NARRATIVE REVIEW OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) INTEGRATION IN NIGERIAN SECONDARY SCHOOLS’ HOME ECONOMICS INSTRUCTION

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Abstract

This paper explores how Information and Communication Technologies (ICTs) can revolutionize Home Economics education in Nigeria, particularly at secondary schools. ICT integration aligns with national policy goals of introducing students to technology and enhancing professional skills in Home Economics. Students can access a wealth of online resources, improving their knowledge of nutrition, healthy living, and sustainable home management. However, challenges like limited internet access, lack of ICT facilities, and inadequately trained teachers impede progress. Overcoming these hurdles requires collaboration. The government can invest in teacher training and infrastructure development, while schools can explore cost-effective solutions. Partnerships with communities and the private sector can further support ICT resource acquisition. The paper emphasizes the importance of teacher collaboration and localized digital content creation to enhance learning and cultural identity. By addressing challenges and implementing a multi-pronged approach, stakeholders can empower educators to leverage technology. Students equipped with both Home Economics knowledge and digital literacy skills will be prepared for the future, becoming informed consumers, responsible family members, and innovative contributors to society. Ultimately, ICT integration has the potential to transform Home Economics into a dynamic and engaging learning experience, empowering individuals and society to thrive in a technology-driven world.

Keywords: Artificial Intelligence (AI), Digital Literacy, Home Economics education, Information and Communication Technology (ICT), Integration, Secondary education

Introduction

Home Economics is a dynamic field of study that draws on various disciplines, including pure sciences like biology and physics, applied sciences like nutrition and textiles design, and social sciences like consumer science and resource management (Urevbu, 2015). This holistic approach equips individuals and families with the necessary skills to navigate the complexities of modern life and achieve a fulfilling standard of living (Oluwagbemileke, 2019). The field’s core focus lies in optimizing quality of life across individual, family, and community levels, encompassing aspects of well-being, resource management, and responsible citizenship (Achebe, 2013; Federal Republic of Nigeria, 2013). Home Economics education emphasizes research to understand evolving family needs (Anyakoha, 2021) and, therefore, empowers individuals to adapt to changing circumstances, such as advancement in the development and deployment of Information and Communication Technology (ICT).
The concept of Information and Communication Technology (ICT) is multifaceted, lacking a universally accepted definition (Neji, 2016). However, organizations like the OECD (2004) have established criteria to categorize technologies as ICT. These criteria typically focus on a product or service's ability to process, transmit, and display information electronically (OECD, 2004). While various definitions exist, they often share keywords that highlight the core aspects of ICT, including electronic processing, communication technologies, and information management (Neji, 2016). For instance, computers, mobile devices, the internet, and software applications all qualify as ICT under this definition, as they enable users to create, store, access, and exchange information electronically. Understanding these core elements is crucial for exploring the potential applications of ICT in Home Economics education. ICT can transform passive learning experiences into interactive engagements, allowing students to explore real-world scenarios and develop critical thinking skills.

Information and Communication Technology (ICT) presents a powerful tool to enhance Home Economics education. While the traditional definition of ICT encompasses computers, the internet, and communication technologies (Victoria, 2015), its scope is constantly expanding. In the context of Home Economics, ICT can be leveraged to provide students with interactive learning experiences that go beyond the classroom walls. For instance, AI-powered virtual assistants can offer personalized guidance on meal planning or budgeting, allowing students to experiment with different scenarios in a safe and simulated environment. Additionally, ICT can facilitate remote collaboration with industry experts such as nutritionists or fashion designers, exposing students to real-world applications of Home Economics principles. By embracing these innovative tools, Home Economics education can become more engaging, relevant, and ultimately, empower future generations to build fulfilling lives.

Purpose of the Study

This exploratory study investigates the integration of Information and Communication Technology (ICT) in Home Economics education, particularly in Nigerian secondary schools. Specifically, the study aims to address the limited research on integrating these technologies into secondary educational system by:

1. describing the forms of ICT deployable in Home Economics education
2. identifying the specific uses of ICT in Home Economics education
3. discussing the leverageable situations for ICT integration in Home Economics education.
4. exploring the challenges associated with integrating ICT in Home Economics education.
5. suggesting practical strategies to facilitate the integration of ICT in Home Economics classrooms.

