

Technology-Enhanced Home Economics Education: Fostering Entrepreneurship and Digital Literacy Among Students in Sierra Leone

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Abstract: Sierra Leone's education and digital transformation agendas increasingly emphasize equitable access to quality learning, stronger teacher capacity, localized content, and safe, meaningful use of technology. Home Economics covering food and nutrition, clothing and textiles, home management, and family life education offers an especially practical platform for connecting schooling to livelihoods and self-employment. Yet, in many classrooms, Home Economics remains taught through traditional routines that do not fully prepare students for modern entrepreneurship or the digital economy. This paper advances a technology-enhanced Home Economics education approach that deliberately integrates entrepreneurship education and digital literacy into Home Economics curricula, pedagogy, and assessment. Drawing on international digital competence and teacher ICT frameworks, TVET entrepreneurial learning guidance, and Sierra Leone's policy context (Education Sector Plan 2022–2026; National Innovation and Digital Strategy 2019–2029; National Digital Development Policy 2021; National Digital Learning Strategy 2025–2030), the paper proposes a coherent framework—the TEHEE Model. The model is organized around (i) competency-based curriculum integration; (ii) project-based, community-linked pedagogy; (iii) mobile-first and low-bandwidth technology choices; (iv) school-based enterprise and incubation; (v) inclusive and safe digital participation; and (vi) monitoring, evaluation, and continuous improvement. Practical implementation guidance is provided, including a competency matrix connecting digital skills to authentic Home Economics tasks, a phased adoption roadmap for schools and teacher educators, and recommended indicators for tracking student outcomes (enterprise projects, financial literacy, digital content creation, and employability). The paper concludes with policy and institutional recommendations for scaling technology-enhanced Home Economics in ways that are affordable, context-sensitive, and aligned with national priorities for human capital development and youth employment (Ministry of Basic and Senior Secondary Education & Ministry of Technical and Higher Education, 2022) (Directorate of Science, Technology and Innovation, 2019) (Ministry of Communications, Technology and Innovation, 2021) (Ministry of Basic and Senior Secondary Education & Teaching Service Commission, 2025).

Keywords: Home Economics; Entrepreneurship Education; Digital Literacy; Educational Technology; TVET; Sierra Leone; Teacher Professional Development.

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I. INTRODUCTION

Across Sub-Saharan Africa, education systems are being asked to do more than expand access: they must also strengthen learning outcomes, support youth employability, and prepare learners for rapidly changing economies. Sierra Leone's education reforms similarly emphasize the need to improve learning while extending equitable access,

strengthening teacher capacity, and aligning schooling with national development priorities. In parallel, Sierra Leone's digitization agenda frames technology as a driver of inclusion, entrepreneurship, and service delivery.

Home Economics occupies a strategic position at the intersection of education, livelihoods, and community well-being. As a practical subject, it develops competencies

related to nutrition and food preparation, clothing and textiles, household resource management, personal and family well-being, and consumer decision-making. These domains connect naturally to microenterprise opportunities catering, baking, agro-processing, fashion design, tailoring, alterations, home décor, soap and cosmetics production, childcare services, and household management consultancy many of which can be launched with modest start-up capital.

However, the economic environment in which today's students will build livelihoods is increasingly digital. Even very small enterprises now rely on mobile money, social media marketing, digital ordering, basic bookkeeping apps, online marketplaces, customer messaging, and digital reputation. For young entrepreneurs, the ability to create simple content, handle customer inquiries, manage records, and participate safely online can be a decisive competitive advantage.

This paper therefore argues that Home Economics education in Sierra Leone should be modernized through technology-enhanced learning that is explicitly entrepreneurship-oriented and digitally literate. The goal is not to introduce technology for its own sake, but to use appropriate digital tools to strengthen practical learning, widen opportunity, and equip students with future-ready capabilities. To operationalize this goal, the paper proposes an integrated framework for Technology-Enhanced Home Economics Education (TEHEE) and offers implementation guidance for curriculum integration, pedagogy, teacher development, resource planning, and outcome monitoring that can support adoption in schools and in teacher-training programs.

II. PROBLEM STATEMENT AND RATIONALE

Despite the strong practical relevance of Home Economics, several interrelated gaps can limit its contribution to youth employability and self-reliance.

First, entrepreneurship learning is often treated as an add-on rather than a structured set of competencies embedded in classroom tasks, assessment, and progression. Students may learn practical skills (e.g., cooking, sewing) but receive limited support to translate these skills into viable enterprise activities such as product development, pricing, customer research, branding, quality control, record-keeping, and basic compliance.

