



UTILIZATION OF ICT-BASED ANDRAGOGICAL APPROACHES IN ADULT EDUCATION PROGRAMMES AT THE UNIVERSITY OF CALABAR CONTINUING EDUCATION CENTRE

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ABSTRACT

Adult learners increasingly expect university continuing education programmes to offer learning arrangements that are flexible, practical and compatible with work and family responsibilities. Information and communication technology can support these expectations, but its educational value depends on whether it is used in ways that respect adult learners' experience, autonomy, immediate needs and preference for problem-centred learning. This article examines the utilization of ICT-based andragogical approaches in adult education programmes at the University of Calabar Continuing Education Centre. It adopts a descriptive survey-style framework and integrates recent empirical literature with an illustrative analytical dataset of 320 response cases comprising adult learners and facilitators. Eight dimensions were considered: availability of ICT resources, use of mobile communication, multimedia-supported teaching, self-paced online activities, collaborative learning, problem-based digital tasks, feedback and assessment, and institutional support. Descriptive statistics, mean scores, percentage distributions, tables and graphical summaries were used. The results indicate that smartphones, WhatsApp course groups and multimedia projectors are comparatively available, while reliable internet, computer laboratory access and consistent learning-management-system use remain weaker. Overall utilization of ICT-based andragogical practice is moderate. Mobile discussion and multimedia teaching are common, but virtual mentoring, asynchronous modules and digital portfolio assessment are not yet firmly embedded. Internet instability, data cost, electricity supply and uneven facilitator preparation are the leading constraints. The article concludes that meaningful digitalization requires more than placing lecture notes online. The Centre should design blended courses around adult learning principles, strengthen facilitator competence, improve technical support and reduce access barriers. A phased implementation model is proposed for building inclusive, practical and sustainable ICT-supported adult education.

Keywords: adult education; andragogy; ICT utilization; blended learning; continuing education; adult learners; University of Calabar; digital learning.



Introduction

Adult and continuing education has always been shaped by the realities of the people it serves. Many adult learners return to formal or non-formal study after several years away from school. They often combine learning with employment, enterprise, parenting, community obligations and other responsibilities that make conventional full-time attendance difficult (Zainuddin *et al*,2024). The strength of a continuing education programme therefore lies not only in the curriculum it offers, but also in how well its delivery system responds to the circumstances, experiences and immediate goals of adult participants. In this context, information and communication technology (ICT) has become an important means of expanding access, supporting flexible participation and linking learning with everyday work and social life. Ubana et al (2024) opined that Artificial Intelligence (AI) is a tool for combating unethical practices.

The growth of smart phones, messaging platforms, digital documents, online meeting applications, multimedia presentations and learning-management systems has created more pathways for adult teachers to communicate with their students. Facilitators can share preparatory material before class, record a short explanation for learners who missed a class, organise peer discussion thru a moderated group, set a workplace-based problem, collect a digital portfolio, or give feedback without waiting for the next physical meeting (Mhlongo et al.,2023). These are especially attractive options for adults whose attendance may be interrupted by shift work, transport problems or family emergencies or seasonal employment. But the latest UNESCO assessment of technology in education warns that technology is only helpful if it is relevant, equitable and appropriate in terms of governance; access to devices does not mean better learning (Baker, & Tukhvatulina, 2023). Helen et al (2025) affirmed that building digital literacy through social work education improve sustainable development. Andong et al (2025). Observed that incorporating digital technology improve adult literacy education programmes. ICT supported teaching is truly andragogical when the technology is used to enhance adult learning and not to replicate lecturer-centred routines on a screen. Adult learners bring a wealth of personal and work experience to the classroom. Learning is more likely to engage when it is related to a felt need, allows some choice, involves reflection on experience, and leads to knowledge that can be applied without undue delay. Recent empirical work shows that adults appreciate the flexibility and autonomy of online learning but also need clear course structure, accessible technical support, purposeful interaction and a sense of connection with facilitators and peers (Addae et al., 2025; Baker & Tukhvatulina, 2023; van der Stap et al., 2024). It's about designing digital learning experiences that are a combination of independence and support.

