# Awareness, Availability and Use of Emerging Technologies for Effective Curriculum Implementation by Librarians and Teachers' of Senior Secondary Schools in Karu LGA, Nasarawa State

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## ABSTRACT

The study investigated the level of awareness, availability and use of emerging technologies for effective curriculum implementation by Librarians and Teachers of Senior Secondary schools in Karu LGA of Nasarawa State .The study population comprises of librarians and teachers from public and private schools in karu LGA, Council of Nasarawa State. Forty(40) schools were sampled, 20 each from public and private schools , one librarian and two teachers from the schools sampled , gave a population of one hundred and twenty respondents(120) .The instruments' used to elicit information from the respondents was a Check list and a structured questionnaire developed by the researchers and tagged ''AAUET'' Questionnaires. Data were analysed using frequencies and percentages presented in tables and weighted mean score of 2.50. Findings reveled that that Ai, Robotics, Internet of Things, Machine learning and blockchain technologies reveled low extent of awareness, \availability and utilization among the librarians and teachers sampled,. Training and skill acquisition for librarians and teachers were recommended to enhance effective curriculum implementation.

**Key-words**:    Awareness, Availability, Usage , Emerging Technologies, Curriculum implementation

## INTRODUCTION

The modern day library is changing dramatically, it's no longer just a static collection of printed materials but rather a dynamic knowledge centre powered by new and radically evolving scientific discoveries generally referred to as Emerging technologies (ET). Emerging technologies are new or developing technologies that are highly innovative with the potentials to significantly change or disrupt existing systems, and change the way societies work and live. According to Quora.com (2023) these are new and or developing technologies with tremendous capabilities and potentials to provide innovative solutions to the most compelling socio-economic and scientific challenges. Such technologies most often have the following characteristics or qualities: novelty, rapid development, uncertainty and a disruptive potential to cause change to societal pattern. In the field of information and communication technology a few of these technologies are: Artificial intelligence (Ai), Block-Chain technology, Internet of Things (IoT), Virtual Reality, Robotics, Cloud-computing, Datafication, Machine-learning, Mobil –networks and the Social Media among others. These emerging technologies are gradually being incorporated into library operations and the mode of education delivery and are having tremendous impact on library management and teacher effectiveness and efficiency in the delivery of the curriculum.

In Nigerian as in the global community the delivery of current curriculum content for education requires the mastery and use of these emerging technologies for effective teaching and learning by both the teachers and the librarians who interpret and disseminate the learning resources for effective curriculum implementation. According to Ola (2022) new trends in information and communication technologies (ICT)have impacted on the way the Librarians and teachers deliver the curriculum content in a collaborative and strategic way for expected educational outcome. The emerging technology in the field of ICT and education are dynamic and

fast-paced; librarians and teachers are expected to be concomitantly fast-paced in their response to new developments and challenges that are occasioned by both the new technologies and the new normal in the wake of the pandemic since 2020. This study therefore investigated the level of awareness, availability and use of emerging technologies for effective curriculum implementation by librarians and teachers of senior secondary schools in Karu LGA of Nasarawa State.

## Statement of the Problem

There have been much research on ICT which indicates that ICT can led to improved students learning and better teaching methods. According to Jaja (2022) learner's exposure to educational ICT through curriculum integration has a significant and positive impact on students achievement. However, the problems with using these emerging ICTs in education is that most teachers and librarians may not be aware they exist, those that are aware of their existence may not have access to these technologies particularly where the school management were not able to provide or make the infrastructures available. Others may not possess the requite skill and technical know how to apply these innovative tools in the delivery of the education curriculum. Other hindrances on the application of new ICTs by teachers in the teaching process identified by Akinsola and Apeji (2015) are lack of steady power supply, poor or outright lack of access to internet connectivity, funding constraints as well as the rapidity with which these hard and soft-wares are replaced by newer discoveries. It is against these backdrop that this study examines the awareness ,availability and use of emerging technologies for effective curriculum implementation by librarians and teachers' of senior secondary schools in Karu LGA, Nasarawa State

## Objectives of the Study

The purpose of this study is to determine the extent of awareness ,availability and use of emerging technologies for effective curriculum implementation by librarians and teachers' of senior secondary schools in Karu LGA of Nasarawa State. The specific objectives are; Assess the level of the librarians and teachers' awareness of these emerging technologies from selected Senior Secondary Schools in Nasarawa State, Nigeria.

