

Evaluating an Integrated Digital-Vocational Skills Intervention for Street-Connected Youth in Nigeria: A Mixed-Methods Study

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Abstract:

Street-connected children in Nigeria face persistent exclusion from formal education, digital learning opportunities, and vocational skill-development programmes, limiting their social inclusion and economic prospects. Although digital literacy and vocational education are increasingly recognized as pathways to youth empowerment and employability, limited evidence exists on integrated interventions designed for low-literacy and marginalized youth populations in low-resource settings. This study examined the implementation and preliminary outcomes of the Cybercatch Project, a four-week integrated digital and vocational skills intervention for street-connected adolescents in Kwara State, Nigeria. An exploratory mixed-methods design was adopted involving twelve (12) participants aged 12-18 years who completed the intervention programme. Quantitative data were collected using structured pre- and post-intervention assessments measuring perceived competencies in digital literacy, vocational skills, entrepreneurship knowledge, and life skills/confidence on a five-point scale. Descriptive statistics and paired-sample comparisons were used to examine changes across learning domains. Qualitative data were obtained through focus group discussions, facilitator reflections, and observation notes and were analyzed thematically. Findings indicated observable improvements across all assessed domains following participation in the programme. Participants reported increased confidence in digital engagement, vocational activities, entrepreneurship understanding, and interpersonal skills. Qualitative findings further highlighted the effectiveness of hands-on and visual learning approaches, supportive learning structures, peer interaction, and practical engagement in enhancing learner motivation and participation. Participants also expressed renewed interest in entrepreneurship, apprenticeships, and continued learning opportunities. The study concludes that integrated digital-vocational interventions show promise as inclusive and low-literacy-sensitive skill-development models for marginalized youth. However, findings should be interpreted cautiously due to the exploratory nature of the study and small sample size. Further longitudinal research is recommended to assess sustainability and long-term livelihood outcomes.

Keywords: Digital literacy; Vocational training; Street-connected children; Cybercatch Project

Introduction

Street-connected children constitute one of the most marginalized and educationally disadvantaged populations in many developing countries. In Nigeria, increasing levels of poverty, family instability, rural–urban migration, and social insecurity have contributed to the growing number of children who live or work on the streets with limited access to formal education and structured opportunities for personal development (Ginting & Shofwan, 2021). The exclusion of these children from educational and skill-building opportunities continues to widen social inequalities and reduces their chances of sustainable livelihood development and social inclusion. As global economies become increasingly knowledge- and technology-driven, access to digital literacy, vocational competencies, and entrepreneurial skills has become essential for employability, social participation, and economic survival (UNESCO, 2022). However, street-connected children often remain excluded from such opportunities because many intervention programmes are designed primarily for formally educated youth and are insufficiently adapted to the realities of low-literacy and vulnerable populations.

Digital literacy has emerged as a critical component of youth empowerment and inclusion in contemporary society. It encompasses the ability to use digital devices, navigate online platforms, communicate effectively, and engage in basic problem-solving using technology. Research has shown that exposure to digital technologies can improve confidence, learning engagement, information access, and long-term educational readiness among disadvantaged youth (Abdullahi, 2019). Similarly, Alexander and Adigwe (2017) observed that digital skill acquisition can contribute significantly to youth empowerment and employability in low-resource settings. Despite the increasing importance of digital literacy, most digital inclusion initiatives in Nigeria continue to focus on in-school adolescents and tertiary-level learners, thereby excluding street-connected youth whose educational needs require flexible, low-literacy-sensitive, and experiential approaches to learning (Abdullahi, 2019).

In addition to digital competence, vocational education remains an important strategy for addressing youth unemployment and poverty among vulnerable populations. Vocational skills such as shoe-making, tailoring, soap production, and other practical crafts have been recognized as accessible pathways into the informal economy, particularly for young people with limited formal educational qualifications (Oviawe, 2019). Studies have demonstrated that practical vocational programmes can improve self-efficacy, livelihood opportunities, and economic participation among disadvantaged youth populations (Mwende et al., 2022). Abdullahi (2025) further noted that integrating entrepreneurship education with vocational training enhances young people's capacity to translate

acquired skills into income-generating activities and self-employment opportunities. However, many existing vocational and entrepreneurship programmes are often literacy-dependent and may not adequately accommodate the unique learning circumstances of street-connected adolescents.

Recent international discourse increasingly emphasizes the importance of integrated skill-development approaches that combine digital literacy, vocational education, life skills, and entrepreneurship training for vulnerable youth populations (UNICEF, 2021). Such integrated interventions are considered more effective because they address multiple dimensions of exclusion simultaneously, including technological exclusion, economic vulnerability, and psychosocial marginalization. Evidence from global education and youth development research suggests that experiential and community-based learning approaches can enhance resilience, employability, and social participation among marginalized youth (Sperling & Winthrop, 2015; World Bank, 2018). Similarly, UNESCO (2022) highlighted that digital inclusion initiatives are most effective when combined with broader livelihood and psychosocial support systems. Despite these growing international efforts, empirical evidence on integrated digital-vocational interventions for street-connected children in low-resource African contexts remains limited.

Furthermore, educating street-connected and low-literacy youth requires instructional strategies that differ significantly from conventional classroom-based approaches. Experiential learning approaches that emphasize demonstrations, observation, peer learning, role-play, and practical engagement have been found to improve comprehension, participation, and skill retention among learners with limited formal educational backgrounds (Kolb, 2015). Abdullahi (2019) similarly observed that visual and hands-on learning approaches are more effective for marginalized learners than text-based instructional methods. In non-formal learning environments, supportive structures such as refreshments, transportation assistance, peer collaboration, and emotionally safe spaces also play important roles in sustaining learner engagement and motivation (Turnbull et al., 2023; Leino, 2021).