Methodology

This research adopted a qualitative approach to analyze the existing body of knowledge on the prospects and challenges of integrating ICTs into Home Economics education in Nigeria. Relevant academic literature, including scholarly journals, research papers, and government policy documents, were reviewed. Thematic analysis was employed to identify key themes and recurring arguments within the collected materials. This approach allowed for a comprehensive understanding of the current state of ICT integration in Home Economics education, the potential benefits and limitations, and the recommendations proposed by various stakeholders to address these issues.

Forms of ICTs in Deployable in Home Economics Education in Nigerian Secondary Schools

Information and Communication Technologies (ICTs) encompass a diverse range of tools that can be harnessed to enhance educational experiences. In the Nigerian context, some of the major ICTs employed in education include radio and television, computers and the internet, and teleconferencing technologies. While radio and television have a long history in educational broadcasting (Victoria, 2015), their applications in
Home Economics education might be somewhat limited. However, these technologies can be valuable for delivering general educational programming, such as documentaries on nutrition or healthy living habits.

1. **Radio and Television**: Radio and television have played a pioneering role in educational broadcasting since the 1920s and 1950s respectively (Victoria, 2015). They provided valuable supplementary resources, particularly in areas with limited access to traditional educational facilities. While their role might be less prominent today, radio and television can still be beneficial in Home Economics education. Educational documentaries on nutrition, healthy cooking practices, or cultural perspectives on food can provide valuable content for classroom discussions.

2. **Computers and the Internet**: Personal computers, laptops, and tablets equipped with internet access offer a vast array of resources for Home Economics learning. Students can access educational websites, online tutorials, and recipe databases. Interactive applications can be used for practicing budgeting skills or meal planning. Social media platforms can facilitate communication and collaboration with peers or industry professionals. Computers and the internet have revolutionized educational experiences. Personal computers, laptops, and tablets equipped with internet access offer a vast array of resources for Home Economics learning (Urevbu, 2015). Oluwagbemileke (2019) reported the framework developed by Richmond (1997) which outlines three key approaches for integrating computers and the internet into education:
   - **Learning About**: This involves developing technological literacy by teaching basic computer skills, internet navigation, and using productivity software (Urevbu, 2015).
   - **Learning With**: This involves utilizing technology as a learning tool across the curriculum. For example, students can use presentation software to showcase their projects or access online simulations for practicing budgeting or meal planning (Bliwise, 2018). They can also connect and collaborate with peers or industry professionals through social media platforms.
   - **Learning Through**: This combines the above approaches. Home Economics students researching local food traditions and the impact of sustainability on clothing choices could utilize online resources, analyze data with spreadsheets, and create multimedia presentations using various software tools (Urevbu, 2015).

3. **Teleconferencing**: Video conferencing tools like Zoom or Skype can connect students with remote experts globally, such as nutritionists or fashion designers. This allows for real-time interaction and exposure to diverse perspectives within Home Economics fields (Victoria, 2015). Home Economics students can connect with nutritionists, fashion designers, or chefs via video conferencing. This allows for virtual consultations, exposure to industry professionals, and opportunities to learn from diverse perspectives (Uwameiye, 2015).

4. **Artificial Intelligence (AI)**: AI is rapidly transforming computer-based learning. AI is a branch of computer science focused on developing intelligent machines that can simulate human cognitive abilities (Bliwise, 2018). AI-powered applications can personalize learning experiences by tailoring content and activities to individual student needs and learning styles. For instance, AI tutors can provide targeted feedback on recipe planning or suggest alternative ingredients based on dietary restrictions. AI offers a range of potential applications in education:
   - **Personalized Learning**: AI algorithms can analyze student data to identify strengths and weaknesses, then tailor learning content and exercises and recommend relevant resources.
   - **Intelligent Tutoring Systems**: AI-powered tutors can provide students with individualized feedback on their work, such as recipe development or project presentations. It can also answer their questions, and guide them through complex concepts.
• **Adaptive Learning Environments:** AI can adjust the difficulty level of learning materials and activities based on student performance, ensuring a more challenging and engaging experience.