● Determine the statues of availability of these identified emerging technologies to the selected twenty (20) government and twenty (20) private Senior Secondary Schools in Nasarawa State.

● To ascertain the level of utilization of the emerging technologies by both teachers and librarians of the schools. These government senior secondary schools are; Government Secondary School, Masaka, Government Secondary School, Gurku; Government Secondary School, Karshi; Government Secondary School, Uke; Government Secondary School, Sabon Karshi; Government Day Secondary School, Aso Pada; Government Girls' Secondary School, Garaku; Government Secondary School, Wamba; Government Secondary School, Awe; Government Secondary School, Doma; Government Secondary School, Nasarawa; Government Secondary School, Agwada; Government Secondary School, Sabon Gida; Government College, Lafia; Government Science School, Lafia; Government Secondary School, Maina; Government Secondary School, Kwandere; Government Secondary School, Shabu; Government Secondary School, Akurba; Government Secondary School, Adogi while the private senior secondary schools are; Seta International School, New Karu; Privilege and Peace International School, Aso-Kodope; The Bright Future Academy, Bagaji-Agada; Montfort International School, Karu; Key Science Academy, Karu; Bright Future Academy, Aso-B; Marvelous International School, Ado; Mercyland International Secondary School, Masaka; Lizdav Academy, Kabayi; Madonna Girls Secondary School, Lafia; Kings & Queens Comprehensive College, Lafia; Sandaji College, Lafia; Sokoga British School, Keffi; Victory Baptist High School, Keffi; Eagle Academy, Akwanga; Hill Crest International College, A kwanza.

## Research Questions

Arising from these objectives, three research questions were raised to guide the study and they are;

1) What is the extent of awareness of the existence of emerging technologies by librarians and teachers at SS Schools in New Karu LGA of Nasarawa State

2) Which emerging technologies are available to the librarians and teachers at SS Schools in New Karu LGA of Nasarawa State.

3) How are the various types of emerging technologies utilised by librarians and teachers of SS Schools in New Karu LGA of Nasarawa State.

# RESEARCH METHODS

The study employed a descriptive survey method. This method was used to allow the researchers a vivid description of and assessment of the level of awareness availability and utilization of emerging ICT technologies by librarians and teachers in senior secondary schools in Karu LGA of Nasarawa state.

## Population and Sample

The population of the study comprised of all librarians and teachers of both public and private senior Secondary Schools in Karu LGA . The sample size consist of 40 librarians(33.3%) and 80 teachers (66.6%), giving a total sample size of (120) purposefully selected from 20 public and 20 private schools . In the 40 schools sampled ,one librarian and two teachers were selected (of the two teachers from each school one science teacher and one arts teacher was purposefully selected ,which resulted In 40 or( 33.3 %) science teachers and (33.3 %) arts teachers .

## Instruments

A check list and a questionnaire tagged; Awareness , Availability And Utilization 0f Emerging Technologies ( AAUET) developed by the researchers were used to elicit data from the respondents . 120 questionnaires administered to the respondents were fully returned achieving a response rate of 100%. This was made possible since the researchers personally administered the instrument using the school librarians as research assistants to ensure that the three (3) instruments administered per school where appropriately completed and returned. The instrument consists of two sections. Section 'A' requested for the respondents 'demographic information, while section 'B' elicited information relating to awareness, availability and utilization of ICT emerging technologies for teaching research and learning to ensure effective curriculum implementation. Respondents were required to respond to the items by ticking as applicable on a four -point Likert scale. A panel of three experts made up of two in educational evaluation and one certified librarian reviewed the research instrument for content and face validity. The amended draft instrument was subjected to reliability test-retest method and a result of r=0.7 was obtained.

