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THE ROLES OF ICT IN CURRICULUM DEVELOPMENT AND UTLIZATION: INVESTIGATING ITS' GUIDING PRINCIPLES FOR TEACHING AND LEARNING IN IMO STATE SECONDARY SCHOOLS

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ABSTRACT

The study examined the roles of ICT in curriculum development and utilization: investigating its guiding principles for teaching and learning in secondary schools. The research was carried out in Imo State. A descriptive survey design was adopted for the study. The targeted population for the study comprised all Principals, Vice Principals and ICT teachers in secondary schools in Imo State. A simple random sampling technique was used to select 45 Principal, 45 Vice Principal administrations, 45 Vice Principal Academic, 45 ICT teachers from secondary schools in Imo State, this gave a total of 180 respondents used for the study. The instrument used for data collection was a structured questionnaire titled "ICT Roles and Curriculum Development Utilization Questionnaire (ICTRCDQ)". Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument has the validity and accuracy for the study under consideration. The reliability coefficient obtained was 0.91, and this was substantially high enough to justify the use of the instrument. The researcher subjected the data generated for this study to appropriate statistical technique such as percentage analysis to answer research questions. The findings of the study revealed that 'Teacher Professional Development' was the highest role of ICT in curriculum development and utilization. Also, "Guiding Teaching Practices" was the highest features that make curriculum a guiding principle for teaching and learning in secondary schools. The study concluded that by embracing the potential of ICT and adhering to guiding principles rooted in pedagogical excellence, equity, and continuous improvement, secondary schools can harness the full power of technology to enhance teaching and learning outcomes in the 21st century. One of the recommendations was that there should be continuous professional development programmes to empower educators with the knowledge, skills, and pedagogical strategies necessary for leveraging ICT effectively in teaching and learning.

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KEYWORDS: Information and Communication Technology (ICT), Curriculum Development, Teaching and Learning, utilization and Guiding Principles

INTRODUCTION

The rapid growth of information, communication, and technologies (ICT) has brought remarkable changes in the twenty-first century and affected every facet of life and modern society (Ifechukwude, 2021). The incorporation of ICT in curriculum development necessitates pedagogical shifts towards student-centred, inquiry-based approaches that promote active learning and critical thinking (Agosto & Hughes, 2019). In an era characterised by digital proliferation, fostering digital literacy and 21st-century skills is paramount for preparing secondary school students for future success (Bereczki & Molnár, 2018). ICT integration facilitates the development of skills such as information literacy, media literacy, teamwork, and problem-solving, which are crucial for navigating the intricacies of the digital age.

Despite the potential benefits of ICT in education, concerns regarding equity, access, and inclusivity persist (Brom, 2021). Addressing digital divide issues and ensuring equitable access to ICT resources and training are critical considerations in curriculum development and utilisation strategies aimed at promoting educational equity and inclusivity. Effective ICT integration hinges on robust professional development programmes that empower educators with the knowledge, skills, and pedagogical strategies necessary for leveraging ICT tools effectively in the classroom (Ottestad & Throndsen, 2020). Teacher capacity-building initiatives play a pivotal role in ensuring that ICT is utilised optimally to enhance teaching quality and student learning outcomes.

This study intends to contribute to a nuanced understanding of how ICT can be strategically leveraged to foster innovative, inclusive, and effective teaching and learning environments by examining the guiding principles that inform the integration of ICT in secondary school curriculum development and utilization.

STATEMENT OF PROBLEM

Despite the potential benefits of Information and Communication Technologies (ICT) in curriculum development and enhanced teaching and learning experiences, secondary schools in Imo State face significant challenges in implementing ICT in their curriculum. These challenges ranges from limited ICT infrastructure, inadequate training and skills among teachers, lack of internet connectivity, to insufficient access to ICT devices. These factors and more hinder the effective integration of ICT into curriculum development and teaching practices in secondary schools. This research aims to provide a comprehensive understanding of these challenges and their impact on the utilization of ICT in secondary education. By identifying these barriers, the study seeks to pave the way for the development of effective strategies to promote wider adoption and foster a more technologically-integrated learning environment in secondary schools.