The Cybercatch Project was developed in response to these identified gaps by implementing a four-week integrated training programme for street-connected adolescents in Kwara State, Nigeria. The programme combined digital literacy training, vocational skill acquisition, entrepreneurship education, and life-skills development using low-literacy-sensitive and experiential instructional methods. Practical vocational sessions included shoe-making, soap production, and perfume production, while digital sessions introduced participants to basic digital navigation and technology use. To enhance participation and retention, the programme also incorporated learner support mechanisms such as

transportation assistance, refreshments, games, peer-learning activities, and structured facilitation.

Although previous studies have examined digital literacy, vocational education, or entrepreneurship training independently, limited research has explored how integrated interventions influence the learning experiences and perceived competencies of street-connected youth in low-resource African settings. Existing evidence also provides limited understanding of how experiential and low-literacy-sensitive pedagogies may contribute to confidence-building, learner engagement, and future aspirations among marginalized adolescents. This study therefore contributes to the emerging literature on inclusive youth development by examining the implementation and outcomes of an integrated digital-vocational intervention for street-connected children in Nigeria. Specifically, the study evaluates participants' perceived improvements in digital literacy, vocational competence, entrepreneurship knowledge, and life skills, while also exploring their experiences and perceptions of the Cybercatch Project intervention.

Problem Statement

Despite increasing national and global attention to digital inclusion, youth employability, and vocational education, street-connected children in Nigeria continue to experience severe exclusion from structured learning and skill-development opportunities. Many existing training programmes are designed for formally educated youth and are often unsuitable for low-literacy and highly vulnerable populations such as street-connected adolescents. Consequently, many of these young people remain without access to digital competencies, vocational skills, entrepreneurship knowledge, and supportive learning environments that could enhance their social inclusion and livelihood opportunities. Although previous studies have examined digital literacy or vocational education independently, limited empirical evidence exists on integrated and low-literacy-sensitive interventions that combine digital, vocational, entrepreneurial, and life-skills training for marginalized youth in low-resource settings. This study therefore, examines whether an integrated digital-vocational intervention can improve perceived competencies and aspirations among street-connected youth in Kwara State.

Research Objectives

General Objective

To examine the effectiveness of the Cybercatch Project in bridging digital and vocational skills gaps for street children in Nigeria through an integrated four-week training intervention.

Specific Objectives

1. To assess the baseline and post-training digital literacy levels of participating street children.
2. To evaluate improvements in life skills, including teamwork, communication, and problem-solving, resulting from the program.
3. To determine the extent of practical vocational skill acquisition, including shoe-making, soap-making, and perfume production.
4. To explore associations between skill gains and perceived employability outcomes.
5. To explore participants' perceptions and experiences of the integrated digital-vocational training model.
6. To identify challenges and enabling factors that influence learning outcomes among low-literacy, street-connected youth.
7. To generate evidence that can inform policy and scale-up of inclusive skills development programs in Nigeria.

Literature Review

Street-Connected Children and Educational Exclusion

Street-connected children remain among the most socially and educationally excluded populations globally. Many experience unstable living conditions, economic hardship, weak social support systems, and limited access to formal education and structured learning opportunities (Consortium for Street Children, 2020). In Nigeria, factors such as poverty, family instability, and rural-urban migration have contributed to the increasing number of children living or working on the streets (Ginting & Shofwan, 2021). The exclusion of these children from formal education often limits their opportunities for personal development, employability, and social participation.

Research indicates that conventional educational and training programmes frequently fail to accommodate the realities of street-connected youth because many interventions rely heavily on literacy-based instruction and rigid participation structures (Stoecklin et al., 2023). Sister et al. (2023) further observed that limited parental support, unstable living conditions, and weak institutional protection contribute significantly to poor educational engagement among street children. Consequently, scholars increasingly emphasize the need for flexible, community-based, and experiential learning approaches that are responsive to the needs of vulnerable adolescents.

Digital Literacy and Youth Empowerment

Digital literacy has become an important requirement for participation in modern educational, economic, and social systems (UNESCO, 2022). Beyond technical competence, digital literacy contributes to communication, information access,

problem-solving, and employability opportunities among young people. Studies have shown that exposure to digital technologies can improve confidence, learning engagement, and social participation among disadvantaged youth populations (Abdullahi, 2019). Similarly, Alexander and Adigwe (2017) reported that digital skill acquisition contributes positively to youth empowerment and inclusion in low-resource environments.

Despite the increasing significance of digital literacy, access remains uneven across many developing countries, particularly among vulnerable youth populations. Simplice et al. (2021) noted that affordability constraints, limited infrastructure, and inadequate access to training opportunities continue to widen digital inequalities in Sub-Saharan Africa. Existing digital literacy programmes in Nigeria also tend to focus primarily on formally enrolled students, with limited adaptation for low-literacy and out-of-school youth populations (Abdullahi, 2019). This highlights the importance of inclusive and context-sensitive digital learning models that prioritize practical engagement and accessibility.

Vocational Skills and Livelihood Development

Vocational education has consistently been identified as an important strategy for promoting employability, income generation, and economic participation among vulnerable youth populations. In developing economies where informal employment constitutes a major source of livelihood, practical vocational skills such as tailoring, soap production, shoe-making, and craft production provide accessible pathways into self-employment and apprenticeship opportunities (Oviawe, 2019).

Studies have demonstrated that vocational training programmes can positively influence self-efficacy, livelihood opportunities, and economic resilience among disadvantaged adolescents (Mwende et al., 2022). Abdullahi (2025) further argued that integrating entrepreneurship education with vocational skill acquisition enhances participants' ability to translate acquired competencies into sustainable income-generating activities. However, many vocational training programmes remain inadequately adapted for low-literacy populations and often fail to provide supportive learning structures necessary for sustained participation and engagement.