## Data –Collection and Analysis

**The two researchers** and the school librarians assisted in the administration and collection of the instrument. Data collected were collated and analysed using frequency counts , percentages and weighted mean scores (WMS) with criterion value set at 2.50

# RESULTS AND DISCUSSIONS

**This** section addressed awareness, availability and utilization of ICT emerging technologies for effective curriculum implementation by teachers and librarians of Senior Secondary Schools in New Karu LGA of Nasarawa State. Ten emerging technologies were chosen five (5) very resent trending and five(5)relatively familiar ones were used as reflected on the tables (1)below;

## Research Question 1:

What is the extent of awareness of the existence of emerging technologies by librarians and teachers of SS Schools in New Karu LGA of Nasarawa State . The question sought to determine the extent to which the respondents are aware of the existence of the emerging technologies, such as artificial intelligence (Ai) , robotics , block-chain, Inter-net of things (IoT), Machine learning among others.

Table 1: Extent of Awareness of Emerging Technologies by Librarians and teachers in Sampled Schools ….Frequency, percentages of Responses and Weighted Mean Average……

| Emerging Technologies | School type | VA (VERY AWARE) | | A (AWARE) | | U (Unaware) | | VU (very Unaware) | | WMA |
|---|---|---|---|---|---|---|---|---|---|---|
| Ai | Public | 4 | 10 | 5 | 20 | 40 | 60 | 20 | 30 | |
| | Private | 6 | (8.3%) | 15 | (16.6%) | 20 | (50%) | 10 | (25%) | 2.08 |
| Robotics | public | 2 | 5 | 6 | 15 | 50 | 70 | 20 | 30 | |
| | private | 3 | (4.1%) | 9 | (12.5%) | 20 | (58.3%) | 10 | (25%) | 1.9 |
| Black-chain | Public | 1 | 6 | 1 | 10 | 70 | 75 | 9 | 29 | 2.1 |
| | Private | 5 | (5%) | 9 | (8.3%) | 5 | (62.5% | 20 | 24.1% | |
| Inter-net of things | Public | O | 3 | 1 | 7 | 66 | 80 | 25 | 30 | |
| | private | 3 | 2.5% | 6 | 5.8% | 14 | 66.6% | 5 | (25%) | 1.8 |
| Machine - Learning | Public | 5 | 15 | 3 | 10 | 40 | 60 | 30 | 35 | |
| | Private | 10 | 12.5% | 7 | 8.3% | 20 | 50% | 5 | 29.1% | 2.04 |
| COMPUTER SYSTEM (Desktop, laptop) | public | 50 | 90 | 15 | 20 | 3 | 6 | 3 | 4 | 3.6 |
| | Private | 40 | 75% | 5 | 16.6% | 3 | 5% | 1 | 3.3% | |
| Internet-connectivity | public | 40 | 75 | 20 | 35 | 2 | 5 | 3 | 5 | |
| | Private | 35 | 62.5 % | 15 | 29.1% | 3 | 4.1% | 2 | 4.1% | 3.5 |
| Social media facebook, watsap | Private | 30 | 50 | 35 | 60 | 4 | 8 | 1 | 2 | |
| | public | 20 | 41.6% | 25 | 50% | 4 | 6.6% | 1 | 1.6% | 3.3 |
| E-Books | Private | 40 | 80 | 15 | 30 | 3 | 6 | 2 | 4 | |
| | Private | 40 | 66.6% | 15 | 25% | 3 | 5% | 2 | 3.3% | 3.5 |
| Area Network (LAN,WAN) | public | 30 | 50 | 31 | 56 | 4 | 7 | 3 | 7 | |
| | Private | 20 | 41.6% | 25 | 46.6% | 3 | 5.8% | 4 | 5.8% | 3.2 |

Weighted Meam Score :Criterion Value set at 2.50 as acceptable.