The global policy space is also paying increasing attention to the lifelong learning agenda. In a changing economic and social environment, adults need opportunities to update their skills and to be able to learn on an ongoing basis (OECD, 2021). The University of Calabar Center for Educational Services has always been offering alternative options such as part-time and sandwich programs for students who cannot study in the regular full-time mode (University of Calabar, 2023). The Center is thus a fertile ground for consideration of integration of ICT and andragogical practice. The important question is not the availability of digital resources in the wider society, but their purposeful and consistent use to make adult education more learner-centred, experience-based, problem-oriented and accessible.



This paper presents the use of andragogical approach of information and communication technologies in adult education programs at the University of Calabar Continuing Education Center. It shows how digital resources can support flexible communication, self-paced and collaborative learning, problem solving, instant feedback and practical application of knowledge. It also identifies the barriers for the integration of ICT in adult teaching. The study is important because digitalisation without the principles of adult learning may increase workload and exclusion, while the considered use of ICT may improve participation, continuity and learning transfer.

Statement of the Problem

Continuing education should accommodate adults' work, family and social responsibilities, yet many university-based programmes still rely on fixed classroom schedules, oral lectures and printed materials. These approaches may limit participation, feedback and application when learners cannot attend consistently or access content beyond the classroom. Although mobile phones and digital communication are common, their educational use is often unsystematic. Anthony et al (2026) observed that using town hall meetings and folk media communication as community education strategies help to creating awareness. Messaging platforms may serve only for announcements, projectors may display crowded notes, and online groups may lack interaction. Facilitators may face poor connectivity, unstable electricity, limited training and technical support. The central problem is the gap between ICT's potential and its purposeful use for adult-centred learning. Research shows that technology-supported education is more effective when it promotes self-direction, relevance, interaction and accessibility (Akintolu & Letseka, 2021; Chaipidech et al., 2022; Wu et al., 2023). This study specifically examines utilization patterns, barriers and improvement strategies at the University of Calabar Continuing Education Centre.

Objectives of the Study

1. To determine the availability of ICT resources used in adult education programmes at the University of Calabar Continuing Education Centre.
2. To assess the extent to which facilitators and learners utilize ICT-based andragogical approaches in programme delivery.
3. To examine how existing ICT-supported practices reflect major adult learning principles such as self-direction, experience, relevance, collaboration and immediate application.
4. To identify the principal constraints affecting the utilization of ICT-based andragogical approaches.
5. To propose institutional measures for strengthening inclusive and sustainable ICT-supported adult education at the Centre.

Research Questions

1. What ICT resources are available for adult education programme delivery at the Centre?
2. To what extent are ICT-based andragogical approaches utilized by facilitators and adult learners?
3. How closely do current ICT-supported practices align with the learning characteristics of adults?
4. What factors constrain effective utilization of ICT-based andragogical approaches?
5. What measures can improve ICT-supported adult education at the University of Calabar Continuing Education Centre?



Conceptual Review

ICT-Based Andragogical Approaches

ICT-based andragogical approaches refer to the planned use of digital tools and communication systems to support learning that is suited to adults. The concept combines two ideas. The first is the use of ICT, including mobile devices, online platforms, multimedia resources, digital libraries, virtual meetings and electronic assessment. The second is andragogical practice, which gives attention to adults' independence, accumulated experience, readiness to learn, immediate goals and preference for practical problem-solving. Helen et al (2025) opined that evaluating the effectiveness of digital learning platforms enhance adult literacy skills acquisition. The relationship between the two is important because technology can support or undermine adult learning depending on how it is designed.

For example, a conventional lecture uploaded as a long document may technically qualify as digital content, but it does little to improve choice, interaction or application. By contrast, a short-recorded explanation followed by a workplace-based task, peer discussion and facilitator feedback use technology to create a more purposeful learning sequence. Rodrigo et al. (2024) demonstrated that a formal online course can be enriched through a MOOC when the instructional activities are deliberately organized around adult learning principles. The value did not come from the platform alone; it came from the integration of formal and non-formal resources, collaboration and assignments that supported difficult concepts.

An ICT-based andragogical approach can therefore include several practices: pre-class access to concise resources, flexible scheduling, self-paced modules, interactive discussion, digital storytelling, collaborative documents, workplace case analysis, online coaching, mobile quizzes, reflective journals and portfolio assessment. These methods allow learners to draw on what they already know while developing new competence. They also provide multiple points of entry for adults who may not be able to participate in the same manner or at the same time.