Entrepreneurship Education and Life Skills Development

Entrepreneurship education equips young people with practical knowledge related to opportunity identification, resource management, customer relations, and small-scale business development. For vulnerable youth populations, entrepreneurship training can strengthen financial awareness, self-reliance, and decision-making abilities (Global Entrepreneurship Monitor, 2022). Mwasalwiba (2010) observed that entrepreneurship education programmes can contribute significantly to learners' problem-solving and business management capacities when delivered using practical and participatory approaches.

For low-literacy learners, however, entrepreneurship instruction must be simplified and adapted through demonstrations, role-play activities, peer interaction, and visual learning techniques (UNICEF, 2021). Integrating entrepreneurship with vocational and life-skills education therefore offers greater potential for supporting long-term livelihood development among street-connected adolescents.

Experiential and Non-Formal Learning Approaches

Experiential learning approaches are widely recognized as effective strategies for engaging low-literacy and out-of-school learners. According to Kolb (2015), learning becomes more meaningful when individuals actively participate in practical experiences followed by reflection and application. Research suggests that demonstrations, collaborative activities, peer learning, and practice-based instruction improve understanding and participation among vulnerable youth populations (Abdullahi, 2019).

Supportive and learner-friendly environments also contribute significantly to effective participation in non-formal education settings. Leino (2021) emphasized that vulnerable learners benefit from safe, flexible, and relationship-oriented learning spaces, while Turnbull et al. (2023) highlighted the importance of structured engagement strategies such as games, breaks, refreshments, and interactive activities in sustaining attention and motivation during training sessions.

Integrated Skill-Development Interventions

Recent global discussions on youth empowerment increasingly advocate for integrated interventions that combine digital literacy, vocational training, entrepreneurship education, and psychosocial support (UNICEF, 2021). Such approaches are considered more effective because they address multiple dimensions of exclusion simultaneously. International evidence suggests that integrated skill-development programmes can improve employability, resilience, and social participation among disadvantaged youth populations (Sperling & Winthrop, 2015; World Bank, 2018).

Despite growing international interest in integrated interventions, empirical evidence on programmes specifically designed for street-connected children in African contexts remains limited. Existing studies have largely examined digital literacy, vocational training, or entrepreneurship education separately, with limited attention to how these components can be integrated within low-literacy and non-formal learning environments. This study therefore contributes to the emerging literature by examining the implementation and perceived outcomes of an integrated digital-vocational intervention designed specifically for street-connected adolescents in Nigeria.

Theoretical Framework

Experiential Learning Theory (Kolb, 2015)

This study is anchored on Experiential Learning Theory as developed by David A. Kolb (2015). The theory explains learning as a process through which knowledge, skills, and understanding are developed through direct experience, reflection, and active engagement. Kolb argues that effective learning occurs when individuals are actively involved in practical activities that allow them to observe, reflect, conceptualize, and apply new knowledge in real-life situations. The theory is particularly relevant for non-formal and low-literacy learning environments where learners benefit more from practical engagement than from abstract or text-based instruction.

Experiential Learning Theory proposes that learning occurs through a cyclical process involving four interconnected stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Concrete experience involves direct participation in an activity or task; reflective observation allows learners to think about and interpret their experiences; abstract conceptualization involves developing ideas or understanding from those experiences; while active experimentation enables learners to apply newly acquired knowledge and skills in practical situations (Kolb, 2015). The cyclical nature of the theory emphasizes that learning becomes more meaningful and sustainable when learners repeatedly engage in practice, reflection, and application.

The theory is particularly suitable for this study because street-connected children often possess limited formal educational experience and may struggle with conventional classroom-based instructional methods. Practical, hands-on, and demonstration-based learning approaches are therefore more appropriate for facilitating participation, understanding, and retention among such learners. Previous studies have shown that experiential learning strategies such as demonstrations, peer learning, role-play, observation, and collaborative activities improve comprehension and engagement among marginalized and low-literacy populations (Abdullahi, 2019; Leino, 2021).

The Cybercatch Project was designed in line with the principles of Experiential Learning Theory by emphasizing active participation, practical engagement, and learner-centered instruction throughout the intervention process. Participants were directly involved in vocational activities such as shoe-making, soap production, and perfume-making, while digital literacy sessions provided opportunities for hands-on interaction with digital devices and applications. Learning activities incorporated demonstrations, guided practice, games, peer collaboration, and repeated practice to strengthen skill acquisition and confidence development.

Furthermore, the supportive learning environment created through peer interaction, refreshments, transportation support, and facilitator guidance encouraged learners to participate actively and reflect on their experiences throughout the programme. Through repeated engagement in practical activities, participants were able to develop not only technical competencies but also confidence, motivation, teamwork, and future aspirations.

Experiential Learning Theory therefore provides an appropriate theoretical lens for understanding how integrated digital and vocational interventions can support skill acquisition, engagement, and psychosocial development among street-connected youth in non-formal learning environments. The theory also offers a useful framework for interpreting the observed improvements in participants' perceived digital literacy, vocational competence, entrepreneurship understanding, and life skills following participation in the Cybercatch Project.