From Table (1) above the analysis of the data reveal that most of the respondents are very unaware of the existence of the newer technologies such as artificial intelligence 60 respondents (50%) and 30 (25%) vary unaware representing a total of 75% indicated that they are highly unaware of the existence of this technology. The data analyzed revealed a similar trend with robotics 70(58.3%), block-chain 75(62.5%), Inter-net of Things 80(66.6%) and machine leaning 70 respondents or (68,3%) indicating that they are unaware and very unaware. However the respondents trends changed when they indicated high extent of awareness relating to

other technologies that are relatively not novel such as computer system 90 (75%) aware, Inter-net connectivity 75(62.5%) social media 50 (41.6%), E-books 80(66.6%) Area Networks 50(41.6%) indicated that they are aware of the existence of such technology. The analysis revealed that IoT with a calculated mean of 1.8, robotics 1.9 and Ai 2.08 are the least known by the respondents while Computer system with calculated mean of 3.6, followed by inter-net connectivity 3.5 and electronic books 3.5, the respondents indicated high extent of awareness with acceptable mean of 3.5 respectively.

Table 2: Avalability of Emerging Technologies to Librarians and Teachers in Sampled Schools, Frequency, Percentages of Responses and Weighted Mean Average

| Emerging Technologies | School type | HA(highly Avaliable) | | A (Available) | | U (Unavailale) | | HU (Highly Unavailable) | | WMS |
|---|---|---|---|---|---|---|---|---|---|---|
| Ai | Public | 5 | 10 | 10 | 20 | 30 | 50 | 20 | 40 | 2.0 |
| | Private | 5 | (8.3%) | 10 | (16.6%) | 20 | (41.6%) | 20 | (33.3%) | |
| Robotics | public | 2 | 5 | 6 | 15 | 40 | 60 | 30 | 40 (33.4%) | |
| | private | 3 | (4.1%) | 9 | (12.5%) | 20 | (50%) | 10 | | 1.8 |
| Block-chain | Public | 1 | 6 | 1 | 10 | 50 | 55 | 29 | 49 | |
| | Private | 5 | (5%) | 9 | (8.3%) | 5 | (45.8%) | 20 | (40.8%) | 1.77 |
| Inter-net of things | Public | O | 3 | 1 | 7 | 60 | 70 | 25 | 40 | |
| | private | 3 | (2.5%) | 6 | (5.8%) | 10 | (58.3%) | 15 | (33.3%) | 1.5 |
| Machine – Learning | Public | 5 | 15 | 3 | 10 | 30 | 50 | 30 | 45 | |
| | Private | 10 | (12.5%) | 7 | (8.3%) | 20 | (41.6%) | 15 | (37.5%) | 1.6 |
| COMPUTER SYSTEM (Desktop, laptop) | public | 40 | 80 | 25 | 30 | 3 | 6 | 3 | 4 | |
| | Private | 40 | (66.6%) | 5 | (25%) | 3 | (5%) | 1 | (3.3%) | 3.55 |
| Internet-connectivity | public | 30 | 65 | 30 | 45 | 2 | 5 | 3 | 5 | |
| | Private | 35 | (54.1%) | 15 | (37.5%) | 3 | (4.1%) | 2 | (4.1%) | 3.4 |
| Social media face book, wat -sap | Private | 20 | 40 | 35 | 70 | 4 | 8 | 1 | 2 | |
| | public | 20 | (33.3%) | 35 | (58%) | 4 | (6.6%) | 1 | (1.6%) | 3.1 A |
| E-Books | Private | 30 | 60 | 25 | 50 | 3 | 6 | 2 | 4 | |
| | Private | 30 | (50%) | 25 | (41'6%) | 3 | (5%) | 2 | (3.3%) | 3.3 |
| Area Network (LAN,WAN) | public | 20 | 40 | 31 | 66 | 4 | 7 | 3 | 7 | |
| | Private | 20 | (33.3%) | 35 | (55%) | 3 | (5.8%) | 4 | (5.8%) | 3.1 |

**Research Question 2:** To what extent are the various emerging technologies available to the librarians and teachers of SS Schools in New Karu LGA of Nasarawa State ?.