Second, many students complete secondary schooling with limited digital literacy beyond informal phone use. This restricts their ability to access learning resources, participate safely online, and engage productively with the growing digital economy. For Home Economics learners, weak digital competence can mean missed opportunities to market products, manage finances, access professional networks, or use technology to improve quality and efficiency.

Third, teachers and institutions face practical constraints including limited connectivity, inconsistent electricity, scarce teaching aids, and uneven teacher confidence in integrating technology making it difficult to implement technology-enhanced learning in a sustainable way.

The rationale for TEHEE is to address these gaps through a coherent, low-cost, mobile-first approach that aligns with Sierra Leone's policy direction on digital learning and inclusive digitization. By anchoring entrepreneurship and digital literacy in authentic Home Economics projects, TEHEE can help students build competencies that directly support employment, self-employment, and community development.

III. AIM, OBJECTIVES, AND NATURE OF THE PAPER

➤ *Aim*

The aim of this paper is to propose a context-appropriate framework for technology-enhanced Home Economics education in Sierra Leone that strengthens students' entrepreneurship competence and digital literacy.

➤ *Objectives*

The paper seeks to: (1) synthesize policy and research supporting the integration of educational technology, digital competence, and entrepreneurial learning in practical subjects; (2) present a TEHEE conceptual and implementation framework tailored to Sierra Leone's resource conditions; (3) provide a competency matrix linking digital literacy to Home Economics learning tasks and enterprise pathways; (4) outline feasible implementation strategies for schools and teacher educators, including professional development and partnership models; (5) propose monitoring and evaluation indicators for tracking outcomes in digital literacy, entrepreneurship, and employability.

➤ *Nature of the paper*

This is a practice- and policy-oriented conceptual paper. It does not report a completed empirical impact evaluation. Instead, it integrates established frameworks and national policy priorities to propose an implementation model that can be piloted and evaluated in Sierra Leonean schools and teacher-training settings.

IV. POLICY AND CONTEXTUAL BACKGROUND IN SIERRA LEONE

Sierra Leone's education reforms and digital development strategies provide a supportive backdrop for technology-enhanced, skills-oriented learning.

➤ *Education Sector Priorities*

Education sector planning emphasizes improved learning outcomes and equitable access. The Education Sector Plan 2022–2026 foregrounds the need to transform learning for all learners and highlights systemic challenges that require

coordinated responses, including teacher development, improved instructional quality, and better learning resources.

➤ *National Digitization Priorities*

National digitization agendas frame technology as a driver of inclusion, service delivery, entrepreneurship, and economic transformation. The National Innovation and Digital Strategy (2019–2029) promotes “Digitization for All,” emphasizing digital identity, digital economy, and digital governance, and it positions entrepreneurship and innovation as essential for national development. The National Digital Development Policy (2021) similarly seeks to harmonize digital initiatives across government and society.

➤ *Education Technology and Digital Learning Strategy*

Sierra Leone’s National Digital Learning Strategy (2025–2030) provides a dedicated framework for educational technology and digital learning. The strategy highlights goals relevant to TEHEE: improving equitable access to educational technology, building teacher capability for integrating technology in teaching, strengthening learner digital literacy while safeguarding learners, increasing access to localized curriculum-aligned content, and improving coordination across stakeholders.

➤ *Implications for Home Economics*

Taken together, these policies suggest that Home Economics is not merely a “domestic” subject, but a national skills platform. A TEHEE approach aligns Home Economics with national goals by expanding safe digital literacy, strengthening employable and productive skills, and creating entrepreneurship pathways that can contribute to household income and local economic development (Ministry of Basic and Senior Secondary Education & Ministry of Technical and Higher Education, 2022) (Directorate of Science, Technology and Innovation, 2019) (Ministry of Communications, Technology and Innovation, 2021) (Ministry of Basic and Senior Secondary Education & Teaching Service Commission, 2025).

V. CONCEPTUAL AND THEORETICAL FOUNDATIONS

TEHEE is anchored in three complementary strands: (i) teacher knowledge for effective technology integration; (ii) digital competence frameworks for learners; and (iii) entrepreneurial learning principles for vocational and practical education.

➤ *Technology Integration in Teaching (TPACK)*

The Technological Pedagogical Content Knowledge (TPACK) framework emphasizes that effective integration requires more than technical skills. Teachers need to understand how technology interacts with pedagogy and subject content. For Home Economics, this means knowing how to teach practical processes, how to design projects that

develop enterprise thinking, and how to select technology that improves learning rather than distracting from it.

