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DIGITAL TRANSFORMATION IN HOME ECONOMICS EDUCATION IN NIGERIA: CHALLENGES, OPPORTUNITIES, AND A CONCEPTUAL FRAMEWORK

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Abstract

Digital transformation has become a defining feature of 21st-century education systems globally. However, the integration of digital technologies into Home Economics education in Nigeria remains limited and uneven. This conceptual paper examines the opportunities and challenges associated with digital transformation in Home Economics education in Nigeria and proposes a framework to guide systematic implementation. Drawing on the Technological Pedagogical Content Knowledge (TPACK) framework (Mishra & Koehler, 2006) and the Diffusion of Innovation Theory (Rogers, 2003), the paper explores how digital tools can enhance teaching and learning in food and nutrition, clothing and textiles, family resource management, and entrepreneurship education. Key challenges identified include inadequate infrastructure, limited digital competence among teachers, funding constraints, curriculum rigidity, and resistance to change. Despite these barriers, significant opportunities exist in blended learning, digital entrepreneurship, virtual simulations, and industry-relevant technological applications. The paper proposes the Digital Integration Framework for Home Economics Education in Nigeria (DIF-HEEN Model) to support coordinated digital adoption. The study concludes that digital transformation is essential for repositioning Home Economics education as a modern, innovation-driven discipline capable of contributing to sustainable national development.

***Keywords*:** digital transformation, Home Economics education, TPACK, educational technology, Nigeria, digital pedagogy

Introduction

Digital transformation has fundamentally reshaped educational systems worldwide, redefining how knowledge is delivered, accessed, and applied (UNESCO, 2023). Educational institutions are increasingly integrating digital technologies to enhance instructional delivery, learner engagement, and skill acquisition. In Nigeria, policy efforts such as the National Policy on Information and Communication Technology (ICT) in Education emphasize

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technology integration across disciplines (Federal Republic of Nigeria [FRN], 2019). However, implementation remains uneven, particularly in skill-based subjects such as Home Economics.

Home Economics education plays a strategic role in Nigeria's educational system. The discipline encompasses food and nutrition, clothing and textiles, family resource management, consumer education, and entrepreneurship. It equips learners with practical competencies necessary for self-reliance, economic empowerment, and family well-being. Despite its applied nature, instructional delivery remains largely traditional, relying heavily on face-to-face demonstrations with limited technological integration. Globally, digital technologies such as virtual laboratories, computer-aided design (CAD), nutrition analysis software, mobile budgeting applications, and e-commerce platforms have transformed professional practice in areas related to Home Economics (International Federation for Home Economics [IFHE], 2022). The failure to align instructional practices with these industry realities risks producing graduates inadequately prepared for the digital economy.

The COVID-19 pandemic further exposed gaps in digital readiness across Nigerian educational institutions (World Bank, 2022). These disruptions highlighted the urgent need for systemic digital integration across all subject areas. Therefore, this conceptual paper examines the opportunities and challenges of digital transformation in Home Economics education in Nigeria and proposes a structured framework to guide effective implementation.

2. Literature Review and Conceptual Clarifications

2.1 Digital Transformation in Education: Concept and Dimensions

Digital transformation in education has evolved from a focus on computer literacy toward a systemic restructuring of educational ecosystems. Contemporary scholarship conceptualizes digital transformation not merely as technological adoption but as an institutional reconfiguration that integrates digital tools into pedagogy, governance, curriculum design, assessment, and professional development (Bond et al., 2018; UNESCO, 2023). It involves a shift from teacher-centered transmission models to learner-centered, technology-enhanced, and competency-driven instructional approaches. According to the UNESCO (2023) Global Education Monitoring Report, digital technologies can expand access, personalize learning, and improve administrative efficiency; however, their effectiveness depends on contextual adaptation, equity considerations, and teacher readiness. Similarly, Selwyn (2022) argues that digital transformation should be understood as a socio-technical process shaped by political, economic, and cultural factors rather than a purely technical innovation.