From table 2 above the respondents clearly indicated that certain technologies were highly unavailable with Ai 50 respondents representing 41.6% and wms of 2.0, for Robotics 60 respondents that is (50%) indicated unavailable with wms of 1.8, Block-chain technology had 55respondents or 45.8% and a wms of 1.7 while

Machine learning and Internet of things with 1.6 and 1.5 weighted mean scores (wms) respectfully were the lowest in terms of extent of availability of the most recent emerging technologies. However a different trend was observed as indicated by the respondents with some other technologies such Computer systems 80(66.6%) wms 3.5, as highly available. Internet connectivity 65(54.1% ) wms3.4, E-books 60(50%) wms 3.3 while Social media and Area Networks were available with a weighted mean score of 3.1 respectively.

**Research Question 3**

What is the extent of utilization of the various types of emerging technologies by librarians and teachers of SS Schools in New Karu LGA of Nasarawa State. from the data collated and analysed on Table3: below reveled very low level of utilization for the following emerging technologies Ai 65 (54.1%) respondents indicated very low extent of utilization, Robotics 65(54.1%),Block- chain59(49.1%) IoT 70(58.3%) Machine learning 60(50%) 2.04 weighted mean average in their responses indicated very low extent of utilization. However computer system 90(75%) and weighted mean score of 3.6 and social media 60(50%) and mean of 3.3 reflected high extent of utilization. It was further reveled that E-books 34 (28.3%) respondents, Internet Connectivity 25(20%) and Area Net-work 30(25%) respondents reveled moderate extent of utilization.

Table 3: Extent of Utilizations of Emerging Technologies by Librarians and Teachers in Sampled Schools Frequency, Percentages of Responses and Weighted Mean Average

| Emerging Technologies | School type | HEU HIGH EXTENT utilization | | MEU MODERATE extent utilizations | | LEU LOW Extent of utilization | | VLEU Very low extent Utilization | | Wms |
|---|---|---|---|---|---|---|---|---|---|---|
| Ai | Public | 6 | 10 | 10 | 20 | 15 | 25 | 30 | 65 | 1.79 |
| | Private | 4 | (8.3%) | 10 | (16.6%) | 10 | (20.8%) | 35 | (54.1%) | |
| Robotics | Public | 3 | 5 | 5 | 15 | 20 | 35 | 40 | 65 | 1.6 |
| | Private | 2 | (4.1%) | 10 | (12.5%) | 15 | (29.1%) | 25 | (54.1%) | |
| Black-chain | Public | 3 | 6 | 3 | 10 | 40 | 45 | 29 | 59 | 1.69 |
| | Private | 3 | (5%) | 7 | (8.3%) | 5 | (37.5% | 30 | 49.1 % | |
| Inter-net of things | Public | 3 | 3 | 7 | 13 | 30 | 40 | 35 | 70 | 1.67 |
| | Private | 0 | 2.5% | 6 | 10.8% | 10 | 33.3% | 35 | (58.3%) | |
| Machine - Learning | Public | 5 | 15 | 3 | 10 | 40 | 60 | 30 | 35 | 2.04 |
| | Private | 10 | 12.5% | 7 | 8.3% | 20 | 50% | 5 | 29.1% | |
| COMPUTER SYSTEM (Destop, laptop) | Public | 50 | 90 | 15 | 20 | 3 | 6 | 3 | 4 | 3.6 |
| | Private | 40 | 75% | 5 | 16.6% | 3 | 5% | 1 | 3.3% | |
| Interner-conectivity | Public | 10 | 25 | 10 | 25 | 35 | 40 | 15 | 30 | 2.3 |
| | Private | 15 | 20.8% | 15 | 20.8 | 5 | 33.3% | 5 | 25% | |
| Social media | Private | 30 | 50 | 35 | 60 | 4 | 8 | 1 | 2 | 3.3 |