• **Virtual Reality (VR) and Augmented Reality (AR) Integration:** AI can power immersive VR and AR experiences that can simulate real-world scenarios relevant to Home Economics, such as practicing meal preparation in a virtual kitchen or learning about fabric textures through AR simulations.

### Specific Uses of ICT in Home Economics Education in Nigerian Secondary Schools

The rapid pace of globalization and technological advancement has fundamentally reshaped the world, creating a knowledge-based economy fuelled by information and driven by skilled individuals (Victoria, 2015). In this context, ICT play a crucial role in secondary education by:

1. **Enhancing access to knowledge:** ICTs can bridge geographical divides and resource limitations. Students in remote areas can access quality educational content, online libraries, and virtual learning resources (Oluwagbemileke, 2019). This fosters inclusivity and empowers students who might otherwise have limited educational opportunities. Students can utilize online databases to explore global cuisines, research cultural perspectives on food, or access tutorials on specific cooking techniques.

2. **Shifting the pedagogical landscape:** ICTs pave the way for a paradigm shift in pedagogical approaches, moving from teacher-centered models towards learner-centered education (Oluwagbemileke, 2024). Constructivist learning theories are well-supported by ICTs, encouraging active learning, collaboration, creativity, and critical thinking skills. Students can engage in online discussions, participate in collaborative projects using virtual tools, and create multimedia presentations to showcase their learning. Interactive simulations can provide students with a safe virtual environment to practice meal preparation, while online tutorials can offer visual demonstrations of sewing techniques. These activities not only deepen understanding but also develop essential 21st-century skills such as communication, collaboration, and problem-solving. Additionally, AI-powered intelligent tutoring systems can provide students with personalized feedback, answer questions in real-time, and guide them through complex concepts in Home Economics (Bliwise, 2018).

3. **Transforming learning experiences:** ICTs transcend rote memorization, transforming classrooms into dynamic hubs of active learning. Interactive tools, simulations, and multimedia resources cater to diverse learning styles. Visual and kinesthetic learners can benefit from engaging multimedia presentations and simulations, while auditory learners can grasp concepts through educational podcasts and audiobooks (Oluwagbemileke, 2019). Project-based learning facilitated by ICTs allows students to explore real-world applications of knowledge. For instance, Home Economics students researching local food traditions could utilize online databases, analyze data with spreadsheets, and design interactive presentations using multimedia software tools (Urevbu, 2015). These activities not only deepen understanding but also develop critical thinking, problem-solving, and collaboration skills – essential for success in the 21st century. Furthermore, ICTs can personalize learning experiences by allowing educators to tailor instruction to individual student needs and learning paces. Adaptive learning platforms can recommend resources and adjust lesson difficulty based on student performance, ensuring a more challenging and engaging learning journey for all.

4. **Empowering learners:** Information and Communication Technologies (ICTs) hold immense potential to revolutionize education in Nigeria. By dismantling geographical barriers and resource limitations, ICTs empower learners with unprecedented access to knowledge. Students in remote locations can leverage online resources, educational content, and virtual connections with educators and peers across the globe (Victoria, 2015). As
Adomi and Kpanghan (2010) emphasize, a well-developed secondary education system is crucial for building a strong national human capital base. Equipping students with ICT skills from an early age, potentially as early as secondary school, is essential for their future success. In the home economics class, students can collaborate on creating a digital cookbook featuring traditional family recipes or utilize design software to plan and showcase their fashion design projects. Organizations increasingly require their employees to possess digital literacy, making ICT competency a prerequisite for many jobs (Adomi & Anie, 2006). By integrating ICT into the secondary school curriculum, Nigeria can ensure its graduates are well-prepared for a technology-driven world. This fosters inclusivity and empowers individuals who might otherwise have limited educational opportunities (World Bank, 2016).