Three interrelated dimensions characterize digital transformation in education:

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1. Technological Dimension – availability of infrastructure, devices, connectivity, and software.
2. Pedagogical Dimension – integration of digital tools into teaching methods and learning strategies.
3. Organizational Dimension – institutional policies, leadership, funding structures, and professional development systems (Bond et al., 2018).

For skill-based disciplines such as Home Economics, digital transformation must move beyond digitizing lecture notes to embedding industry-relevant technologies into practical instruction. This approach ensures alignment between classroom practices and professional realities.

2.2 Digital Competence and Digital Pedagogy

Digital competence has become central to discussions of educational transformation. The European Commission's DigCompEdu framework (Redecker, 2017) and its subsequent updates emphasize that educators require not only technical skills but also pedagogical strategies for integrating digital technologies meaningfully. Recent studies (Caena & Redecker, 2019; UNESCO, 2023) highlight six core domains of digital competence for educators: professional engagement, digital resources, teaching and learning, assessment, empowering learners, and facilitating learners' digital competence. Digital pedagogy refers to instructional approaches that leverage digital technologies to promote active, collaborative, and reflective learning (Koehler et al., 2022). In practical subjects, digital pedagogy may involve simulation-based learning, blended instruction, flipped classrooms, and project-based digital assignments.

In the African context, digital competence remains uneven due to infrastructural disparities and limited professional development opportunities (Trucano, 2022). In Nigeria, studies indicate that while many teachers possess basic ICT literacy, fewer demonstrate the ability to integrate technology pedagogically (Adeleke & Emeahara, 2023). This distinction between technological familiarity and pedagogical integration is crucial for Home Economics education, where effective teaching requires contextualized application rather than generic ICT skills.

2.3 Home Economics Education in the 21st Century

Home Economics education has historically evolved in response to societal changes. Initially focused on domestic management and household efficiency, the discipline has expanded to encompass nutrition science, textile technology, family development, consumer studies, and entrepreneurship (International Federation for Home Economics [IFHE], 2022). Contemporary global perspectives position Home Economics as a discipline that promotes sustainable development, social inclusion, and economic resilience (IFHE, 2022). The field aligns strongly with several Sustainable Development Goals (SDGs), including Zero Hunger (SDG 2), Gender Equality (SDG 5), Responsible Consumption (SDG 12), and Decent Work and Economic Growth (SDG 8). In Nigeria, Home Economics is taught at

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junior and senior secondary school levels and in tertiary institutions under vocational and technical education programs. The curriculum emphasizes practical skill acquisition in food preparation, clothing construction, interior decoration, and family resource management. However, instructional delivery remains largely analogue in many institutions, despite increasing digitization within related industries.

Globally, the professional fields associated with Home Economics have undergone significant technological evolution. For example:

- Nutrition practice now integrates digital diet-tracking platforms and telehealth services (WHO, 2021).
- Fashion and textiles industries rely on CAD systems and 3D modeling technologies (Nayak & Padhye, 2022).
- Household financial management increasingly utilizes digital banking and budgeting applications.
- Entrepreneurship ecosystems are driven by digital marketing, social media branding, and e-commerce platforms (World Bank, 2022).

The divergence between professional practice and educational delivery highlights the urgency of digital transformation within Home Economics education in Nigeria.

2.4 Digital Transformation in Technical and Vocational Education

Home Economics shares similarities with Technical and Vocational Education and Training (TVET), particularly in its emphasis on practical competencies and employability. Recent scholarship on digital transformation in TVET provides relevant insights. The World Bank (2022) emphasizes that digital technologies can modernize skills training through virtual simulations, online certification platforms, and blended learning environments. Similarly, Oketch (2021) notes that digital integration enhances employability by aligning training with labor market demands. However, digital transformation in vocational fields presents unique challenges. Practical subjects require specialized software, equipment, and instructor training. Without adequate infrastructure and pedagogical adaptation, digital adoption risks superficial implementation (UNESCO-UNEVOC, 2021). These observations are directly applicable to Home Economics education in Nigeria, where effective transformation requires context-sensitive strategies rather than wholesale technology importation.