| facebook, watsap | public | 20 | 41.6% | 25 | 50% | 4 | 6.6% | 1 | 1.6% | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-Books | Private | 14 | 34 | 15 | 30 | 20 | 30 | 2 | 26 | 2.6 |
| | Private | 20 | 28.3% | 15 | 25% | 10 | 25% | 2 | 21.6% | |
| Area Network (LAN,WAN) | public | 20 | 30 | 10 | 25 | 15 | 25 | 30 | 40 | 2.3 |
| | Private | 10 | 25% | 15 | 20.8% | 10 | 20.8% | 10 | 33.3 | |

# DISCUSSION OF FINDING

Table 1 indicated that the extent of awareness for the following technologies with various weighted mean scores were very low for Ai( 2.08) Robotics ( 1.9) Black chain (2.1 ) Inter-net of Things (1.8 ) and Machine Leraning (2.4 )were very Low. Finding of this study corroborate the report of UNESCO (2020) and Nwonye (2021) that most teachers and librarians in Nigeria lack technical knowledge of and the requsite skill to access and effectively utilize most recent emerging technologies'. This situation thus calls for proprietors of schools both government and private schools should provide training opportunities for teachers and librarians. However that of Computer System(3.6), Inter-net connectivity(3.5), Social Media (3,3) E-Book (3.5) and Area Network (3,2 ) revealed very high extent of awareness.

Table 2 Revealed that availability of emerging technologies to librarians and teachers in sampled schools for the following technologies in the schools sampled to be very low since they are below the weighted mean score of 2.50 : Ai (2.0), Robotics (1.8,) Block Chain (1.7.) Internet of things (1.5 a) and machine learning (1.6) all of the five technologies reflected highly extent of unavailability. However the following technologies indicated high level of availability Computer system(3.5) Internet connectivity(3.4) Social media (3.1) , E-boobs (3.3) and Area Networks (3.1) the respondents indicated very high level of availability with their weighted mean score above 2,50. The reason for this status of availability may be due to the fact that these set of technologies are not very new or recent unlike the earlier once.

Table 3 dealt extent of utilization of emerging technologies and the data analyzed reveled the following as exhibiting very low extent of utilization Ai(1.7), Robotics (1.6) Block chain (1.6), Machine learning (2.0). However Area network (2.3), E-book (2.6) and Internet connectivity (2.3)revealed moderate extent of utilization . Only computer System (3.6) and social media (3.3) reveled high exent of utilization. From analysis of this data and information secured from the checklist reveled that although e-books, , Area networks and internet connectivity are highly available but they are not often utilized due to lack of access to data for connectivity and source of power.

# CONCLUSION

**This study** investigated the extent of awareness, availability and utilization of selected ten emerging technologies and found that that the awareness, availability and utilization of Ai, Robotics, Internet of things, Blockchain and Machine learning is very low. It further revealed that awareness, availability and utilization of computer systems and the social media is very high extent by the teachers and librarian while use and availability of E-book and Internet connectivity is at a moderate extent.

# RECOMMENDATIONS

Based on the findings of this study, it was recommended that

4. Proprietors of schools both public and private schools should organize regular workshops and seminars for their teachers and librarians on the use of emerging technologies to enhance teaching and learning

5. Sponsor their librarians and teachers for regular trainings to enable then know and acquire the skill to utilize these technologies when available

6. School proprietors should always acquire such modern technologies, equipment and software to make them accessible to their librarians and teachers for enhanced curriculum delivery.

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