5. **Catering to diverse needs:** ICTs address the diverse learning needs of students by offering multiple pathways to understanding. Mobile applications with features like text-to-speech conversion, screen magnification, and simplified interfaces can provide additional support for students with visual or cognitive impairments (Newton & Dell, 2011; Rodriguez et al., 2013). Similarly, students who excel in visual and tactile learning can benefit from multimedia resources and interactive activities like educational games and simulations (Kenney, 2011; Tileston, 2003). This ensures that all students have the opportunity to excel, fostering a more inclusive and equitable learning environment.

6. **Preparing for the future:** Equipping students with digital literacy and ICT competency is crucial for success in today's job market. The ability to utilize technology effectively is a sought-after skill across diverse industries (Lemke, 2000). By integrating ICTs into the curriculum, Nigerian education can prepare graduates for the demands of a technology-driven workplace. This encompasses not only technical skills but also the ability to communicate effectively, solve problems collaboratively, and think critically in a digital environment (Lemke, 2000). In the Home Economics classroom, for instance, students can develop digital literacy skills by researching recipes online, evaluating the credibility of information sources, and effectively communicating their learning through multimedia presentations. By strategically harnessing the power of ICTs, Nigeria can empower its youth to become active participants and innovators in the globalized knowledge economy.

The specific uses of ICT in Home Economics education, especially in Nigerian secondary schools, as outlined above, opens the door for professionals to consider several existing situations that can be leveraged to improve the integration of the technology in Home Economics classrooms.

**Leverageable Situations for the Integration of ICT in Home Economics Education in Nigerian Secondary Schools**

There are a number of prospects or leverageable situations for the integration of ICT in Home Economics education in Nigerian secondary schools. For instance, the ever-growing population in Nigerian secondary schools, coupled with the crucial role of education in national development, necessitates a shift towards more effective teaching methods (Ajayi & Ekundayo, 2009). Specifically, Home Economics educators should take advantage of the following situations in the country.

1. **Aligning with National Policy on Education:** The National Policy on Education (Federal Republic of Nigeria, 2013) emphasizes the importance of pre-vocational training, including Home Economics, in introducing students to technology. Home Economics educators in Nigeria can leverage on the fact that ICT integration aligns perfectly with the national goals, as it equips students with technological literacy by fostering understanding and appreciation for technology, equipping students with a valuable skill set regardless of their chosen career path. ICTs can equip Home Economics students with the technological proficiency needed for professional success. This could include using software for recipe creation, meal planning, or budgeting, or utilizing online communication tools for
collaboration and client interaction. Similarly, ICTs provide access to a wealth of information on various career options within the Home Economics field. Students can explore diverse pathways, such as food science, fashion design, or interior decorating, through virtual tours of workplaces or interviews with industry professionals conducted online.

2. Fulfilling the Philosophy of Home Economics: As Ejinkeonye and Usoroh (2016) emphasize, Home Economics aims to improve the quality of life at individual, family, and societal levels. Educationists in the profession can leverage on this philosophy to facilitate the integration of ICTs in the classroom, and the technology can provide up-to-date information. For instance, online resources and databases offer access to the latest trends and innovations in nutrition, food technology, and sustainable living practices. ICT can also enhance learning experiences, as interactive simulations can help students understand complex topics like food safety or budgeting practices. These all lead to developing 21st-century skills, as ICT use fosters critical thinking, problem-solving, creativity, and digital communication skills, all essential for success in the modern world (Oluwagbemileke, 2019, 2024).

3. Moving Beyond Traditional Tools: Home Economics educators can also leverage on the global shift in focus towards more contemporary technologies that offer greater interactivity and engagement in the classroom (Ejinkeonye & Usoroh, 2016). Some examples are

- **Interactive simulations**: These can provide students with virtual experiences like practicing meal preparation in a simulated kitchen or experimenting with fabric textures through Augmented Reality (AR) applications.
- **Online learning platforms**: Platforms offering video tutorials, interactive quizzes, and collaborative learning activities can enhance the learning experience and cater to diverse learning styles.
- **Social media and online communities**: These can connect students with Home Economics professionals, allowing them to ask questions, share ideas, and gain insights from industry experts.