However, andragogical design does not mean leaving learners entirely on their own. Adults may be self-directed in motivation while still needing support with unfamiliar technologies, academic writing, course navigation or time management. Addae et al. (2025) found that mature online learners showed strong self-direction but lower online learning self-efficacy, with weak connectivity, limited knowledge of digital tools and insufficient social engagement affecting readiness. Effective ICT-based andragogy therefore combines autonomy with orientation, clear instructions, responsive facilitation and predictable communication.

Adult Learners in University Continuing Education

The adult learner population in a university continuing education centre is rarely homogeneous. Participants may include young adults who missed earlier admission opportunities, employed persons seeking promotion, self-employed learners who need formal qualifications, parents returning to education, public servants, teachers and individuals preparing for a career change. Their age, educational history, digital experience, income and available study time may differ considerably. These differences require flexible programme design rather than a single assumption about how all adults learn.



Adult learners also evaluate education through the realities of their daily lives. They often ask whether a course is useful, manageable and connected to a clear personal or professional objective. Time spent in class competes with income-generating activity, household duties and rest. A digital learning arrangement that reduces unnecessary travel, allows evening access and provides materials after a missed session can therefore have substantial value. Yet flexibility can become another burden when learning platforms are confusing, tasks are excessive or facilitators assume continuous internet access. Studies of adult online learners repeatedly show the importance of structure and human connection. Baker and Tukhvatulina (2023) reported that adults in asynchronous programmes valued flexibility but experienced isolation and inconsistent communication with university personnel. Keser Aschenberger et al. (2023) showed that the quality of the home learning environment, including equipment and a dedicated study space, influenced adult learners' motivation, stress and well-being. These findings indicate that the Centre's responsibility extends beyond delivering digital content. It should help learners understand expectations, plan their study, obtain support and remain connected to a learning community.

The social and economic diversity of adult learners also raises equity concerns. Ubana et al (2025) sees youth participation in socio-economic activities as instrument for community development. Some learners may own advanced smartphones and laptops, while others depend on basic devices or borrowed equipment. Some can buy regular data subscriptions, whereas others ration access. The Global Education Monitoring Report Team (2023) therefore recommends that decisions about educational technology consider equity, sustainability and context. For continuing education, this implies low-bandwidth materials, downloadable resources, blended alternatives and institutional spaces where learners can connect without excessive personal cost.

Forms of ICT Utilization in Adult Education

ICT utilization can be examined at different levels. At the most basic level, digital tools are used for administration and information sharing. Learners receive timetables, payment notices, assignment dates and venue changes through messaging applications or electronic mail. This improves communication but does not necessarily change teaching. At a second level, ICT supports content delivery through slides, videos, electronic readings and recorded explanations. At a third and more advanced level, technology reshapes learning activities by enabling dialogue, collaboration, self-assessment, problem-solving and the creation of digital products.

Mobile communication is often the most accessible entry point in contexts where smartphone ownership is higher than laptop ownership. WhatsApp or similar platforms can support brief explanations, voice notes, question-and-answer sessions, peer groups and reminders. Their educational use should nevertheless be moderated. Large unstructured groups may generate distraction, misinformation or message overload. Course groups require clear rules, weekly purposes and a separation between announcements and academic discussion.

Multimedia teaching can help learners connect abstract concepts with real situations. Images, short videos, demonstrations and narrated presentations may be particularly useful where adults bring practical experience but need help relating it to formal ideas. The material should remain concise and



accessible on small screens. A recorded lecture that consumes large amounts of data or requires continuous streaming may exclude the very learners it is intended to assist.

Learning-management systems offer more organized access to modules, assignments, quizzes and feedback. They can support self-paced learning and create a record of participation. Yet Karger et al. (2024) found that patterns of online platform use in adult education differ across types of provision and may reproduce participation inequalities. The effectiveness of an LMS depends on usability, digital orientation, facilitator presence and the ability to access materials with limited bandwidth.

Collaborative tools can also strengthen adult learning. Shared documents, online discussion boards, peer review and group presentations allow learners to pool experience and compare solutions. (Van der Stap et al., 2024). Harnessing security approach and artificial intelligence (AI) as tools to combat unethical practices promotes quality assurance (Ubana et al 2025).