Conceptual Framework

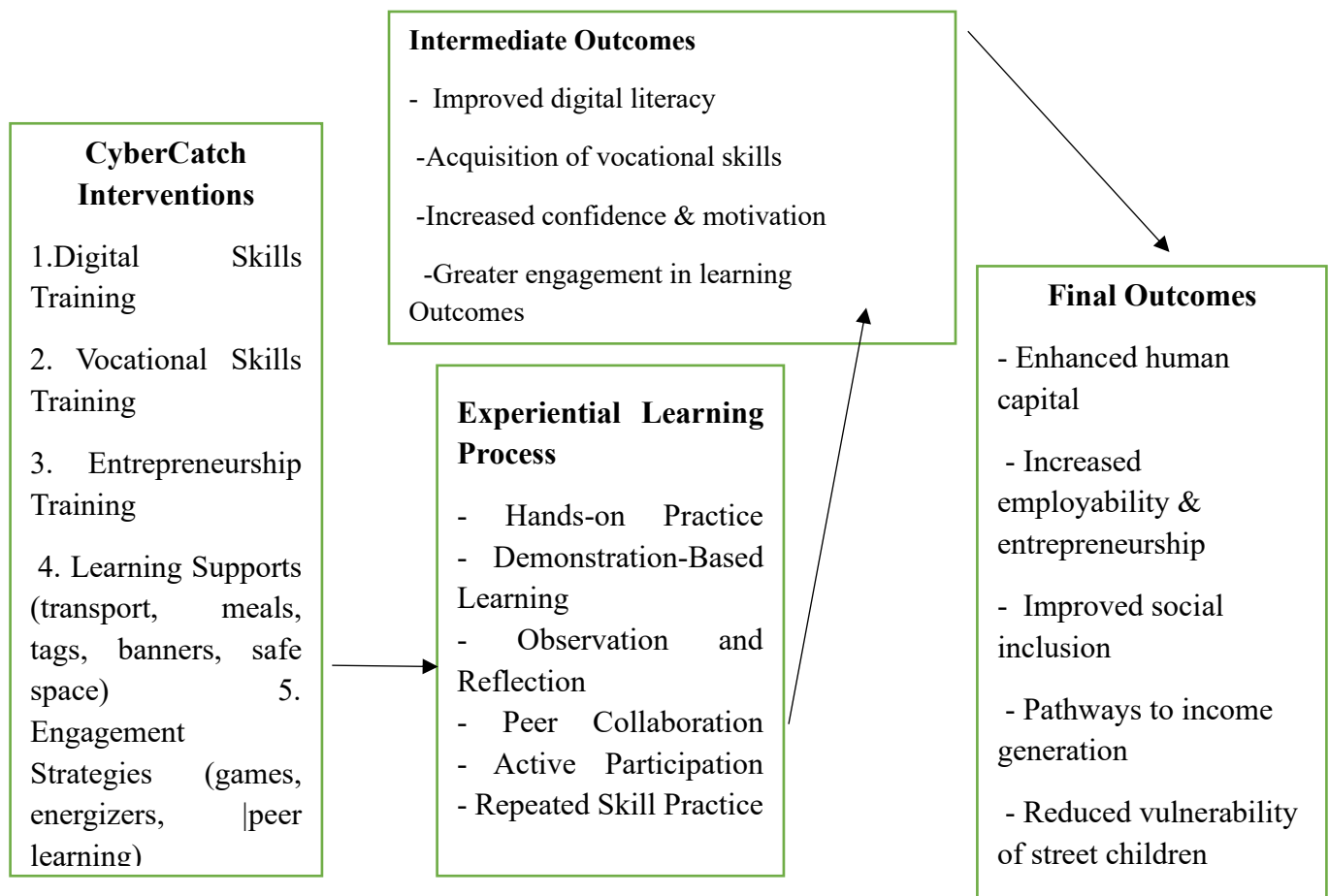


Figure 1: Conceptual Framework of the Cybercatch Project Intervention

The conceptual framework for this study is grounded in David A. Kolb's Experiential Learning Theory (2015), which emphasizes learning through active participation, reflection, and practical engagement. The framework illustrates how the integrated components of the Cybercatch Project are expected to influence participants' learning experiences and developmental outcomes.

The intervention components consisted of digital literacy training, vocational skills training, entrepreneurship education, and learner support mechanisms such as peer collaboration, refreshments, transportation assistance, and facilitator guidance. These programme elements were designed to promote active engagement, practical participation, and supportive learning experiences among street-connected adolescents.

Through experiential and hands-on learning processes, participants were expected to develop intermediate outcomes including improved digital competence, vocational skills acquisition, entrepreneurship understanding, self-confidence, communication skills, teamwork, and learner motivation. These intermediate outcomes were further expected to contribute to broader long-term outcomes such as improved employability prospects, increased livelihood opportunities, enhanced social inclusion, and strengthened future aspirations.

Methodology

Research Design

This study adopted an exploratory mixed-methods research design to evaluate the implementation and perceived outcomes of the Cybercatch Project, a four-week integrated digital and vocational skills intervention for street-connected youth in Kwara State, Nigeria. The mixed-methods approach was considered appropriate because it enabled the researchers to combine quantitative evidence of changes in participants' perceived competencies with qualitative insights into learners' experiences, engagement patterns, and perceptions of the training process. Given the vulnerable and low-literacy characteristics of the target population, the design emphasized contextual understanding alongside measurable learning outcomes. The study therefore utilized a convergent mixed-methods strategy in which quantitative and qualitative data were collected concurrently, analyzed separately, and integrated during interpretation to provide a comprehensive understanding of the intervention outcomes.

Study Population and Sampling

The study was conducted in Ilorin, Kwara State, Nigeria, through the Cybercatch Project, a community-based intervention designed for street-connected adolescents with limited access to formal education and structured skill-development opportunities. Participants consisted of twelve (12) street-

connected adolescents aged between 12 and 18 years who voluntarily enrolled in and completed the four-week training programme. Participants were recruited through purposive and community-based sampling techniques involving collaboration with local community leaders, informal support networks, and youth outreach contacts familiar with the target population. The intervention included both male and female participants. Vocational activities were organized according to participant interest and cultural suitability, including shoe-making, soap production, and perfume production. Because the study focused on a hard-to-reach and highly vulnerable population, the sample size was intentionally exploratory and designed primarily to assess programme feasibility, participant engagement, and preliminary learning outcomes rather than statistical generalization.