➤ *Digital Competence for Learners*

Learner digital competence is commonly described across domains such as information and data literacy, communication and collaboration, digital content creation, safety and well-being, and problem solving. TEHEE operationalizes these domains through authentic Home Economics tasks. For example, students develop information literacy by evaluating nutrition and consumer information sources; content creation by producing labels and marketing flyers; communication by engaging customers respectfully; safety through privacy and consent routines; and problem solving by troubleshooting devices and adapting production processes.

➤ *Entrepreneurial Learning in Practical and TVET Settings*

Entrepreneurship competence is developed through experience, iteration, teamwork, and engagement with real markets and stakeholders. TVET guidance emphasizes institutional approaches that enable projects, mentorship, partnerships, and school-based enterprises. This aligns with Home Economics, where learners can design products and services, test them with customers, and improve them based on feedback.

➤ *Experiential, Project-Based, and Competency-Based Learning*

Home Economics is naturally suited to experiential learning, where learners build competence by doing, reflecting, and refining. TEHEE strengthens this by formalizing project cycles, using rubrics for performance evidence, and integrating digital portfolios. A competency-based approach also helps teachers focus on observable outcomes rather than coverage of topics alone.

➤ *Human Capital, Employability, and Capabilities*

From a human capital perspective, TEHEE strengthens productive skills that can improve employability and earnings. From a capability perspective, TEHEE enhances learners’ agency by expanding what they are able to do for themselves, their families, and their communities through practical competence, entrepreneurship, and safe digital participation (Mishra & Koehler, 2006; Schmidt et al., 2009) (Vuorikari et al., 2022; UNESCO Institute for Statistics, 2018) (UNESCO-UNEVOC, 2020; World Bank, 2014).

➤ *Core Design Principles of TEHEE*

To be feasible in Sierra Leone’s context, TEHEE should follow design principles that reduce cost and risk while maximizing learning value:

- Mobile-first design: prioritize smartphones and low-cost devices.

- Low-bandwidth and offline-capable learning: use downloadable content, printed complements, and device storage.
- Minimum viable technology: begin with a small toolkit that teachers can support locally; expand gradually.
- Project-based learning: organize learning around practical projects that generate tangible products or services.
- Enterprise authenticity: ensure projects include real decision-making (costing, pricing, marketing, customer feedback).
- Inclusion and safeguarding: protect access and build safe digital participation routines.
- Local relevance: integrate local foods, materials, cultural practices, and real market conditions.

- Evidence-informed improvement: track outcomes and use feedback cycles to refine implementation.

VI. THE TEHEE MODEL

The Technology-Enhanced Home Economics Education (TEHEE) Model is proposed as a coherent framework for integrating entrepreneurship and digital literacy into Home Economics learning. It is structured around six mutually reinforcing components: (1) competency-based curriculum integration; (2) project-based and community-linked pedagogy; (3) appropriate technology toolkit; (4) school-based enterprise and incubation; (5) inclusion and digital safety; and (6) monitoring, evaluation, and learning (MEL). Figure 1 presents the logic of TEHEE from inputs to outcomes.