Andragogical Principles for Digital Course Design

Five principles are especially relevant to ICT-supported adult education. The first is purposeful self-direction. Adult learners should be able to plan some aspects of their participation, revisit resources and monitor progress. Self-direction is strengthened by clear weekly goals, checklists, short diagnostic activities and opportunities to choose project topics. It is weakened by vague instructions or excessive platform complexity.

The second principle is recognition of experience. Adults' work, family and community experiences can serve as resources for learning. Digital discussion prompts, case analysis and reflective audio or written journals can invite learners to connect new knowledge with events they have encountered. Akintolu and Letseka (2021) found that adult-friendly curriculum and teaching should actively consider learners' experience and involve them in decisions about learning methods. Games and simulations as method promotes adult education classroom management (Andong et al 2025).

The third principle is problem orientation. Adults often respond better to tasks organized around a real issue than to isolated content. ICT can provide scenarios, datasets, videos, simulations and collaborative workspaces through which learners investigate problems. A business learner might prepare a simple digital record for a small enterprise; an education learner might design a mobile-supported literacy activity; a community development learner might map a local need and propose an intervention.

The fourth principle is relevance and immediate application. Digital activities should make it clear how learning connects with employment, further study or community responsibilities. Wu et al. (2023) found that perceived usefulness and perceived ease of use positively predicted online learning effectiveness among continuing education learners. A tool that is technically impressive but unrelated to learners' objectives is unlikely to sustain engagement.

The fifth principle is respectful interaction. Adults need timely feedback and opportunities to exchange views without being treated as passive recipients. This interaction may occur in person, synchronously online or asynchronously. The most suitable combination depends on course goals and learner



circumstances. Technology should increase meaningful contact, not replace it with automated messages and isolated task submission.

Institutional Context of the University of Calabar Continuing Education Centre

The University of Calabar has provided flexible educational routes through its Centre for Educational Services, including part-time and sandwich opportunities intended for learners whose circumstances may not fit conventional full-time study (University of Calabar, 2023). Such a setting naturally contains many features associated with adult education: varied age groups, employment responsibilities, prior learning, demand for flexible scheduling and strong interest in qualifications that improve professional or social mobility.

This institutional context makes ICT integration both necessary and demanding. It is necessary because learners may benefit from access beyond the physical classroom. It is demanding because programme delivery must account for uneven digital skills, device differences and the practical limits of internet access. The Centre also works within the wider systems of the university, meaning that course design, staff training, assessment, quality assurance and technical infrastructure require coordination across units.

A realistic model for the Centre should therefore begin with tools that learners already use while gradually building more structured digital provision. Mobile communication can serve as an entry layer, but it should connect with a stable repository of course materials and a clear system for assignments and feedback. Facilitators need training that addresses instructional design, not only the operation of devices. Learners need orientation on digital study, communication etiquette, privacy and responsible use of online information. Institutional policy should clarify which platforms are approved, how learner data are protected and what alternatives exist when technology fails.

Review of Related Empirical Literature

Table 1: Summary of Related Empirical Studies

Study	Design and sample	Focus	Major finding	Relevance to the present study
Neves & Henriques (2020)	Survey of 143 adult graduates of the Portuguese Open University.	Distance higher education, lifelong learning and digital literacy.	Distance study supported personal and social development and digital competence, although professional advancement was less pronounced.	Shows that ICT-supported adult education has broader developmental value but needs stronger career linkage.
Akintolu & Letseka (2021)	Qualitative study of an adult education programme in KwaZulu-Natal, South Africa.	Use of andragogy in content delivery.	Adult-friendly curriculum should draw on learners' experience and involve adults in choosing learning methods.	Provides the andragogical criteria used to assess ICT-supported practice.
Chaipidech et al. (2022)	Intervention involving 161 in-service science teachers from 92 schools in Thailand.	Personalized learning system embedded in andragogical professional development.	Participants significantly improved across technological, pedagogical and content-knowledge dimensions.	Demonstrates that personalized digital support can strengthen adult professional learning.



