinking. In order to better understand how to evaluate the appropriateness of educational technology, it is important to identify what educational aims are, what educational technology is and how appropriate educational technology should be defined.

The current definition of educational technology from the Association for Education Communications & Technology (AECT) in Adediran, Adeyanju and Tyokase (2015), is as follows: Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources (Adediran and Onifade, 2015). The sheer breadth of what form technology can take and how it interacts with the learning environment has important implications for its potential to 'facilitate learning and improve performance.' For instance, both a pencil and a laptop can be seen as different types of technologies for use in the classroom. However, this does not mean that either tool is necessarily appropriate for all classrooms or lessons all of the time. What facilitates learning for one context or situation does not necessarily do so for all.

Traditionally, the concept of appropriate technology has been discussed with respect to economic development. The British economist, Shumacher was the first to formerly posit the notion. The criteria for appropriate technology are encapsulated in his book; *Small is Beautiful* in Adediran, Adeyanju and Tyokase (2015), in which he states that it should be: (a) simple, (b) small scale, (c) low cost, and (d) non-violent. Although the definition has subsequently been adapted by others, from the educational perspective, it suffices to stick with the original criteria. The rationale underpinning the criteria is that 'new possibilities are created for people, singly or collectively, to help themselves' This certainly ties into what most educators are trying to do, which is to develop independent learners. Irrespective of context or situation, classroom or lesson, the core idea presented by Shumacher is that when it comes to the aim of empowering people by using appropriate technology, less is more. From a pedagogical standpoint, appropriate technology would imply itself to be easily and non-invasively assimilated into the learning environment of the classroom.

The appropriateness of technology according to Shumacher's criteria is positively related to the degree of what Mishra and Koelher (2006) have referred to as “transparency”, i.e. the extent to which the technology blends into the environment such that it is not even considered a technology anymore. These technologies, which have become so commonplace such as pens and exercise books, are now rendered as “transparent”. Arguably, this is in contrast to digital technologies for example, which are not as deeply assimilated into the educational system and therefore not as “transparent”. Laurillard (2012), supports such an assertion: 'the story of digital learning technologies has hardly begun, and there will be no end until they have become so fully embedded in education that will not even ask the question is now so completely embedded, and it is so diverse in its benefits, that no-one begins to ask how “effective” it is.' A “transparent” technology then can certainly be seen to meet Schumacher's criteria. Pedagogically speaking, the greater the transparency (and therefore appropriateness) of educational technology the greater its effectiveness insofar as facilitating teaching and learning.

Transparency alone, although for the most part a necessary condition is not a sufficient condition in determining the appropriateness of technology in the classroom setting. Luckin (2006), discusses teaching and learning as taking place within an 'ecology, a dynamic and constantly evolving interaction between a wide range of resources. She refers to this dynamic as 'The Learner Centric Ecology of Resource Model' and argues that such a model helps us to design educational experiences that are relevant to the learner's needs. Ultimately, this model sets the context in which technologies are used and in part, determines the appropriateness of their use. Most importantly, it shows us that a technology appropriate for one classroom is not necessarily appropriate for another. This is because the model is made up of resources, which include knowledge on the part of the teacher and learner. In the case of interactive whiteboards for example, some teachers are very knowledgeable in how to effectively use this technology, whereas others are not. To this extent, it can be seen that the appropriateness of technology is defined by the user. Mishra and Koelher (2006), refer to a very specific type of knowledge that the teacher needs: Technological Pedagogical Content Knowledge (TPCK) in Mishra and Koelher (2006), arguing that this complex type of knowledge is required for thoughtful pedagogical uses of technology. As the technology is used more regularly and becomes embedded in the classroom, its “transparency” not only increases to better facilitate the pedagogy, but the technology itself is also used more effectively by the class teacher as the teacher's TPCK improves.

The relatively recent arrival of digital technologies is still filtering its way down into the educational system. Education will have to adapt in order to be able to fully embrace digital technology. Indeed, most schools are now only just starting to fully integrate digital applications into their ICT curriculums, much less the curriculum as a whole and are therefore not adequately preparing students for ICTs in real world contexts (Dorgu, Orukotan and Adediran, 2019). Prior to the overhaul in the English ICT curriculum (now called 'Computing'), the former UK Education Secretary, Michael Gove had branded the ICT curriculum in England's schools as a 'mess'. Until recently, a lot of ICT education had

been inappropriate for today's needs. Much more emphasis in particular is now needed on teaching students to use open source software from an earlier age, as the core principles of open source are being recognized by the wider community.