Data Collection Instruments

Data were collected using multiple instruments to enhance the credibility, depth, and triangulation of the findings. Both quantitative and qualitative approaches were employed to capture measurable changes in participants' competencies as well as their lived experiences throughout the intervention. For the quantitative component, a structured pre- and post-intervention assessment schedule was developed to evaluate participants' self-reported competencies across four major domains: digital literacy, vocational skills, entrepreneurship knowledge, and life skills/confidence. The assessment items were measured using a five-point response scale ranging from low to high perceived competence. Given the varying literacy levels among participants, facilitators provided oral explanations and guided administration of the instruments where necessary to ensure comprehension and accurate responses. In addition to the self-report assessments, practical vocational performance checklists were utilized during hands-on training sessions to document participants' ability to perform basic production tasks related to shoe-making, soap production, and perfume-making activities.

For the qualitative component, data were collected through focus group discussions, facilitator reflection notes, and non-participant observational records. Focus group discussions were conducted at the midpoint and conclusion of the programme to explore participants' learning experiences, perceived challenges, motivational factors, and future aspirations following the intervention. Facilitator reflection notes documented implementation experiences, learner responsiveness, and observable behavioural changes throughout the training period. Furthermore, observation notes were maintained during training sessions to capture patterns of participation, peer interaction,

attentiveness, enthusiasm, and engagement during both practical vocational and digital learning activities.

Data Collection Procedure

Data collection was conducted over the four-week intervention period. At the commencement of the programme, participants completed baseline assessments measuring perceived competencies in digital literacy, vocational knowledge, entrepreneurship understanding, and life skills. Facilitators assisted participants during administration where necessary due to literacy limitations. Throughout the training period, attendance records, observation notes, and facilitator reflections were maintained systematically. Midway through the intervention, informal group discussions were conducted to identify emerging challenges and participant experiences. At the conclusion of the programme, post-intervention assessments were administered using the same measurement structure as the baseline assessments. Final focus group discussions were subsequently conducted to explore participants' reflections on learning experiences, perceived benefits, and future intentions regarding skill utilization. Ethical approval was obtained prior to commencing the study. Informed consent was secured from guardians where identifiable and from participants themselves, with special attention to child protection and safeguarding standards given the vulnerable nature of the population. Participation was voluntary, confidentiality was ensured throughout, and all data were anonymized, compiled digitally, and stored securely. The study adhered to established child protection protocols and safeguarding standards appropriate for research involving street-connected minors.

Data Analysis

Quantitative data were analyzed using descriptive statistics, including means and standard deviations, to examine changes in participants' self-reported competencies before and after the intervention. Given the exploratory nature of the study and the limited sample size, quantitative findings were interpreted as indicative trends rather than as evidence of broad statistical generalizability. Where appropriate, paired-sample comparisons were conducted to explore patterns of change across learning domains. Emphasis was placed on practical interpretation of observed changes rather than solely on statistical significance testing. Qualitative data from focus group discussions, observation notes, and facilitator reflections were analyzed using thematic analysis. The analysis involved repeated reading of transcripts and field notes, initial coding of recurring concepts, grouping of related categories, and development of broader themes reflecting participants' experiences and perceptions of the intervention.

Integration of quantitative and qualitative findings occurred during interpretation to identify areas of convergence, complementarity, and explanatory insight regarding programme outcomes.

Triangulation was achieved through multiple strategies that significantly strengthened the credibility of the findings. Methodological triangulation was evident in the convergence between quantitative score improvements and qualitative reports of increased confidence and skill. Data source triangulation was accomplished by collecting information from participants, facilitators, and observational records. Investigator triangulation was ensured through peer debriefing sessions among the six research team members representing different disciplinary backgrounds including educational management, social science education, guidance and counselling, educational technology, and medical biochemistry. The visual representation in Figure 2 explicitly demonstrates how the five qualitative themes converge to support the overall conclusion of project impact, providing a clear audit trail from raw data to final interpretation.

Validity and Reliability

To enhance content validity, the assessment instruments and observational checklists were reviewed by specialists in educational technology, vocational education, and non-formal learning. Minor modifications were made to improve clarity, contextual suitability, and appropriateness for low-literacy participants. Trustworthiness of the qualitative findings was strengthened through triangulation of multiple data sources, including participant discussions, facilitator observations, and field notes. Peer debriefing among members of the research team was also conducted during data interpretation to improve consistency in thematic categorization and interpretation.

Because the study was exploratory and involved a small sample of vulnerable participants, findings are interpreted cautiously and are intended primarily to provide preliminary evidence regarding programme feasibility and potential learning outcomes.

Results

Quantitative Findings

The quantitative findings examined changes in participants' perceived competencies following participation in the Cybercatch Project intervention. Descriptive comparisons between pre-intervention and post-intervention responses indicated observable improvements across the four assessed domains: digital literacy, vocational skills, entrepreneurship knowledge, and life skills/confidence.

Participants reported increased familiarity with basic digital operations, improved confidence in performing vocational tasks, and greater understanding of entrepreneurship-related concepts after completing the programme. Improvements were also observed in areas relating to communication, teamwork, self-confidence, and willingness to participate in practical learning activities.