Research supports the effectiveness of ICTs in Home Economics education in other countries, and it could be in Nigeria as well. For instance, Yiu-Chi and Edmund (2012) found that using wikis improved learning outcomes in Hong Kong secondary schools. Additionally, Okafor (2008) highlights the potential of ICTs for information dissemination, communication, and empowering Home Economics students. By embracing ICTs and integrating them strategically into Home Economics curriculum, educators can create a more engaging, effective, and future-oriented learning environment for students. This will equip them with the knowledge, skills, and digital literacy to thrive in the 21st century and contribute meaningfully to society. Notwithstanding, this may not be without some challenges.

**Challenges Hindering Effective ICT Integration in Home Economics**

While Information and Communication Technologies (ICTs) hold immense potential to revolutionize Home Economics education, their successful implementation faces significant challenges in developing countries like Nigeria (Victoria, 2015). These challenges, as identified by Adomi and Kpangban (2010) and others, can be categorized as follows:

1. **Infrastructure Constraints:**
   - **Limited or poor information infrastructure**: Reliable access to the internet and telecommunication services is crucial for utilizing online resources and educational tools. However, many Nigerian schools lack adequate internet bandwidth or consistent connectivity (Adomi & Anie, 2006).
   - **Inadequate ICT facilities**: Equipping schools with sufficient computers, tablets, or other ICT devices is essential. The research by Adomi and Kpangban (2010) highlights the lack of these resources as a significant barrier, and this is corroborated by the reports of Ajayi and Ekundayo (2009), Department of Education and Science (2008), Bartlett al (2013), Oguegbu (2016), Adeyemo (2010), and Abdulkadir et al (2014).
Frequent electricity interruption: Electricity failure has been a persistent problem militating against ICT application and use in Nigeria (Adomi, 2005; Ofodu, 2007).

2. Policy and Implementation Issues:
   - Poor ICT policy or project implementation strategy: Government policies promoting ICT integration may exist, but challenges arise in translating them into action. Inadequate funding, lack of proper training programs for teachers, and insufficient technical support hinder effective implementation (Aginam, 2006; Evoh, 2007).
   - Poor Financing and High Cost of ICT Facilities: The high cost of acquiring and maintaining ICT equipment can be a significant barrier for schools with limited budgets. Strategies like exploring open-source software or utilizing cloud-based solutions can help address these limitations (Nwite, 2007; Evoh, 2007).

3. Human Resource Limitations:
   - Inadequate ICT manpower in schools: A shortage of qualified ICT personnel in schools is a major concern. Teachers themselves may lack sufficient digital literacy or training to confidently integrate ICTs into their lessons (Dabesaki, 2005; Kwache, 2007).
   - Lack of or poor perception of ICTs among teachers and administrators: Some teachers and administrators may hold negative perceptions about the benefits of ICTs or feel overwhelmed by the technology. Addressing these concerns and providing training opportunities can foster a more positive and supportive environment (Aginam, 2006).

Strategies for Facilitating ICT Integration in Home Economics Education

Interestingly, some scholars and researchers have sought to proffer suggestions that could help in improving the level at which Home Economics Instructors (particularly in secondary schools) are aware and make use of Information and Communication Technology (ICT) in their instruction. The transformative potential of ICTs in Home Economics education hinges on equipping teachers with the necessary knowledge, skills, and resources. Several recommendations from scholars like Adomi and Kpangban (2010), Ejinkeonye and Usoroh (2016), and Alsied and Pathan (2015) can guide this process:

1. Government Initiatives:
   - Policy translation into action: Clearly defined ICT policies must be accompanied by concrete implementation strategies. This could involve establishing dedicated funding bodies, providing ICT facilities to schools, and monitoring their effective use.
   - Universal ICT education: Integrating computer or ICT education into the core curriculum for all secondary school students will ensure a baseline level of digital literacy among learners.
   - Skilled ICT teachers: Recruiting and deploying teachers with strong ICT skills to schools is crucial. Additionally, providing ongoing professional development opportunities can enhance existing teachers' digital literacy.
   - Reliable electricity supply: A stable power supply is essential for the consistent utilization of ICT tools in the classroom.