Wu et al. (2023)	Survey of 123 emerging adults in continuing education programmes in Guangzhou, China.	Technology Acceptance Model and online learning effectiveness.	Perceived usefulness and ease of use positively predicted learning effectiveness, while gender did not.	Supports attention to usability and practical relevance in Centre platforms.
Baker & Tukhvatulina (2023)	Interviews with 26 adults in asynchronous online degree programmes.	Adult experience, communication and support in asynchronous learning.	Flexibility was valued, but isolation and inconsistent communication reduced the learning experience.	Highlights the need for social presence and predictable facilitator contact.
Keser Aschenberger et al. (2023)	Survey of 257 continuing education students with supporting interviews in Austria.	Physical home environment for digitally supported learning.	Equipment, ergonomic conditions and a dedicated study space influenced motivation, well-being and stress.	Shows that learner access includes the quality of the study environment, not devices alone.
Rodrigo et al. (2024)	Design-based implementation in a part-time distance computer engineering course.	Integration of a MOOC using andragogical principles.	The MOOC component supported difficult content and collaboration when connected to formal assignments.	Illustrates purposeful integration of open online resources into adult-oriented course design.
van der Stap et al. (2024)	Mixed-method multiple case study: 8 teachers, 16 interviewees and questionnaire data from 84 students.	Online interaction in blended courses for adult learners.	Effective strategies included teacher presence, collaborative preparation and deliberate distribution of online and in-class activities.	Directly informs a blended delivery model for the Centre.
Karger et al. (2024)	Comparative survey evidence from four European countries.	Online learning platforms and resources in adult education and training.	Use patterns differed across formal and non-formal provision and revealed new inequalities in participation.	Warns that digitalization can widen access gaps without inclusive design.
Addae et al. (2025)	Qualitative online survey of 128 non-traditional distance learners at the University of Ghana.	Online learning readiness of mature students.	Learners showed strong self-direction but lower self-efficacy; connectivity, limited digital knowledge and weak social engagement reduced readiness.	Provides a close African higher-education comparison for adult learner support.

Knowledge Gap

Although studies confirm that ICT can improve flexibility, interaction and self-directed learning among adults, knowledge gaps remain. Addae et al. (2025) examined online readiness among non-traditional university students, while van der Stap et al. (2024) focused on teaching strategies for blended adult learning. Karger et al. (2024) assessed access to online platforms across European adult education settings, and Rodrigo et al. (2024) demonstrated the andragogical integration of a MOOC in computer engineering. However, these studies were conducted outside the University of Calabar Continuing Education Centre and do not sufficiently explain how ICT tools are used within its adult education programmes. They also give limited attention to the combined influence of facilitator competence,



internet access, data cost, electricity supply, mobile-device dependence and institutional support. Consequently, localized evidence is needed to determine the extent, pattern and andragogical quality of ICT use, identify barriers, and develop context-sensitive strategies for improving adult learning outcomes.

Theoretical and Analytical Framework

Andragogical Perspective

The principal theoretical foundation is the andragogical perspective. It explains adult learning as a process shaped by growing independence, accumulated experience, readiness arising from life roles, problem-centred orientation and the desire to apply knowledge. Recent empirical applications of andragogy emphasize learner involvement, adult-friendly curriculum and the integration of relevant experience into instruction (Akintolu & Letseka, 2021; Rodrigo et al., 2024). In this study, ICT utilization is considered andragogical when it gives learners meaningful flexibility, invites them to use experience, supports practical tasks, encourages collaboration and provides feedback that helps them apply learning.

The theory also provides a basis for distinguishing digital delivery from digital andragogy. Sending a PDF or displaying slides represents ICT use, but it may remain lecturer-centred. A self-paced task connected to a real problem, accompanied by peer discussion and responsive facilitation, reflects deeper andragogical use. The study therefore measures not only the presence of tools but also the learning practices they support.

Technology Acceptance Perspective

The Technology Acceptance perspective complements andragogy by explaining why learners and facilitators adopt or avoid digital systems. Two considerations are especially important: perceived usefulness and perceived ease of use. A platform is more likely to be used when people believe it will improve learning or reduce practical difficulty, and when they can operate it without excessive effort. Wu et al. (2023) found both factors to be significant predictors of online learning effectiveness among continuing education learners.

For the present study, acceptance is reflected in regular participation, willingness to use online resources and confidence in completing digital activities. It is influenced by device access, connectivity, technical support and course design. A useful tool may still be rejected if data costs are high or instructions are unclear. Conversely, a familiar messaging application may be widely used but have limited academic value unless facilitators design purposeful activities around it. The combined framework therefore links adult learning quality with technology usability and contextual access.