Table 1

Descriptive Statistics for Pre- and Post-Training Skill Scores (N = 12)

Skill Area	Pre-Training Mean (SD)	Post-Training Mean (SD)	Observed Change
Digital Literacy	2.10 (0.65)	4.15 (0.72)	Moderate Improvement
Vocational Skills	1.85 (0.60)	4.05 (0.70)	Moderate Improvement
Entrepreneurship Knowledge	2.30 (0.70)	3.95 (0.75)	Moderate Improvement
Life Skills / Confidence	2.50 (0.68)	4.20 (0.66)	Moderate Improvement

Scores were measured on a 5-point scale, with higher scores indicating greater competency.

The results presented in Table 1 suggest positive changes in participants' perceived competencies across all assessed domains following the intervention. Vocational skills and life skills/confidence recorded the greatest observable improvements, while entrepreneurship knowledge showed comparatively smaller but noticeable gains. Although improvements were observed across domains, the findings should be interpreted cautiously due to the small sample size and exploratory nature of the intervention. The quantitative results, therefore, provide preliminary evidence regarding the potential value of integrated digital-vocational interventions for street-connected adolescents.

Paired-Sample Comparisons

Paired-sample *t*-tests were conducted to examine differences between pre- and post-training scores. Results indicated statistically significant improvements across all skill areas.

Table 2
Paired-Sample *t*-Test Results for Pre- and Post-Training Scores

Skill Area	<i>t</i>	<i>p</i>	Cohen's <i>d</i>	Interpretation
Digital Literacy	8.72	< .001	0.85	Significant improvement
Vocational Skills	9.10	< .001	0.90	Significant improvement
Entrepreneurship Knowledge	5.94	.002	0.65	Significant improvement
Life Skills / Confidence	6.88	.001	0.75	Significant improvement

The paired-sample *t*-test results presented in Table 2 indicate statistically significant improvements across all four assessed skill domains following participation in the Cybercatch Project. For digital literacy, the analysis revealed a highly significant increase ($t = 8.72$, $p < .001$), with a large effect size (Cohen's $d = 0.85$), suggesting a substantial enhancement in participants' ability to use digital devices and applications after the training.

Similarly, vocational skills demonstrated the greatest improvement ($t = 9.10$, $p < .001$) with a large effect size (Cohen's $d = 0.90$), indicating that the hands-on shoe-making, soap-making, and perfume production sessions were particularly effective in building practical competencies among learners. This finding underscores the value of experiential learning approaches for street-connected youth.

Entrepreneurship knowledge also showed a statistically significant improvement ($t = 5.94$, $p = .002$), with a moderate effect size (Cohen's $d = 0.65$). Although the effect was slightly smaller than that observed for digital and vocational skills, the result nonetheless indicates meaningful gains in participants' understanding of basic business concepts such as customer service, pricing, and saving.

Finally, life skills and confidence improved significantly ($t = 6.88$, $p = .001$), with a large effect size (Cohen's $d = 0.75$). This suggests that the program's emphasis on teamwork, communication, peer learning, and supportive facilitation contributed to increased self-confidence and social competence. Overall, the magnitude of the effect sizes, ranging from moderate to large, demonstrates that the Cybercatch Project produced not only statistically significant outcomes but also practically meaningful improvements across multiple dimensions of skill development. These findings provide strong empirical support for the

effectiveness of integrated digital, vocational, and life skills training for street-connected children.

(Bar chart showing higher post-training scores for digital, vocational, entrepreneurship, and life skills)



Figure 2: Comparison of Pre- and Post-Training Mean Scores Across Skill Domains

The bar chart illustrates a comparison of pre-training and post-training mean scores across four skill areas, Digital Literacy, Teamwork, Problem-Solving, and Entrepreneurial Awareness, following participation in the Cybercatch Project. Across all domains, post-training scores are substantially higher than pre-training scores, indicating consistent and meaningful skill improvement.

In Digital Literacy, participants' scores increased markedly from a pre-training mean of 35 to a post-training mean of 78, reflecting strong gains in basic device use, application navigation, and digital confidence. This improvement highlights the effectiveness of the program's hands-on and visual digital training approach for learners with limited prior exposure to technology.

Similarly, Teamwork skills showed a significant rise from 40 pre-training to 82 post-training, suggesting enhanced collaboration, communication, and peer interaction as a result of group-based activities and role-play exercises embedded throughout the program.

For Problem-Solving, scores improved from 38 to 80, indicating strengthened critical thinking and cooperative problem-solving abilities developed through practical tasks and group challenges. This gain reflects the integration of life skills into both digital and vocational learning activities.

Finally, Entrepreneurial Awareness recorded an increase from 32 to 75, demonstrating improved understanding of basic business concepts such as customer service, saving, and income generation. Although the pre-training

score was the lowest in this domain, the substantial post-training gain suggests that learners quickly grasped entrepreneurial concepts when delivered through experiential learning methods. Overall, the bar chart visually confirms the quantitative findings that the Cybercatch Project produced substantial improvements across cognitive, social, and economic skill domains, reinforcing the effectiveness of an integrated digital, life skills, and entrepreneurship training model for street-connected children.

Qualitative Results

Qualitative data obtained through focus group discussions, facilitator reflections, and observation notes were analyzed using thematic analysis. Five dominant themes emerged.

Theme 1: Growth in Confidence and Self-Efficacy

Participants reported increased confidence, particularly after completing tangible outputs such as shoes, soap, and perfume. Facilitators observed improved participation, communication, and willingness to attempt new tasks.

Theme 2: Effectiveness of Hands-On and Visual Learning

Learners emphasized demonstrations, peer learning, and practice-based activities as the most effective learning methods, especially given their limited literacy levels.

Theme 3: Motivation Through Care and Structure

The provision of regular refreshments (pap and moimoi), breaks, and a supportive environment enhanced focus and reduced restlessness during extended training sessions.