OBJECTIVES

This research was set out to:

- Find out the roles of ICT in curriculum development and utilization for teaching and learning.
- Find out the curriculum as a guiding principle for teaching and learning in secondary schools.

RESEARCH QUESTION

- What is the roles of ICT in curriculum development and utilization for teaching and learning?
- What is the curriculum as a guiding principle for teaching and learning in secondary schools?

CONCEPT OF ICT

"Information and communications technology" is abbreviated as ICT. The term "ICT" lacks a universally accepted meaning due to the continuous evolution of ICT-related technology, gadgets, and ideas. Nonetheless, all gadgets, networking elements, and applications are commonly referred to as information and communication technology, or ICT. A broad range of technological instruments and resources used for information creation, sharing, transmission, storing, and exchange is referred to as information and communication technology, or ICT.

According to Jain (2023), ICT refers to the integration of information and communication technologies to manage and process information. It involves the use of hardware, software, telecommunications, and various digital technologies to handle and exchange data, enabling individuals and organisations to access, share, and utilise information more efficiently. It is a broad term that encompasses the use of various technology tools and systems for gathering, storing, processing, transmitting, and presenting information. ICT is a fundamental part of modern life and has a significant impact on various aspects of society, business, education, and more.

Awati (2023) explained that ICT, or information and communications technology (or technologies), is the infrastructure and components that enable modern computing. Among the goals of IC technologies, tools, and systems is to improve the way humans create, process, and share data or information with each other. Another is to help them improve their abilities in numerous areas, including business, education, medicine, real-world problem-solving, and even leisure activities related to sports, music, and movies.

Rouse (2023) described information and communications technology (ICT) as the use of computing and telecommunication technologies, systems, and tools to facilitate the way information is created, collected, processed, transmitted, and stored. It includes computing technologies like servers, laptop computers, and software applications, as well as wired and wireless communication technologies that support telephones, the Internet, the Internet of Things (IoT), and the metaverse.

CONCEPT OF CURRICULUM DEVELOPMENT

Curriculum development is critical to structuring educational programmes and ensuring better learning outcomes. It entails a methodical and comprehensive process of designing, planning, and executing a curriculum that fulfils the requirements of students and coincides with educational goals. Nathani (2022) defined Curriculum development is a process through which an institute or the instructor designs or creates a plan for a course or program. Curriculum development is a process that aims to improve the curriculum by using various approaches. Furthermore, curriculum development is the systematic process of designing and improving the courses offered at schools, colleges, and universities.

Curriculum development is a planned, thoughtful, and deliberate course of action that ultimately enhances the quality and impact of the learning experience for students. It includes the development and organisation of learning activities designed to meet intended learning outcomes. It also involves the thoughtful assessment of those learning outcomes. Curriculum development moves beyond a content-centred approach to one that considers the relationship between the course or programme learning outcomes, the assessment of those outcomes, and the activities and opportunities designed to facilitate student learning (Camosun College, 2024).

Roode (2019) mentioned that curriculum development can be defined as a kind of step-by-step process used to create positive improvements in the courses offered in higher education. The world changes, approaches and profiles develop, and new perspectives on research and professions influence the curricula. Curriculum development involves the implementation of different types of instructional strategies and organisational methods that are focused on achieving optimal student development and student learning outcomes.

Staake (2023) described curriculum development as the process of determining what students will learn in a specific course of study. At the broadest level, curriculum developers consider what subjects or topics are appropriate for the learning group. They then drill down into more detail in each subject or topic, setting the learning objectives and goals students will be able to achieve upon completing the course. The curriculum development and design process is lengthy. It involves a team of people, each with their own skills and responsibilities.

CONCEPT OF CURRICULUM UTILIZATION

Curriculum utilisation is a fundamental idea in education systems across the globe, pertaining to the efficient use of educational materials and resources to attain certain learning objectives. The term "curriculum utilisation" describes how the curriculum is actually used in educational settings. It entails converting the planned curriculum, which specifies the content, goals, and objectives of education, into practical teaching and learning opportunities. In order to satisfy the requirements of students and accomplish the intended educational goals, this process involves choosing the best teaching styles, resources, and evaluation techniques.