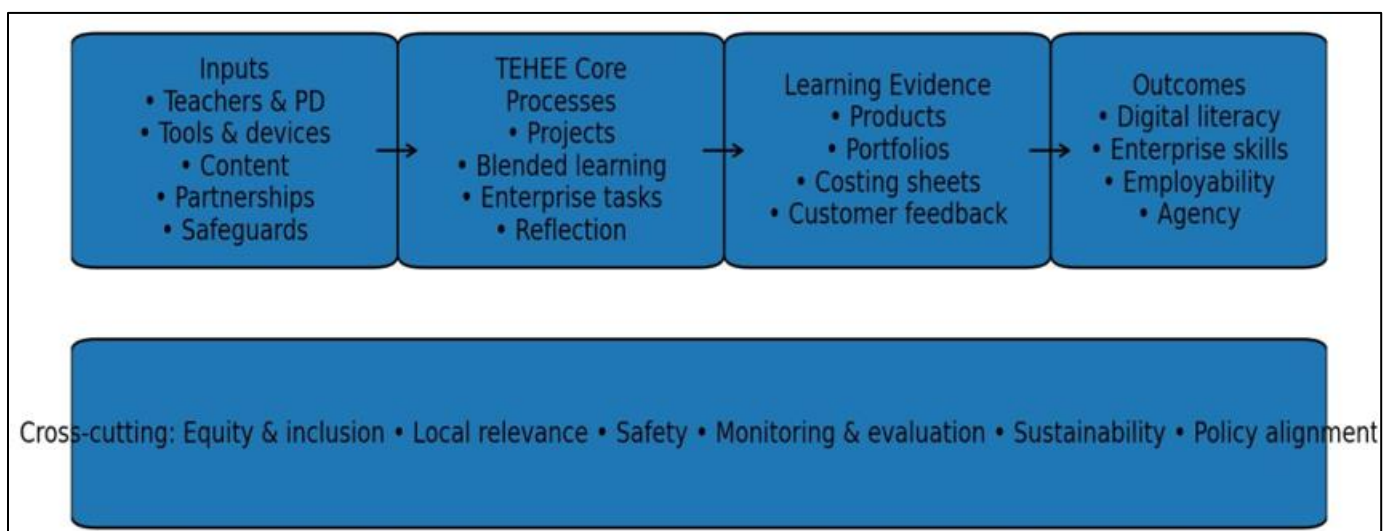


Fig 1. TEHEE Conceptual Framework (Inputs–Processes–Evidence–Outcomes).

➤ Competency-Based Curriculum Integration

TEHEE recommends that curriculum tools (schemes of work, lesson plans, and assessment guides) explicitly specify outcomes across three dimensions: (i) practical Home Economics outcomes (technical processes and product/service standards); (ii) entrepreneurship outcomes (opportunity recognition, costing, pricing, marketing, record-keeping, reflection); and (iii) digital outcomes (information literacy, content creation, communication, safety, problem solving).

A practical way to achieve this is to redesign each major Home Economics topic into a project sequence. For example, a nutrition unit becomes a ‘Healthy snack micro-enterprise’ project in which learners design a product, calculate input costs, test preparation methods, establish hygiene standards, set a selling price, design labels, and present a simple marketing plan.

Curriculum integration should also define progression: junior secondary projects focus on foundational competence and small team tasks, while senior secondary projects

introduce more complex enterprise functions (budgeting, market research, customer feedback, quality control, and basic reporting).

➤ Pedagogical Strategies for TEHEE Classrooms

TEHEE pedagogy prioritizes active learning strategies that match practical subjects. Useful approaches include:

- Demonstration plus micro-practice: teachers demonstrate a technique in short steps; learners practice each step immediately with feedback.
- Station rotation: groups rotate through stations (production, quality check, costing, marketing design), allowing limited devices to be shared efficiently.
- Flipped micro-demos: where feasible, learners watch a short offline video at home or before class, freeing class time for practice.
- Peer coaching: learners with stronger skills support peers, building collaboration and leadership.

- Continuous formative feedback: teachers use checklists and rubrics to guide improvement rather than only grading final products.

These strategies help TEHEE remain feasible even with limited resources: one device can support multiple groups if tasks are structured and time-boxed.

➤ *Community-Linked Learning and Partnerships*

Home Economics enterprise learning becomes more authentic when connected to community needs and real market expectations. TEHEE therefore encourages structured partnerships with local artisans, caterers, tailors, market associations, health units, and community leaders. Partnerships can provide mentorship, guest demonstrations, internship opportunities, and feedback on product standards.

To avoid informal or unsafe arrangements, schools should set simple partnership guidelines: clear learning objectives, adult supervision, safeguarding measures, and documented roles. Tertiary institutions (including Freetown

Polytechnic) can support school partnerships by coordinating mentor lists, offering short entrepreneurship and digital skills workshops, and helping schools document and share good practices.

VII. INTEGRATING DIGITAL LITERACY INTO HOME ECONOMICS

Digital literacy in TEHEE is treated as applied competence embedded in authentic Home Economics tasks. Rather than teaching digital skills in isolation, TEHEE integrates them into activities such as researching credible information, documenting practical processes, creating product labels, budgeting inputs, managing orders, and communicating with customers.

TEHEE promotes a ‘see–do–share–reflect’ cycle: learners access a brief digital resource, perform the practical task while recording evidence, produce a simple digital artifact, and reflect on improvements using feedback.

Table 1. Aligning Home Economics Domains with Digital Literacy and Entrepreneurship within TEHEE.

Home Economics Domain	Project Examples	Digital Literacy Integration (Examples)	Entrepreneurship Integration (Examples)
Food & Nutrition	Healthy snack micro-enterprise; food preservation; catering for school events	Costing and budgeting in spreadsheets; hygiene checklist; short demo video; credible nutrition research; order log	Input sourcing; costing → price setting; packaging and labeling; customer feedback; simple profit/loss tracking
Clothing & Textiles	Uniform alterations;	Photo portfolio of	Pricing (materials +
	reusable bags; basic fashion design portfolio	stages; simple design mockups; trend research; digital price comparison; order tracking	labor); brand identity; product photos and posting; record-keeping for orders
Home Management	Budgeting challenge; household inventory; waste-reduction project	Budget templates; charts; inventory list; mobile money records; simple spreadsheet graphs	Service concept; customer communication; fee model; tracking service delivery; ethical consumer practice
Family Life & Consumer Education	Childcare safety awareness; consumer rights; wellness campaign	Digital citizenship; privacy; credible health info; awareness posters; reflection notes	Community service entrepreneurship; partnership building; event planning; impact tracking

➤ *Digital Safety and Responsible Participation*

Because TEHEE increases students’ use of digital tools, digital safeguarding must be built into classroom routines. Key topics include privacy, consent for photos/videos, respectful communication, protection from cyberbullying, and recognition of misinformation and scams. Safety should be taught through applied practice: learners configure privacy settings, draft respectful customer messages, and reflect on what information should not be shared.