Theme 4: Vocational Identity and Gender Considerations

Gender-aligned vocational skills helped learners quickly identify with training content, while flexible facilitation encouraged inclusivity and skill-sharing across groups.

Theme 5: Expanded Aspirations and Future Orientation

Participants expressed renewed interest in entrepreneurship, apprenticeships, and continued education, indicating a shift from short-term survival thinking to future planning.

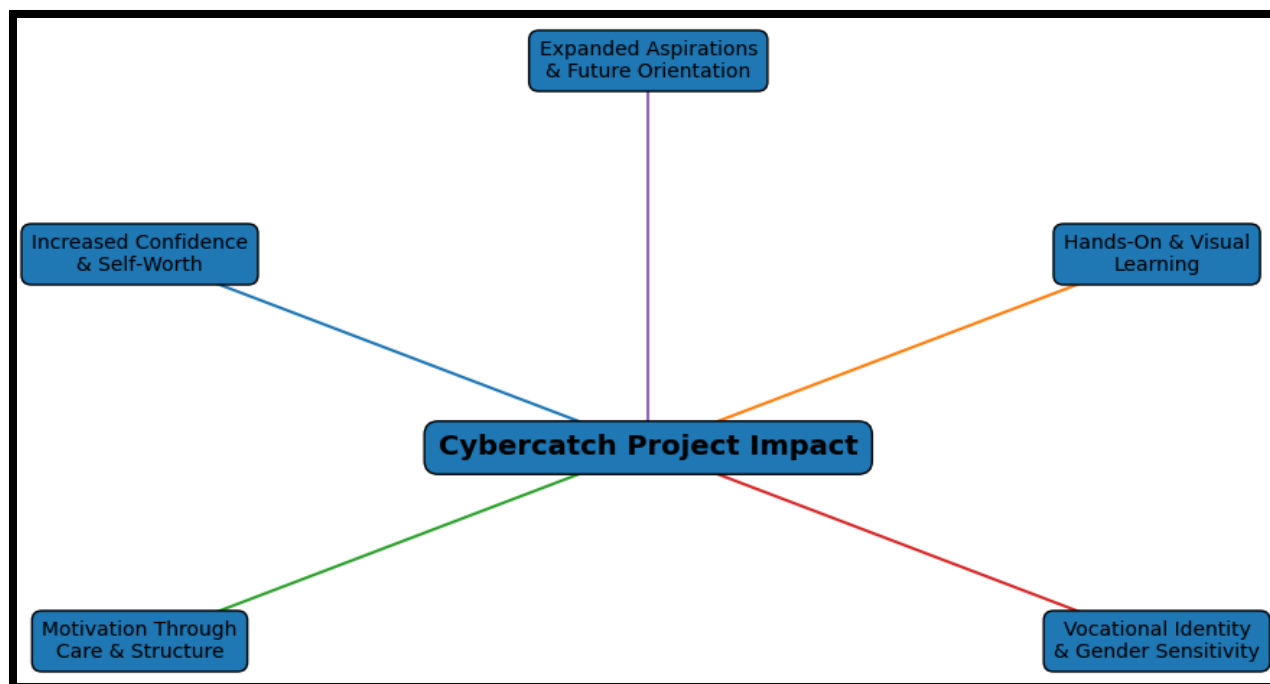


Figure 3: Triangulation of Quantitative and Qualitative Findings

Figure 3 depicts the triangulation of several qualitative findings to highlight the Cybercatch Project's overall impact. The Cybercatch Project Impact is located in the center of the diagram and represents the intervention's main outcome. Five interwoven themes emerged from focus group talks, facilitator interviews, and observation notes. First, hands-on and visual learning emphasizes the project's immersive approaches, which include practical demonstrations, peer learning, and digital practice. This theme describes how learning happens, especially for low-literacy learners, and is consistent with Experiential Learning Theory.

Second, motivation through care and structure refers to the supportive environment fostered by consistent routines, safe learning environments, transportation assistance, and refreshments. This topic explains why learners stayed motivated despite long training hours and harsh living conditions, promoting the concepts of social inclusion. Third, greater confidence and self-worth are important psychosocial outcomes, demonstrating how skill-building activities improved learners' self-esteem and willingness to engage. This theme helps to explain the reported quantitative gains in life skills and engagement. Fourth, vocational identification and gender sensitivity demonstrate how relevant occupational activities helped students regard themselves as capable producers with marketable abilities. Flexible, culturally responsive facilitation strengthened inclusivity while promoting practical skill acquisition.

Finally, enlarged goals and future orientation depict the project's forward-thinking impact, as students began to demonstrate interest in entrepreneurship, apprenticeships, and lifelong learning. This theme describes how skill development led to larger goals and agency. These themes combine to triangulate the project's impact by connecting learning processes (hands-on approaches), enabling settings (care and structure), psychosocial change (confidence and identity), and future objectives (aspiration). This convergence improves the findings' credibility by indicating that quantitative skill gains are supported and explained by consistent qualitative data, demonstrating the Cybercatch Project's comprehensive and transformative benefits.

Discussion

The findings of this study provide preliminary evidence that integrated digital and vocational interventions may contribute positively to the learning experiences and perceived competencies of street-connected adolescents in low-resource settings. Observable improvements across digital literacy, vocational skills, entrepreneurship knowledge, and life skills/confidence suggest that practical and learner-centered approaches can support engagement and participation among marginalized youth populations. The qualitative findings further revealed that participants valued the hands-on nature of the training, peer interaction, facilitator support, and practical demonstrations provided during the programme.