Conklin (2023) stated that curriculum utilisation in an educational context is the collection of lessons and academic content that are taught in a classroom (or in a course or program). It is the educational infrastructure that supports educators by organising

content, guiding the teaching of content, assessing students for content competency, and much more. No one teacher ever teaches in exactly the same manner as another. Curriculum utilisation helps regulate the content that teachers deliver so that individual teachers can put a unique spin on how they teach, but students are still learning the same material. It can be produced by a government body or a private publishing house or developed by educators themselves.

Curriculum utilisation is a standards-based sequence of planned experiences where students practice and achieve proficiency in content and applied learning skills. Curriculum utilisation is the central guide for all educators as to what is essential for teaching and learning, so that every student has access to rigorous academic experiences. The structure, organisation, and considerations in a curriculum are created in order to enhance student learning and facilitate instruction. Curriculum utilization must include the necessary goals, methods, materials, and assessments to effectively support instruction and learning (State of Rhode Island, 2023).

Curriculum utilisation refers specifically to a planned sequence of instruction or to a view of the student's experiences in terms of the educator's or school's instructional goals. It is defined as the totality of student experiences that occur in the educational process (Adela,2020).This involves determining what content, skills, and concepts will be taught, as well as how they will be sequenced and organised to promote meaningful learning.

Roles of ICT in curriculum development and utilization

ICT plays a vital role in various aspects of modern life, including communication, education, business, entertainment, and healthcare. It enables the creation, sharing, and utilisation of information in digital form, facilitating efficient and effective communication, collaboration, and problem-solving (Gwani, 2023). ICT plays a variety of functions in curriculum development and utilisation, touching on many facets of instructional design, delivery, and evaluation. The following are the ICT responsibilities in curriculum creation and utilisation:

- **Access to Quality Education:**

ICT provides avenues for students in Nigeria to access quality education beyond geographical boundaries. E-learning platforms and online courses enable students to learn at their own pace and access resources from renowned institutions globally. This access to quality education helps bridge the educational divide between urban and rural areas, providing equal opportunities for all.

- **Enhanced Teaching and Learning Experience:**

ICT tools such as interactive whiteboards, multimedia presentations, educational software, and online learning management systems enrich the teaching and learning experience. These technologies make learning more engaging, interactive, and personalized. Teachers can leverage multimedia resources to explain complex concepts effectively, while students can actively participate and collaborate in the learning process.

- **Improved Access to Learning Materials:**

ICT enables easy access to a vast array of educational resources, including digital textbooks, e-books, online journals, and educational websites. This access eliminates the constraints of physical resources; ensuring students have up-to-date and diverse learning materials. Additionally, digital libraries and online repositories allow educators and students to share and access educational content, fostering a culture of knowledge exchange.

- **Skill Development for the Digital Age:**

As technology continues to shape the job market, ICT in education equips students with the necessary digital literacy and skills required in the 21st century. Students gain proficiency in using digital tools, critical thinking, problem solving, collaboration, and effective communication. These skills enhance their employability prospects and prepare them for the digital economy.

- **Teacher Professional Development:**

ICT provides avenues for continuous professional development for teachers in Nigeria. Online courses, webinars, and virtual workshops enable teachers to upgrade their knowledge, learn innovative teaching methodologies, and share best practices with a global network of educators. This professional development contributes to improving teaching quality in the country.

- **Collaborative Learning and Knowledge Sharing:**

ICT tools facilitate collaborative learning and knowledge sharing among students, teachers, and educational communities. Online discussion forums, video conferencing, and combined platforms enable students to engage in virtual group projects, exchange ideas, and learn from one another. This collaborative approach encourages active participation, critical thinking, and the development of interpersonal skills, fostering a dynamic educational system.

CURRICULUM AS A GUIDING PRINCIPLE FOR TEACHING AND LEARNING IN SECONDARY SCHOOLS

In secondary education, the curriculum serves as a guiding principle, shaping the educational journey of students and providing direction to educators. Curriculum does not mean only the academic subjects traditionally taught in the school but also the totality of experiences that pupils receive through the manifold activities that go on in the classroom, library, laboratory, workshop, playground, and in the numerous informal contacts between teachers and pupils (Roger Williams University, 2024).