What set open source software apart from other technologies is that it is much more people centred than closed source software. As Pearce (2012) points out, 'Where Microsoft might utilize a few thousand programmers and software engineers to debug their code, the Linux community has access to hundreds of thousands of programmers debugging, rewriting, and submitting code.' It is this type of mass-scale collaboration that is driving the success of other Web 2.0 applications such as social networking sites and wikis. In education, moves have been made in this direction with the high-profile case of Nicholas Negroponte's "One Laptop Per Child" project, which fully embraces open source software. By bringing about greater connectivity by means of collaboration such projects according to Adediran and Onifade (2015), serve as a vehicle to empower teachers and students, particularly in the developing world where lack of access to key information can be a critical issue. This can also help to bridge the so-called digital divide in which there is a gap between different groups of people in terms of their effective access to digital and information technology.

Pearce (2012), uses Appropedia as an example of an 'Open source appropriate technology' website, where a large number of participants are allowed to create and modify the content directly from their web browsers. Education has slowly followed suit with similar open source resources such as 'Curriki' and 'Connexions', which facilitate collaboration and access to free instructional materials for educators. The appropriateness of such sites is measured insofar as they 'simplify the administration of collaboratively organizing information, project examples, best practices, and "how to' (Pearce, 2012). In so doing, open source software can be the solution to the problem of access to critical information for sustainable development

Clearly, any medium that enhances peer communication is a step in the right direction towards achieving greater levels of appropriateness. The purpose of these blogs has been to digitalize paper-based book reviews that the children have had to do in the past. It represents a cheaper and simpler alternative to photocopying and distributing copious paper book review templates. By encouraging greater collaboration and increasing the accountability of both the student and class teacher, these blogs help to improve the quality of students' written work, as they are effectively publishing it for the whole school community to see (Januszewski and Molenda, 2008). In the process, the children learn important digital literacy, such as netiquette and how best to search for information online. It also serves for a smoother transition into secondary school, where secondary students are having to setup and manage their own wiki spaces. In these ways, the use of blogs represents an appropriate use of digital technology for educational purposes.

Appropriate technology can take the form of many different tools. As technology becomes more "transparent" to the extent that it is embedded in the classroom, it more closely aligns itself with Shumacher's criterion. In addition, the extent to which a

technology empowers students to become more independent learners and teachers to deliver more engaging lessons should be seen to be at the heart of determining the appropriateness of educational technologies because this is what education is all about. However, the extent that educational technologies achieve these aims is largely contingent upon teachers need specific pedagogical and content knowledge to use technology thoughtfully. Moreover, the emergence of web applications and specifically open source software models according to Kershaw (2012) identify the need for appropriate technology to be people-centered. This is because the more people developing the software, the more the software is going to benefit from being of better quality and greater reliability. Independent of the technology though, as educators we need to make sure that it is of greatest benefit to teaching and learning. This can only be achieved by embedding the technology into our daily pedagogy such that it is not out of place and can be used very naturally by teachers and learners alike.

It would be in vain setting up technology goals if the appropriate resources are not pooled to gather to support them. As the second consideration, the teachers must as well consider the resources that are needed to develop multi literacies in students, understanding all the social and cultural aspects of the specific society being affected by technologies. Such a question should be oriented towards combining resources in the most effect and efficient way in order to attain the learning goals developed.

Various debates have been advanced by numerous scholars specifically on the multimodal texts that are usually found on the internet and whether such material should be freely available on the internet. Specifically, Perkel (2006) explains that the use of multimodal texts from the internet not only amounts to language borrowing but also the design, since the feel, sound and look of the digital material can be copy-pasted as easily as language or material texts. In this retrospect, Wertsch (2013), explains that more often than not, people often tend to look at copyrights and more so, original creations as emanating from nothing and associate such with genius. However, this is an aspect that people take to be real but only exists in the imaginations, as little focus is given to the cultural resources and the meditational means that the originator of the idea, concept of information relied on to come up with his or her proposition (Wertsch in 2013).

### **Objectives of the Study**

The objectives of the study were:

- i) To assess the selection of appropriate instructional technology in revamping technology education in Osun State, Nigeria.
- ii) To examine the effectiveness of appropriate instructional technology in improving technology education in Osun State.