Where schools use messaging groups for coordination, teacher supervision is essential. Clear acceptable-use rules, guided discussion of gender-based harassment risks, and safe reporting mechanisms help ensure digital participation remains empowering.

➤ *Digital Financial Literacy for Micro-Enterprise*

For many Sierra Leonean learners, the most immediate ‘digital economy’ experience is digital payments and mobile money. TEHEE therefore recommends explicit digital financial literacy within projects. Learners practice keeping a

cashbook, recording mobile money transactions, separating enterprise money from personal spending, and recognizing common scams. Digital financial literacy is also connected to budgeting and costing: learners compare supplier prices, compute unit costs, set prices, and document income and expenses.

When learners understand digital payments, record-keeping, and basic budgeting, they are better positioned to run small ventures responsibly, avoid loss, and demonstrate accountability to customers and partners.

VIII. ENTREPRENEURSHIP LEARNING PATHWAYS IN TEHEE

Entrepreneurship learning in TEHEE progresses from exploration to practice to enterprise. Learners identify local needs, prototype products/services, and iterate based on feedback. TEHEE emphasizes ‘enterprise habits’: opportunity awareness, quality mindset, financial discipline, customer care, and reflection and resilience.

TEHEE recommends that each Home Economics term include at least one enterprise-linked project. Projects start small and low-risk and become more complex over time with the integration of branding, quality assurance, and sales tracking.

➤ *School-Based Enterprise and Incubation*

A school-based enterprise approach provides a safe environment for students to practice entrepreneurship under supervision. Schools can establish enterprise clubs or “Home Economics enterprise corners” where teams develop products, set prices, record sales, and reflect on outcomes. Small profit margins can be reinvested into learning materials.

Partnerships with local tailors, caterers, market traders, and small businesses can provide mentorship, internships, and access to real market expectations. Schools can also collaborate with community leaders to identify projects that address local needs such as affordable nutritious snacks or reusable household items.

At tertiary level, institutions such as Freetown Polytechnic can support TEHEE by offering mentorship networks, short courses (digital marketing for micro-enterprises, spreadsheet bookkeeping), and collaboration with teacher-training and quality assurance initiatives.

➤ *Green Entrepreneurship and Responsible Production*

TEHEE can also support ‘green skills’ by integrating responsible production and waste reduction into enterprise projects. Examples include producing reusable bags, minimizing food waste through preservation techniques, using safe packaging, and promoting hygiene and environmental responsibility in catering services. These practices help

learners connect enterprise success to community well-being and sustainability.

IX. TECHNOLOGY TOOLKIT FOR LOW-RESOURCE CONTEXTS

The TEHEE technology toolkit prioritizes affordability, accessibility, and offline functionality.

The focus is on what teachers and students can sustain.

Recommended tool categories include learning resources (short videos, photo step-guides, PDFs), documentation and portfolios (camera + folder structure), costing and budgeting (spreadsheets), communication (moderated groups), design and marketing (lightweight design tools), and data and evidence (simple forms or logs for feedback and reflection).

Technology choices should be guided by pedagogical value and maintenance feasibility. Schools should begin with a minimum viable toolkit and expand only after routines and teacher confidence are stable.

➤ *Localization and Open Educational Resources*

To reduce cost and improve relevance, TEHEE encourages localization of content: examples using local foods, locally available materials, and local market realities. Schools and teacher educators can build simple resource banks of short videos, photo sequences, and worksheets aligned to the scheme of work. Where appropriate, resources can include multilingual elements (e.g., key terms in English and Krio) to support understanding.

Open educational resources (OER) are also useful: teachers can adapt open content to local context, rather than relying only on expensive textbooks. A shared repository at district or institutional level can reduce duplication of effort and improve quality over time.

X. IMPLEMENTATION STRATEGY, GOVERNANCE, AND COSTING

Implementing TEHEE requires coordinated action at classroom, school, and system levels. A phased approach reduces risk and builds sustainable capacity.