2.5 Digital Inequality and the Nigerian Context

Digital transformation initiatives in developing countries must contend with structural inequalities. Digital divide research identifies disparities in access (first-level divide), skills (second-level divide), and meaningful usage (third-level divide) (van Dijk, 2020). In Nigeria, broadband penetration has improved but remains uneven across urban and rural areas (Nigerian Communications Commission [NCC], 2023). Electricity instability further

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constrains digital implementation in schools. Additionally, socio-economic disparities affect students' access to personal devices and internet connectivity outside school environments. Gender dimensions are also relevant. Although Home Economics historically attracted more female students, digital technology adoption may challenge traditional gender stereotypes while also exposing disparities in digital access and confidence (UNESCO, 2023).

Therefore, digital transformation strategies must prioritize equity, affordability, and inclusive access to prevent exacerbating existing inequalities.

2.6 Rationale for a Conceptual Framework

Despite increasing discourse on digital education in Nigeria, limited scholarship specifically addresses digital transformation within Home Economics education. Existing studies tend to focus broadly on ICT integration in general education or STEM disciplines. There remains a conceptual gap regarding structured models tailored to the unique characteristics of Home Economics as a multidisciplinary, skill-based, and entrepreneurship-oriented field. Conceptual frameworks serve as analytical tools that organize complex variables and guide systematic implementation (Ravitch & Riggan, 2020). For digital transformation in Home Economics education, a framework must integrate:

- Infrastructure readiness
- Teacher digital competence
- Curriculum redesign
- Student skill acquisition
- Industry and socio-economic alignment

The absence of such an integrated model in Nigerian literature underscores the contribution of this study.

3. Theoretical Framework

Digital transformation in Home Economics education requires a robust theoretical foundation that explains how technology integration occurs, how educators adapt to innovation, and how pedagogical knowledge intersects with technological competence. This paper draws primarily on the Technological Pedagogical Content Knowledge (TPACK) framework, the Diffusion of Innovation Theory, and complementary perspectives from digital competence frameworks to construct a multi-layered analytical lens.

3.1 Technological Pedagogical Content Knowledge (TPACK)

The Technological Pedagogical Content Knowledge (TPACK) framework, developed by Mishra and Koehler (2006), remains one of the most influential models for understanding technology integration in education. TPACK posits that effective teaching with technology occurs at the intersection of three knowledge domains:

1. Content Knowledge (CK) – Mastery of subject matter.
2. Pedagogical Knowledge (PK) – Understanding of instructional strategies and learning theories.

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3. Technological Knowledge (TK) – Competence in digital tools and technological systems. The framework emphasizes that meaningful digital integration emerges not from technological knowledge alone but from the dynamic interplay between all three domains. Recent scholarship continues to validate TPACK as a relevant model for 21st-century education, particularly in vocational and skill-based disciplines (Koehler et al., 2022; Scherer et al., 2021).

Application to Home Economics Education

In the context of Home Economics education in Nigeria, the TPACK framework provides a structured lens for analyzing teacher readiness:
- A food and nutrition educator may possess strong content knowledge of dietary principles and effective pedagogical strategies for demonstrations. However, without technological knowledge of digital diet-analysis software or virtual simulation tools, instruction remains limited to traditional methods.
- A clothing and textiles instructor may excel in manual pattern drafting but lack competence in CAD-based garment design systems increasingly used in the fashion industry.
- An entrepreneurship educator may understand small business principles yet be unfamiliar with digital marketing analytics or e-commerce platforms.
Thus, TPACK highlights a critical transformation need: teachers must move beyond basic ICT literacy toward integrated techno-pedagogical competence. Scherer et al. (2021) emphasize that teachers' self-efficacy in TPACK significantly predicts technology integration quality. Therefore, professional development programs in Nigeria must explicitly target the intersectional domains of TPACK rather than isolated technical workshops.