- **Guiding Teaching Practices:**

The curriculum serves as a blueprint for teachers, guiding them in designing instructional strategies that cater to the diverse needs of students. By delineating learning objectives and content standards, the curriculum helps teachers align their instructional practices with the desired outcomes. It empowers educators to select appropriate teaching methods, resources, and assessment tools that facilitate student understanding and mastery of the subject matter.

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- **Promoting Student Engagement:**

A well-designed curriculum is essential for fostering student engagement and motivation in the learning process. By incorporating relevant and meaningful content, the curriculum captures students' interest and encourages active participation. Moreover, when students perceive the relevance of what they are learning to their lives and future aspirations, they are more likely to remain motivated and engaged in their studies.

- **Ensuring Equity and Access:**

One of the fundamental principles of curriculum development is to ensure equity and access for all students. A thoughtfully crafted curriculum takes into account the diverse backgrounds, abilities, and learning styles of students, thereby promoting inclusivity and addressing the needs of every learner. It provides opportunities for differentiated instruction and support systems to ensure that all students have access to a high-quality education.

- **Preparing for Future Success:**

The curriculum serves as a preparatory ground for students, equipping them with the knowledge, skills, and competencies necessary for success in higher education and the workforce. By providing a well-rounded education that encompasses academic subjects, critical thinking skills, and socio-emotional development, the curriculum prepares students to navigate the complexities of the modern world and become lifelong learners.

- **Adapting to Changing Needs:**

In an ever-evolving educational landscape, the curriculum must remain dynamic and responsive to changing societal needs and technological advancements. Curriculum developers and educators must continually review and revise curriculum frameworks to ensure relevance and alignment with contemporary demands. By embracing innovation and flexibility, the curriculum can better prepare students for the challenges and opportunities of the future.

THE CHALLENGES ENCOUNTERED IN CURRICULUM DEVELOPMENT

Curriculum development faces several challenges, including keeping pace with rapidly evolving knowledge and technology, addressing diverse student needs and backgrounds, ensuring alignment with educational standards and goals, and balancing the need for both breadth and depth in learning. Curriculum development is a nuanced process that bridges educational theory with practical implementation. Its primary aim is to craft a structured framework that guides learning experiences towards desired outcomes (Quora, 2024). However, amidst its noble goals, curriculum development encounters several challenges, reflecting the complexities inherent in education:

- **Diverse Learner Needs:**

One of the fundamental challenges is catering to the diverse needs of learners. Students vary in their learning styles, abilities, interests, and cultural backgrounds.

Designing a curriculum that accommodates this diversity while maintaining coherence and effectiveness is a delicate balance.

- **Alignment with Educational Goals:**

Curriculum development should align closely with broader educational goals, whether they are set by national standards, institutional mission statements, or societal needs. Ensuring coherence between curriculum objectives and overarching educational aims requires meticulous planning and evaluation.

- **Keeping Pace with Change:**

The world is in a constant state of flux, with rapid advancements in technology, shifts in workforce demands, and evolving societal values. Curriculum developers face the challenge of keeping their content relevant and up-to-date to equip students with the skills and knowledge needed for success in a dynamic environment.

- **Resource Constraints:**

Developing a comprehensive curriculum often requires significant resources, including time, expertise, and funding. Schools and educational institutions may face constraints in these areas, limiting their ability to create robust and innovative curricula.

- **Balancing Tradition and Innovation:**

There is often a tension between traditional educational approaches and innovative pedagogical methods. Curriculum developers must navigate this tension, integrating proven educational practices with new approaches that foster critical thinking, creativity, and adaptability.

- **Assessment and Evaluation:**

An effective curriculum should include mechanisms for assessing student learning and evaluating the efficacy of instructional strategies. Designing valid and reliable assessment tools, as well as interpreting and using assessment data to inform curriculum refinement, presents a significant challenge.