Governance roles include: teachers (design, delivery, supervision, assessment), school leadership (time allocation, resources, partnerships, safeguarding), and district/system support (coaching, quality assurance, consolidation of lessons learned). Costing should cover basic devices and protection, power solutions, consumables, and teacher PD. Where feasible, enterprise projects can reinvest part of proceeds into consumables.

Table 2. Phased Roadmap for Implementing TEHEE.

Phase	Focus	Key activities	Outputs	Sustainability actions
Phase 1: Readiness (0–3 months)	Baseline and planning	Needs assessment; device/connectivity mapping; teacher self-assessment; stakeholder engagement; safeguarding guidelines; identify local mentors	School TEHEE plan; baseline indicators; PD schedule; partner list	Budgeting; maintenance roles; record-keeping routines
Phase 2: Capacity building (3–6 months)	Teacher skills + content	TPACK-aligned PD; localized resources; portfolios and rubrics; pilot one enterprise project; offline content pack	Lesson packages; digital portfolios; pilot outputs	Peer coaching; device care policy; basic tech support routines
Phase 3: Pilot and refine (6–12 months)	Implementation + refinement	Run 2–3 projects; integrate assessment; collect feedback; refine toolkit and routines; document lessons learned	Evidence of outcomes; refined templates	Termly review; strengthen partnerships; scale plan
Phase 4: Scale (Year 2+)	Expansion and institutionalization	Expand coverage; mentor new teachers; integrate into schemes; link to clubs/incubators; district coordination	Institutional routines; shared resource bank	Cost-sharing models; local procurement; long-term PD and MEL

➤ *Teacher Professional Development (PD)*

Teacher PD is the engine of TEHEE. A practical PD model includes modular training supported by coaching and peer learning communities. Core PD topics include enterprise-oriented project design, rubric-based assessment, safe digital participation, low-bandwidth content creation, and basic troubleshooting.

Where connectivity is limited, PD can be delivered through blended arrangements: workshops supplemented by offline resources stored on phones or local servers. Institutions such as Freetown Polytechnic can support by embedding TEHEE modules in teacher preparation and offering short courses for practicing teachers.

➤ *Procurement, Maintenance, and Device Management*

A common barrier to school technology initiatives is weak maintenance. TEHEE recommends simple device management routines: (i) an inventory register; (ii) protective cases and basic care rules; (iii) a charging schedule; (iv) user rotation logs for shared devices; and (v) basic troubleshooting guides. Where possible, schools can identify a ‘technology focal person’ (often an ICT teacher) to support Home Economics teachers and coordinate basic maintenance.

Procurement should prioritize durability and repairability over high specifications. Selecting a small number of standardized devices can reduce complexity and make it easier to source chargers, cases, and spare parts.

XI. ASSESSMENT, MONITORING, AND EVALUATION

Assessment in TEHEE should capture three types of evidence: practical competence (process quality and product/service standards), entrepreneurship competence (planning, costing, marketing, reflection), and digital competence (information use, content creation, safety, problem solving). TEHEE recommends combining performance tasks, portfolios, peer assessment, and teacher observation.

➤ *Portfolio-Based Assessment*

Each student or group maintains a portfolio containing photos of production stages, measurement records, hygiene/quality checklists, a costing sheet, a marketing artifact, and a reflection note. Portfolios can be stored on phones and backed up periodically.

➤ *Monitoring Indicators*

Table 3 Proposes Simple Indicators that Schools can Track each Term.

Outcome Area	Indicator Examples	Data Source	Frequency
Digital literacy	Label/flyer created; basic costing spreadsheet completed; safety checklist met	Portfolios; teacher rubric; observation checklist	Termly
Entrepreneurship	Projects completed; sales records maintained; customer feedback documented	Project logs; costing sheets; feedback forms	Termly
Practical competence	Quality/hygiene standards met; measurement accuracy; process consistency	Observation; product evaluation rubrics	Per project
Equity/safeguarding	Girls' participation; device access rotation; incidents addressed; consent followed	Participation records; safeguarding log	Monthly/termly

➤ *Learning Cycles and Continuous Improvement*

Monitoring is only useful if it leads to improvement. TEHEE encourages short learning cycles: each term, teachers review evidence (portfolio quality, project outcomes, participation, and challenges), identify one or two priorities, and adjust project design or routines. School clusters can share lessons learned, exchange resources, and mentor teachers who are new to TEHEE.

At district level, periodic reflection workshops can help consolidate evidence and support scaleup decisions based on feasibility and cost.