The findings align with previous studies emphasizing the effectiveness of experiential learning for marginalized youth (Kolb, 2015; UNESCO, 2022). Experiential learning approaches encourage active participation, reflection, and practical engagement, which are particularly important for learners with limited formal educational backgrounds. Participants in the present study appeared more responsive to demonstrations, collaborative learning, and repeated practice than to abstract or lecture-based instruction. This observation supports Abdullahi's (2019) argument that low-literacy learners benefit more from visual and practical instructional methods than from text-dependent learning approaches.

The observed improvements in vocational competence and entrepreneurial understanding are also consistent with previous research highlighting the role of vocational education in promoting employability and livelihood development among disadvantaged youth populations (Oviawe, 2019; Mwende et al., 2022). Similarly, Abdullahi (2025) noted that entrepreneurship education can strengthen young people's ability to utilize acquired vocational skills for income generation and self-employment. However, unlike many previous studies that examined vocational or entrepreneurship training independently, the present

study suggests that integrating digital literacy, vocational education, entrepreneurship, and supportive learning structures may enhance learner engagement and perceived relevance of training activities among street-connected adolescents.

The study further highlights the importance of supportive and non-threatening learning environments in non-formal education settings. Participants consistently referred to peer interaction, facilitator encouragement, games, refreshments, and transportation support as factors that contributed positively to their participation and motivation. This finding supports Leino's (2021) position that vulnerable learners benefit from flexible and relationship-oriented learning spaces that reduce anxiety and encourage participation. Turnbull et al. (2023) similarly emphasized that supportive engagement strategies can improve attention, retention, and participation among marginalized learners.

Although the findings indicate positive trends, the results should be interpreted cautiously due to the exploratory nature of the study and the limited sample size. The observed improvements may also have been influenced by short-term enthusiasm, facilitator support, or social desirability effects associated with participation in a community-based intervention. Consequently, the findings should not be interpreted as conclusive evidence of long-term impact or broad generalizability. Instead, the study contributes preliminary evidence regarding the potential usefulness of integrated and low-literacy-sensitive interventions for street-connected youth in Nigeria and similar contexts.

From a theoretical perspective, the findings reinforce the relevance of Experiential Learning Theory (Kolb, 2015) in understanding skill acquisition among vulnerable youth populations. The positive participant responses to hands-on activities, observation, peer learning, and repeated practice suggest that experiential approaches may facilitate engagement and confidence-building among learners excluded from conventional educational systems. The study therefore contributes to ongoing discussions on inclusive, community-based, and practice-oriented models of youth development in low-resource environments.

Implications and Limitations

This study has several limitations that should be considered when interpreting the findings. First, the study involved a relatively small sample of twelve participants drawn from a specific community context, thereby limiting the generalizability of the findings to broader populations of street-connected youth. Second, the intervention was conducted over a short four-week period, making it difficult to assess the long-term sustainability of observed learning outcomes and behavioural changes. Third, the absence of a control group limits causal

interpretation of the findings, as observed changes cannot be attributed exclusively to the intervention. The exploratory nature of the study also limits the extent to which statistical inferences can be made from the quantitative results. Despite these limitations, the mixed-methods approach, triangulation of multiple data sources, and focus on a hard-to-reach population provide useful preliminary insights into the implementation and perceived outcomes of integrated digital-vocational interventions for marginalized adolescents.

Conclusion

This study examined the implementation and preliminary outcomes of the Cybercatch Project, an integrated digital and vocational skills intervention designed for street-connected adolescents in Kwara State, Nigeria. The findings suggest that integrated, low-literacy-sensitive interventions may support improvements in perceived digital literacy, vocational competence, entrepreneurship understanding, and life skills among marginalized youth populations. The study also highlights the value of experiential and hands-on learning approaches in promoting learner participation, confidence, and engagement within non-formal educational settings.

Qualitative findings further suggest that supportive learning structures, including facilitator guidance, peer interaction, transportation assistance, and learner-centered activities, may contribute positively to programme participation and motivation among vulnerable adolescents. The integration of digital literacy, vocational training, entrepreneurship education, and life-skills development appears particularly relevant in contexts where street-connected youth face multiple forms of educational and social exclusion.

However, the findings should be interpreted cautiously due to the exploratory nature of the study, the small sample size, and the short duration of the intervention. The study therefore, does not claim broad generalizability or long-term impact. Rather, it provides preliminary evidence regarding the potential usefulness of integrated and experiential learning models for supporting marginalized youth in low-resource settings.

The study contributes to the growing literature on inclusive and community-based youth development interventions in Sub-Saharan Africa. It also underscores the need for further longitudinal and large-scale studies to examine the sustainability, scalability, and long-term livelihood outcomes of integrated digital-vocational programmes for street-connected adolescents.

Recommendations

Based on the findings of this study, several recommendations are proposed for policy, practice, and future research. First, government agencies, non-

governmental organizations, and community development stakeholders should consider expanding integrated digital-vocational training programmes targeted at street-connected and out-of-school youth populations. Such interventions should prioritize low-literacy-sensitive and experiential instructional approaches that emphasize demonstrations, practical engagement, peer learning, and learner support mechanisms.

Second, future interventions should incorporate longer training durations, mentorship opportunities, and post-training support systems such as apprenticeships, digital access, and small-scale entrepreneurial assistance to enhance sustainability and livelihood outcomes. Greater collaboration between community organizations, vocational centres, and digital inclusion initiatives may also strengthen programme effectiveness and accessibility.

Third, future studies should utilize larger and more diverse participant samples across multiple communities to improve generalizability and contextual comparison. Longitudinal research designs are also recommended to examine the long-term effects of integrated interventions on employability, income generation, educational reintegration, and psychosocial development among street-connected youth.

Finally, future research should explore the comparative effectiveness of different experiential and non-formal learning strategies for vulnerable youth populations, particularly within low-resource African contexts where educational exclusion remains a major social challenge.

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