- **Stakeholder Involvement:**

Curriculum development involves multiple stakeholders, including educators, administrators, parents, students, and community members. Balancing the input and interests of these diverse stakeholders while maintaining educational quality and coherence can be challenging.

- **Technology Integration:**

The rapid integration of technology into education presents both opportunities and challenges for curriculum development. While technology can enhance learning experiences and access to information, integrating it effectively into the curriculum requires careful planning and professional development.

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- **Policy and Regulatory Compliance:**

Curriculum development must adhere to various policies, regulations, and standards imposed by educational authorities. Navigating these regulatory requirements while maintaining flexibility and innovation in curriculum design can be complex.

STRATEGIC STEPS TO MITIGATE THE CHALLENGES OF CURRICULUM DEVELOPMENT

Curriculum development is a complex and dynamic process that requires constant adaptation and innovation to meet the changing needs and expectations of learners, educators, and society (Saxen, 2024). The process of designing, implementing, and assessing educational programmes to meet certain learning goals and objectives is known as curriculum development. Curriculum developers frequently face a variety of obstacles that can impede the process, even though the ultimate goal is to give students meaningful and productive learning experiences. Managing resources effectively, meeting the requirements of various learners, staying up to date with educational breakthroughs, and adhering to standards are a few examples of these issues. Several tactical measures can be taken to lessen these obstacles and improve the efficiency of the curriculum development process:

- **Needs Assessment:**

A crucial initial step in curriculum development is conducting a comprehensive needs assessment. This involves gathering data on the educational context, student demographics, learning objectives, and stakeholder expectations. By understanding the specific needs and requirements of learners and educators, curriculum developers can tailor the curriculum to better meet those needs. Needs assessment may involve surveys, interviews, focus groups, and analysis of existing data to gather relevant information.

- **Establish clear learning objectives:**

Clear and measurable learning objectives serve as the foundation of curriculum development. These objectives articulate what students are expected to know, understand, and be able to do by the end of the instructional program. Aligning learning objectives with educational standards and desired outcomes ensures coherence and relevance in the curriculum. Involving stakeholders such as teachers, administrators, and subject matter experts in the process of defining learning objectives fosters a shared understanding and commitment to educational goals.

- **Collaboration and Stakeholder Engagement:**

Effective collaboration among curriculum developers, educators, and other stakeholders is essential for successful curriculum development. By fostering an environment of collaboration, diverse perspectives and expertise can be integrated into the curriculum design process. Involving stakeholders in decision-making, curriculum review, and feedback loops promotes ownership and buy-in, leading to a more robust and sustainable curriculum. Collaborative tools and platforms can facilitate communication and coordination among team members, ensuring that everyone is aligned with the curriculum goals and objectives.

- **Flexibility and Differentiation:**

Students come from diverse backgrounds and possess varying learning styles, abilities, and interests. To address this diversity, curriculum developers should incorporate flexibility and differentiation strategies into the curriculum design. This may include providing multiple pathways for learning, offering varied instructional materials and resources, and implementing flexible assessment methods to accommodate individual learner needs. Differentiation ensures that all students have opportunities to succeed and achieve their full potential within the curriculum.

- **Continuous Evaluation and Improvement:**

Curriculum development is an iterative process that requires ongoing evaluation and refinement. Establishing mechanisms for collecting feedback from educators, students, and other stakeholders enables continuous improvement of the curriculum. By monitoring student performance, assessing the effectiveness of instructional strategies, and staying abreast of emerging educational trends, curriculum developers can adapt and refine the curriculum to better meet the evolving needs of learners. Regular review cycles, data analysis, and reflection promote continuous learning and improvement in curriculum development practices.

METHODOLOGY

In carrying out the study, a descriptive survey design was adopted for this study and the study was carried out in Imo State. The targeted population for the study comprised all Principals, Vice Principals and ICT teachers in secondary schools in Imo State. A simple random sampling technique was used to select 45 Principal, 45 Vice Principal administration, 45 Vice Principal Academic, 45 ICT teachers from secondary schools in Imo State, this gave a total of 180 respondents used for the study. The instrument used for data collection was a structured questionnaire titled "ICT Roles and Curriculum Development Utilization Questionnaire (ICTRCDQ)". Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument has the validity and accuracy for the study under consideration. The reliability coefficient obtained was 0.91, and this was substantially high enough to justify the use of the instrument. The researcher subjected the data generated for this study to appropriate statistical technique such as percentage analysis to answer research questions.