➤ *Suggested Evaluation Approach for Pilots*

For schools or districts piloting TEHEE, a feasible evaluation approach is mixed-methods: baseline and endline student surveys on digital self-efficacy and entrepreneurial intention, portfolio rubric scoring, and qualitative interviews with teachers and students on feasibility and challenges. Where possible, comparison with non-TEHEE classes can strengthen inference. Early pilots should focus on implementation quality and short-term outcomes, while longer-term employment effects require follow-up over time.

XII. INCLUSION, SAFETY, AND ETHICAL CONSIDERATIONS

Because digital access and social norms can differentially affect participation, TEHEE requires an explicit inclusion and safeguarding approach.

➤ *Gender and Inclusion*

Schools should ensure girls have equal access to devices during projects and use group work structures that rotate leadership. Project selection should avoid reinforcing harmful stereotypes and should highlight diverse enterprise pathways.

➤ *Disability Inclusion*

Where learners have disabilities, TEHEE encourages adaptation larger print materials, voice notes, and peer support so that learners can contribute meaningfully to projects and portfolio evidence.

➤ *Ethical Enterprise Learning*

Enterprise activities must be transparent and educational. Pricing, sales, and profit use should be monitored to prevent exploitation and to ensure activities remain aligned with learning goals.

Schools should maintain clear rules on how any revenue is handled.

XIII. IMPLEMENTATION CHALLENGES AND RISK MITIGATION

TEHEE implementation is promising but must be realistic about constraints. Common challenges include infrastructure limitations, teacher confidence, sustainability of consumables, and safeguarding risks. Table 4 outlines common risks and mitigation actions.

Table 4. Common TEHEE Risks and Mitigation Actions.

Risk	How it may appear	Mitigation actions
Limited electricity / charging	Devices not available during lessons; interrupted portfolio work	Power banks/solar; charging routines; offline-first materials
Low connectivity	Cannot stream resources; difficulty sharing content	Downloadable packs; local sharing; printed complements
Teacher low confidence	Technology used rarely or superficially	Coaching; peer support; start small with one tool per project
Cost of consumables	Projects stop due to lack of	Micro-enterprise reinvestment; partner support; low-cost

	ingredients/materials	project choices
Safeguarding concerns	Inappropriate sharing; cyberbullying; privacy violations	Rules; consent protocols; moderation; digital citizenship lessons

XIV. DISCUSSION

TEHEE offers a pragmatic pathway for strengthening employability and self-reliance through a subject that already has strong livelihood relevance. By integrating digital literacy within enterprise-linked Home Economics projects, students can develop capabilities that transfer directly to income-generating activities. TEHEE also provides a strategy for making technology use meaningful in contexts where resources are constrained.

A key contribution of TEHEE is coherence: it ties policy priorities (digital learning, teacher capability, localized content, safeguarding) to a practical subject where results can be visible and motivating. Students see immediate value when digital tools help improve product quality, reduce waste, price accurately, attract customers, and communicate professionally.

Sustainable impact, however, requires time for teacher development, gradual scale-up, and alignment with assessment systems. If Home Economics is assessed mainly through written tests without recognizing portfolios and performance evidence, teachers may face incentives that discourage TEHEE practices. Therefore, assessment modernization and school leadership support are essential.

TEHEE also creates opportunities for collaboration across departments: ICT teachers can support device management and digital tool practice, while Home Economics teachers lead practical projects and enterprise learning. This cross-department collaboration can strengthen whole-school digital learning culture.

XV. RECOMMENDATIONS

➤ *Policy and System Level*

- Integrate TEHEE priorities into curriculum guidance and digital learning implementation plans.
- Develop assessment guidance that legitimizes portfolios and performance tasks in Home Economics.
- Support school clusters to share resources, mentor teachers, and document best practices.

➤ *School Leadership Level*

- Allocate timetable space for projects and ensure safe supervision for digital activities.
- Establish partnerships with local businesses and mentors to strengthen enterprise authenticity.
- Adopt transparent and equitable arrangements for consumables and project costs.

➤ *Teacher Education and Professional Development*

- Embed TEHEE modules in teacher preparation, including TPACK-aligned practice.
- Provide modular PD supported by coaching and peer learning communities.

➤ *Research and Evaluation*

- Pilot TEHEE in selected schools, document implementation lessons, and scale gradually with costed plans and indicators.
- Conduct empirical studies to test TEHEE effects on digital literacy, entrepreneurial competence, and longer-term outcomes such as progression to TVET, employment, or microenterprise creation (Mishra & Koehler, 2006; Schmidt et al., 2009).