### **Research Questions**

In order to fulfill the objectives of the study, the following questions were raised for the study:

1. How resourceful are the tools used as instructional materials for revamping technology education in Osun State?



2. Does the technology have significant effect on secondary school student's academic performance in Osun State?

### Methodology

The study adopted a descriptive survey research design. Population comprises of Secondary School students in Osun State. Simple random sampling technique was used to select one hundred (100) students from secondary School in Aiyedade local government in Osun State. as sample for study. A self-developed questionnaire was used as instrument for data collection. The questionnaire contained items on the main title of study. To ensure the validity of the instrument, the researcher gave the draft of the questionnaire to the experts to restructure the instrument in line with the research questions. To determine the reliability of the instrument, a pilot test was conducted and the scores were tabulated and the Pearson Product Moment Correlation Coefficient formula was applied and a correlation coefficient of 0.72 was obtained. On the basis of the corrections done on the questionnaire items, and the test-retest reliability coefficient computed, the instrument was judged adequate, valid and reliable for the purpose of gathering relevant data for the study. Data collected was analyzed using simple percentage, mean and standard deviation statistical tools.

### Presentation of Data Analysis and Results

**Research Question One:** How resourceful are the tools used as instructional materials for revamping technology education in Osun State?

**Table 1:** Resourceful tools used as instructional materials for revamping technology education in Osun State?

S/N	ITEMS	YES		NO		TOTAL	
		Freq (N)	Percent %	Freq (N)	Percent %	Freq (N)	Percent %
1.	Students are allowed to use internet during class as one of the tools for improving technology education.	40	40	60	60	100	100
2.	There is adequate access for students of computer in school ICT for training and providing solutions to given problems.	35	35	65	65	100	100
3.	Students are restricted from using any form of technology in school premises unless provided by the school authority for training purpose during school hours.	63	63	37	37	100	100
<b>TOTAL</b>		138	46	162	54	300	100

The study shows that 40 of the respondents (40%) selected 'yes' for item 1 while the remaining 60 (60%) chose 'No'. For item 2, 35 (35%) choose 'Yes' while the remaining 65 (65%) choose 'No'. Majority of the respondents opted for "yes" at 63 (63%) in items while the remaining 37 (37%) choose 'No'. Therefore, since the cumulative percentage of Yes "138" (46%) is less than No "162" (54), it therefore shows that tools used as instructional materials for revamping technology education in Osun State are not resourceful for the student because of the inadequacy. The findings agree with Pearce (2012) who stated that

it would be in vain setting up technology goals if the appropriate resources are not pooled to gather to support them. As the second consideration, the teachers must as well consider the resources that are needed to develop multi-literacies in students, understanding all the social and cultural aspects of the specific society being affected by technologies.

**Research Question Two:** Does the technology have significant effect on secondary school student's academic performance in Osun State?

**Table 2:** Significant effect of technology on secondary school students' academic performance in Osun State?

S/N	ITEMS	YES		NO		TOTAL	
		Freq (N)	Percent %	Freq (N)	Percent %	Freq (N)	Percent %
1.	Implementation of technological material in the class for student trainings affects their academic performance positively.	67	67	33	33	100	100
2.	Ever since the use of appropriate technology for teaching and learning has been accepted and implement, students have been achieving greater goals academically.	50	50	50	50	100	100
3.	The use of technology has influenced most students negatively due to the inappropriate use.	50	50	50	50	100	100
<b>TOTAL</b>		167	57	133	43	300	100

The study shows that 67 of the respondents (67%) selected 'yes' for item 1 while the remaining 33 (33%) chose 'No'. For item 2, 50 (35%) choose 'Yes' while the remaining 50 (65%) choose 'No'. Likewise in items 3, 50 respondents opted for "yes" at representing (50%) while the remaining 50 (50%) choose 'No'. Therefore, since the cumulative percentage of Yes "167" (57%) is more than No "133" (43), it therefore shows that technology education have significant effect on secondary school student's academic performance in Osun State. This work is in line with Laurillard (2012), which supports the assertion that, a transparent technology can certainly be seen to meet the benefit of students learning needs.

### Conclusion

Based on the findings, appropriate instructional materials are better in determining the best way students learn to assimilate. Essentially, in order to understand how the students are reacting to the training materials and practical sessions that entail offline and online engagements with peers and organized intercultural language events, it is critical for the teachers to carry out an evaluation in order to monitor their progress, and note any challenge that they may be facing. Essentially, evaluation remains a critical tool that is not only useful in the educational sector but also in other disciplines. In the current scenario, an evaluation on how the students is using the resources would be critical to understanding the various ways that can be used to foster the comprehension of the new language of technology.

## Recommendations

Arising from the findings, the following recommendations are made:

1. School management should allow teachers and students access and use school technological materials for easy teaching and learning.
2. Government should assist school authorities in providing sufficient technological materials for teaching and learning among secondary school students in order to attain greater academic goals.
3. School authority should ensure appropriate technological materials are provided in order not to allow students inculcate bad behavior through the use of inappropriate technology.

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