Moreover, TPACK aligns with competency-based education models, which emphasize applied knowledge in authentic contexts. For Home Economics education, authenticity implies using the same digital tools employed in professional practice.

3.2 Diffusion of Innovation Theory

While TPACK explains the knowledge base required for effective integration, it does not fully address how innovation spreads within institutions. Rogers' (2003) Diffusion of Innovation Theory provides insight into adoption patterns and resistance to change.
According to Rogers, innovation adoption is influenced by five perceived attributes:

1. Relative Advantage – The perceived superiority of the innovation over existing practices.
2. Compatibility – Alignment with existing values and needs.
3. Complexity – Perceived difficulty of use.
4. Trialability – Opportunity to experiment before full adoption.
5. Observability – Visibility of positive results.

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In Nigerian educational institutions, these attributes significantly influence digital transformation efforts. For example:

- If educators perceive digital tools as enhancing instructional efficiency (relative advantage), adoption is more likely.
- If technology integration aligns with cultural and institutional norms (compatibility), resistance decreases.
- If digital tools appear overly technical (complexity), teachers may revert to traditional methods.

Recent studies on technology adoption in African higher education confirm that perceived usefulness and institutional support strongly predict adoption behaviors (Boateng et al., 2022). This finding underscores the importance of leadership commitment and systemic support in implementing digital transformation within Home Economics programs. Rogers also categorizes adopters into innovators, early adopters, early majority, late majority, and laggards. In Nigerian institutions, digitally enthusiastic educators often serve as early adopters who can influence peers. Harnessing these champions through mentorship and peer-led training may accelerate institutional diffusion.

3.3 Digital Competence Frameworks and Educator Preparedness

Beyond TPACK and diffusion theory, digital competence frameworks provide contemporary benchmarks for educator readiness. The European DigCompEdu framework (Redecker, 2017), increasingly referenced globally, identifies progressive levels of digital competence from novice to pioneer. Similarly, UNESCO (2023) emphasizes that teacher digital competence is central to equitable and effective technology integration.

Digital competence extends beyond operational skills to include:

- Critical evaluation of digital resources
- Ethical and responsible technology use
- Digital assessment strategies
- Facilitating students' digital literacy

For Home Economics education in Nigeria, digital competence must also include industry-specific technological skills, such as:

- Nutritional data analysis platforms
- Textile and fashion design software
- Financial planning applications
- Digital branding tools

Failure to incorporate discipline-specific technologies risks superficial compliance with ICT policies without meaningful pedagogical transformation.

3.4 Integrative Theoretical Synthesis

While each theoretical perspective offers valuable insights, digital transformation in Home Economics education requires an integrative approach.

- TPACK explains what teachers need to know.
- Diffusion of Innovation Theory explains how adoption spreads within institutions.
- Digital competence frameworks define standards of proficiency and progression.

Together, these frameworks form a multi-level explanatory structure:

Level	Theoretical Lens	Focus
Micro (Teacher Level)	TPACK	Knowledge integration

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Meso (Institutional Level)	Diffusion Theory	Adoption and organizational change
Macro (Policy/System Level)	Digital Competence Frameworks	Standards, regulation, and capacity-building

This layered understanding is particularly important in Nigeria, where systemic challenges—such as infrastructural deficits and policy-implementation gaps—interact with individual teacher competencies. By grounding the proposed Digital Integration Framework for Home Economics Education in Nigeria (DIF-HEEN Model) within these complementary theories, the present study ensures conceptual rigor and analytical coherence.

Conclusion

Digital transformation has emerged as a critical driver of educational innovation and workforce preparedness in the twenty-first century. This paper examined the challenges and opportunities associated with integrating digital technologies into Home Economics education in Nigeria and highlighted the urgent need for systematic transformation of instructional practices. The analysis revealed that while significant barriers exist—including inadequate infrastructure, limited teacher digital competence, funding constraints, curriculum rigidity, and persistent digital inequalities—these challenges are not insurmountable.