XVI. CONCLUSION AND LIMITATIONS

Technology-Enhanced Home Economics Education provides a feasible, context-sensitive approach for helping Sierra Leonean students build practical livelihoods, entrepreneurial competence, and digital literacy. The TEHEE Model shows how curriculum redesign, project-based pedagogy, mobile-first tools, school-based enterprise, inclusion safeguards, and monitoring can be combined into an actionable pathway for strengthening learning and employability.

Because this is a conceptual and practice-oriented paper, its limitation is the absence of new empirical outcome data. The framework is intended as a foundation for piloting and evaluation. Future work should test TEHEE implementation in diverse school contexts, examine cost and sustainability, and evaluate impacts on learner competence and post-school transitions.

REFERENCES

- [1]. Government of Sierra Leone, Directorate of Science, Technology and Innovation. (2019). *Sierra Leone National Innovation & Digital Strategy 2019–2029: Digitization for all Identity, economy, and governance.* Office of the President.
- [2]. Government of Sierra Leone, Ministry of Basic and Senior Secondary Education & Ministry of Technical and Higher Education. (2022). *Sierra Leone Education Sector Plan 2022–2026:
- [3]. Transforming learning for all.* UNICEF Sierra Leone (Ministry of Basic and Senior Secondary Education & Ministry of Technical and Higher Education, 2022).

- [4]. Government of Sierra Leone, Ministry of Communications, Technology and Innovation. (2021).
- [5]. *National Digital Development Policy 2021.* Government of Sierra Leone (Ministry of Communications, Technology and Innovation, 2021).
- [6]. Government of Sierra Leone, Ministry of Basic and Senior Secondary Education & Teaching
- [7]. Service Commission. (2025). *National Digital Learning Strategy 2025–2030.* Government of Sierra Leone (Ministry of Basic and Senior Secondary Education & Teaching Service Commission, 2025).
- [8]. Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for integrating technology in teachers' knowledge. *Teachers College Record, 108*(6), 1017–1054.
- [9]. Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J., & Shin, T. S. (2009). Technological pedagogical content knowledge (TPACK): The development and validation of an assessment instrument for preservice teachers. *Journal of Research on Technology in Education, 42*(2), 123–149 (Mishra & Koehler, 2006; Schmidt et al., 2009). UNESCO. (2018). *UNESCO ICT Competency Framework for Teachers (Version 3)*. UNESCO (UNESCO, 2018).
- [10]. UNESCO Institute for Statistics. (2018). *A global framework of reference on digital literacy skills for indicator 4.4.2.* UNESCO.
- [11]. UNESCO-UNEVOC. (2020). *Entrepreneurial learning for TVET institutions: A practical guide.* UNESCO.
- [12]. Vuorikari, R., Kluzer, S., & Punie, Y. (2022). *DigComp 2.2: The Digital Competence Framework for Citizens—With new examples of knowledge, skills and attitudes.* Publications Office of the European Union.
- [13]. UNICEF Innocenti. (2020). *Digital literacy for children: Exploring definitions and frameworks.* UNICEF Office of Research – Innocenti.
- [14]. UNICEF. (2019). *Digital literacy for children: 10 things you need to know.* UNICEF Office of Research – Innocenti.
- [15]. World Bank. (2014). Entrepreneurship education and training: Insights from Ghana, Kenya, and Mozambique. World Bank.

APPENDIX A. EXAMPLE TEHEE PROJECT SEQUENCE

➤ *Project: Healthy Snack Micro-Enterprise (6–8 weeks)*

- Week 1: Identify local snack preferences; discuss nutrition and hygiene; assign roles.
- Week 2: Prototype recipes; measure ingredients; record processes (photos/notes).
- Week 3: Cost inputs; compute unit cost and selling price; create a costing sheet.

- Week 4: Improve quality and consistency; create packaging and labeling.
- Week 5: Test with a small customer group; collect feedback using a simple form.
- Week 6: Final production; manage orders; record sales and expenses.
- Week 7: Reflection and reporting; calculate profit/loss; present lessons learned.
- Week 8: Portfolio submission and peer review.

➤ *Portfolio evidence: photos of stages, hygiene checklist, costing sheet, label/flyer, customer feedback summary, reflection note.*

APPENDIX B. SUGGESTED MINIMUM RESOURCE PACKAGE FOR A TEHEE PILOT

- 1–2 smartphones (or tablets) per group (shared), with protective cases
- Power banks and/or solar charging option where electricity is unreliable
- Offline content pack (videos, PDFs, photo guides) aligned to the Home Economics scheme
- Basic consumables for projects (ingredients, fabric, thread, needles, etc.)
- Simple printing access for labels/flyers where possible (or structured hand-drawn alternatives)
- Project record book for each group + digital portfolio folders
- Safeguarding/acceptable-use guidelines and consent procedures for photos/videos