2. School-Level Strategies:
   - Teacher Training: Providing targeted training programs focused on integrating ICTs into Home Economics lessons empowers teachers to leverage technology effectively. Continuous in-service training programs ensure that teachers remain up-to-date with the latest ICT tools and pedagogical approaches.
   - Dedicated time for practice: Allocating sufficient time for teachers to explore and experiment with ICT tools fosters confidence and skill development.
   - ICT infrastructure investments: Schools should prioritize acquiring and maintaining ICT equipment like computers, tablets, or projectors to support ICT integration.
   - Technical Support: Schools require readily available technical support to address any challenges related to ICT infrastructure or software troubleshooting.
• Collaboration with external experts: Inviting ICT specialists to conduct workshops or provide informal training sessions for teachers and students can inject fresh perspectives and expertise.
• Incentivizing ICT use: Recognizing and rewarding teachers who actively integrate ICTs in their lessons can encourage wider adoption and innovation.

3. Community and Stakeholder Involvement:
• Funding Initiatives: Partnerships between individuals, communities, and educational institutions can help raise funds for procuring ICT equipment and resources.
• Local Content Development: Creating digital learning materials in local languages and reflecting the local culture fosters a stronger connection with students and enhances learning outcomes (Alsied & Pathan, 2015).

By implementing a combination of these strategies, stakeholders can create a supportive environment for ICT integration in Home Economics education. This will empower teachers to leverage technology, fostering a dynamic and engaging learning experience for students. The development of a long-term vision with ongoing technical, human, and organizational support is critical for ensuring the effective and sustainable use of ICTs (Kopcha, 2012; Whizz Education, 2018). As students gain exposure to technology and develop essential digital literacy skills, they will be better prepared to navigate the opportunities and challenges of the 21st century.

Conclusion

ICTs hold the key to revolutionizing Home Economics education in Nigeria. These technologies can personalize learning, enhance engagement through multimedia and simulations, and prepare students for the demands of a technology-driven world. Overcoming infrastructure limitations, teacher training gaps, and a lack of localized content requires a collaborative effort from policymakers, schools, and the community. By fostering a culture of ICT integration, educators can leverage AI-powered intelligent tutoring systems for personalized feedback, virtual reality simulations for practical experiences, and online communities for global collaboration. This holistic approach, coupled with the development of culturally relevant digital resources, empowers students with both Home Economics knowledge and essential digital literacy skills, preparing them to be successful contributors to the future.

Recommendations

1. To empower Home Economics teachers with the skills to leverage technology effectively, the Ministry of Education should invest in comprehensive training programs focused on ICT integration and provide ongoing support through workshops, mentoring programs, and online resources.
2. To bridge the digital divide and ensure equitable access to technology, the government and the private sector can collaborate on strategies to secure reliable and affordable internet connectivity in schools. Additionally, schools can explore public-private partnerships or innovative financing models to acquire and maintain essential ICT equipment like computers, tablets, and projectors.
3. To enhance student engagement and cater to the Nigerian context, educational institutions and content developers should work together to create a robust ecosystem for high-quality digital learning materials. These resources should be available in local languages, reflect the local culture, and cater to diverse learning styles.
4. To foster a supportive environment for ICT integration and continuous improvement, school administrators should encourage collaboration between Home Economics teachers, ICT specialists, and educational content developers. This collaboration can lead to the sharing of best practices, the creation of innovative ICT-based learning activities, and a stronger support system for educators.
5. To explore the potential of AI in enhancing the learning experience, the Ministry of Education and educational research institutions can investigate the integration of
Dietary habits and impact of good nutrition in children with down syndrome by Bansan & Mandah

Artificial Intelligence (AI) in Home Economics education. This could involve implementing AI-powered intelligent tutoring systems for personalized feedback and developing virtual reality simulations for immersive practical experiences.

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