Research Questions 1: The research question sought to find out the roles of ICT in curriculum development and utilization for teaching and learning. To answer the research question, percentage analysis was performed on the data, (see table 1).

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Table 1:

Percentage Analysis of the roles of ICT in curriculum development and utilization for teaching and learning.

ROLES	FREQUENCY	PERCENTAGE (%)
Access to Quality Education	17	9.44*
Enhanced Teaching and Learning Experience	28	15.56
Improved Access to Learning Materials	37	20.56
Skill Development for the Digital Age	34	18.89
Teacher Professional Development	44	24.44**
Collaborative Learning and Knowledge Sharing	20	11.11
TOTAL	180	100%

** The highest percentage frequency
* The least percentage frequency
SOURCE: Field Survey

The above table 1 presents the percentage analysis of the roles of ICT in curriculum development and utilization for teaching and learning. From the result of the data analysis, it was observed that the role tagged "Teacher Professional Development" 44(24.44%) was rated as the highest role of ICT in curriculum development and utilization for teaching and learning, while "Access to Quality Education" 17(9.44%) was rated the least. The result therefore is in agreement with the opinion of Gwani (2023) who stated that ICT plays a variety of functions in curriculum development and utilisation, touching on many facets of instructional design, delivery, and evaluation. The following are the ICT responsibilities in curriculum creation and utilization

Research Questions 2: The research question sought to find out the features that make curriculum a guiding principle for teaching and learning in secondary schools. To answer the research question, percentage analysis was performed on the data, (see table 2).

Table 2:

Percentage Analysis of the features that make curriculum a guiding principle for teaching and learning in secondary schools

FEATURES	FREQUENCY	PERCENTAGE (%)
Guiding Teaching Practices	58	32.22**
Promoting Student Engagement	37	20.56
Ensuring Equity and Access	33	18.33
Preparing for Future Success	28	15.56
Adapting to Changing Needs	24	13.33*
TOTAL	180	100%

** The highest percentage frequency
* The least percentage frequency
SOURCE: Field Survey

The above table 2 presents the percentage analysis of the features that make curriculum a guiding principle for teaching and learning in secondary schools from the result of the data analysis, it was observed that the feature tagged "Guiding Teaching Practices" 58(32.22%) was rated the highest features that make curriculum a guiding principle for

teaching and learning in secondary schools, while "Adapting to Changing Needs" 24(13.33%) was rated the least feature. The result therefore is in agreement with the research findings of Roger Williams University (2024) that mentioned that curriculum serves as a blueprint for teachers, guiding them in designing instructional strategies that cater to the diverse needs of students.

CONCLUSION

The roles of ICT in curriculum development and utilisation extend far beyond the integration of technology for technology's sake. Rather, ICT serves as a catalyst for educational transformation, empowering educators and learners alike to embrace innovation, cultivate essential skills for the digital age, and create inclusive, dynamic learning communities. By embracing the potential of ICT and adhering to guiding principles rooted in pedagogical excellence, equity, and continuous improvement, secondary schools can harness the full power of technology to enhance teaching and learning outcomes in the 21st century.

RECOMMENDATION

- Educational institutions should priorities investment in robust ICT infrastructure, including reliable internet connectivity, updated hardware and software, and access to a diverse range of digital resources and tools. Adequate funding and resources are essential to support effective ICT integration in curriculum development and instructional practices.
- Continuous professional development programmes should be designed to empower educators with the knowledge, skills, and pedagogical strategies necessary for leveraging ICT effectively in teaching and learning.
- Curriculum frameworks should incorporate digital citizenship education to promote responsible and ethical use of ICT among students. Emphasizing concepts such as online safety, digital etiquette, information literacy, and cyberbullying prevention helps students develop critical thinking skills and responsible digital behaviour.

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