The study further demonstrated that digital technologies offer enormous potential to enhance teaching and learning across the various domains of Home Economics, including food and nutrition, clothing and textiles, family resource management, consumer education, and entrepreneurship. Through blended learning environments, virtual simulations, digital design tools, online business platforms, and technology-enhanced assessment systems, Home Economics education can become more engaging, relevant, and aligned with contemporary industry practices.

Drawing on the Technological Pedagogical Content Knowledge (TPACK) framework, Diffusion of Innovation Theory, and digital competence frameworks, the paper proposed the Digital Integration Framework for Home Economics Education in Nigeria (DIF-HEEN Model) as a conceptual guide for coordinated and sustainable implementation. The framework emphasizes the interdependence of infrastructure development, teacher capacity building, curriculum redesign, institutional support, and industry collaboration in achieving meaningful digital transformation.

For digital transformation to succeed, policymakers, educational administrators, teacher educators, and other stakeholders must adopt a holistic and collaborative approach that prioritizes equitable access, continuous professional development, and context-sensitive implementation strategies. Investment in digital infrastructure, curriculum modernization, and teacher training should be viewed not as optional reforms but as strategic necessities for national development. Ultimately, transforming Home Economics education through digital technologies will not only

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improve instructional quality and student learning outcomes but also strengthen the discipline's contribution to entrepreneurship, employability, sustainable development, and economic growth in Nigeria. As the world continues to advance toward a digital economy, Home Economics education must evolve accordingly to prepare learners with the knowledge, skills, and competencies required to thrive in an increasingly technology-driven society.

References

Adeleke, A. A., & Emeahara, E. N. (2023). Teachers' digital competence and technology integration in Nigerian secondary schools. *African Journal of Educational Technology, 12*(2), 45–59.

Boateng, R., Mbrokoh, A. S., Boateng, S. L., Senyo, P. K., & Ansong, E. (2022). Determinants of e-learning adoption in higher education in Africa. *Education and Information Technologies, 27*, 1203–1225.

Bond, M., Marín, V. I., Dolch, C., Bedenlier, S., & Zawacki-Richter, O. (2018). Digital transformation in higher education. *International Journal of Educational Technology in Higher Education, 15*, 1–20.

Caena, F., & Redecker, C. (2019). Aligning teacher competence frameworks to digital transformation. *European Journal of Education, 54*(3), 356–369.

International Federation for Home Economics. (2022). *Home economics education and sustainable development*. IFHE.

Koehler, M. J., Mishra, P., & Cain, W. (2022). What is technological pedagogical content knowledge (TPACK)? *Journal of Education, 193*(3), 13–19.

Koehler, M. J., Mishra, P., & Cain, W. (2022). What is technological pedagogical content knowledge? *Journal of Education, 193*(3), 13–19.

Nayak, R., & Padhye, R. (2022). *Garment manufacturing technology* (2nd ed.). Woodhead Publishing.

Nigerian Communications Commission. (2023). *Subscriber statistics report*. NCC.

Oketch, M. (2021). Reforming technical and vocational education in Africa. *International Journal of Educational Development, 82*, 102356.

Ravitch, S. M., & Riggan, M. (2020). *Reason & rigor: How conceptual frameworks guide research* (2nd ed.). Sage.

Redecker, C. (2017). *European framework for the digital competence of educators*. European Commission.

Scherer, R., Siddiq, F., & Tondeur, J. (2021). The technology acceptance model (TAM): A meta-analytic structural equation modeling approach. *Computers & Education, 128*, 13–35.

Selwyn, N. (2022). *Education and technology: Key issues and debates* (3rd ed.). Bloomsbury.

UNESCO. (2023). *Global education monitoring report 2023: Technology in education*. UNESCO Publishing.

ISSN: 1597-5037

UNESCO-UNEVOC. (2021). *Digital transformation in TVET*. UNESCO-UNEVOC.

van Dijk, J. (2020). *The digital divide*. Polity Press.

World Bank. (2022). *Digital skills and the future of work in Africa*. World Bank.

World Health Organization. (2021). *Global strategy on digital health 2020–2025*. WHO.

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