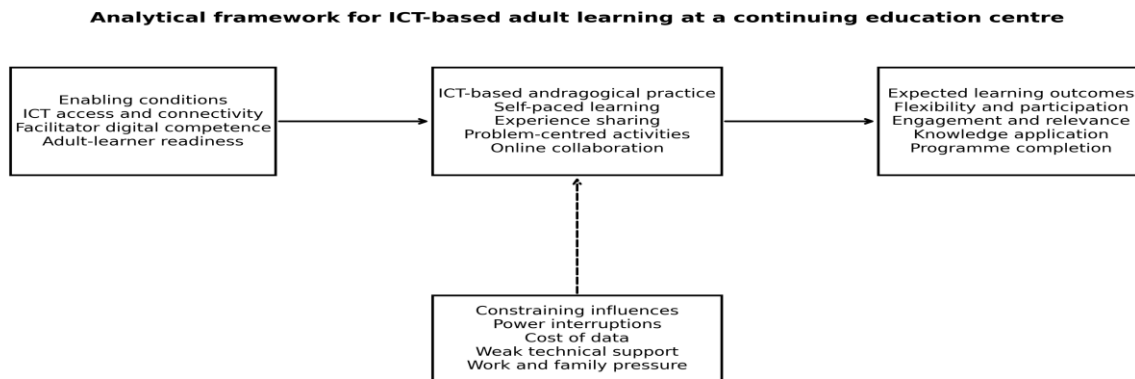


Figure 1. Analytical framework linking enabling conditions, ICT-based andragogical practice and adult-learning outcomes.

Methodology

8.1 Research Design

The article adopts a descriptive cross-sectional survey-style design. This design is suitable for describing the availability and utilization of ICT resources, comparing dimensions of andragogical practice and identifying constraints at a particular period. It also supports the use of frequencies, percentages, mean scores, rankings, tables and graphs. For research-integrity purposes, the numerical results in this manuscript are presented as an illustrative analytical dataset developed to demonstrate a complete journal-style reporting structure. They should not be represented as completed field evidence. Before journal submission, the tables and figures should be replaced with verified responses collected under institutional ethical approval.

Population and Analytical Sample

The target population comprises adult learners and facilitators involved in continuing education programmes at the University of Calabar Continuing Education Centre. The illustrative sample contains 320 response cases: 296 adult learners and 24 facilitators. The learner cases represent different age groups, employment situations and participation modes, while facilitators represent the instructional perspective. The combination allows the analysis to reflect both observed teaching practice and learner experience. A field version of the study should obtain the current enrolment and staff figures from the Centre, determine a statistically appropriate sample and apply proportionate sampling across programme areas and study modes. Inclusion criteria should require active participation during the session under investigation so that respondents can meaningfully assess current ICT practices.

Instrumentation

Data were structured through an instrument titled Utilization of ICT-Based Andragogical Approaches Questionnaire. Section A covered demographic and programme characteristics. Section B measured the availability of ICT resources. Section C examined the frequency of specific instructional practices, including mobile discussion, multimedia teaching, self-paced activity, online collaboration, problem-



based tasks, virtual mentoring and digital assessment. Section D measured alignment with adult learning principles, while Section E assessed barriers and preferred institutional interventions. Items were rated on a five-point scale. For availability and utilization, the response options ranged from 1 (very low) to 5 (very high). Constraint items ranged from 1 (not serious) to 5 (very serious). A field study should subject the instrument to expert validation in adult education, educational technology and measurement, followed by pilot testing and internal-consistency analysis.

Method of Data Analysis

Frequency and percentage were used to summarize respondent characteristics and preferred interventions. Mean scores were used for resource availability, utilization, andragogical alignment and barriers. Mean values of 3.50 and above were interpreted as high, values from 2.50 to 3.49 as moderate, and values below 2.50 as low. Items were ranked to identify the strongest and weakest aspects of practice. Graphical presentation was used to make the comparisons easier to interpret.

Ethical Considerations

A field implementation should obtain approval from the appropriate university ethics or research committee. Participation should be voluntary, and respondents should receive clear information about the purpose of the study, data handling and the right to withdraw. Names and registration numbers should not be collected where they are unnecessary. Results should be reported in aggregate form, and access to digital response files should be restricted. Because learners may fear that negative comments could affect their programme standing, recruitment and consent procedures should emphasize that participation has no relationship with grades or administrative decisions.

Results

This section presents the illustrative respondent profile, availability of ICT resources, extent of utilization, alignment with adult learning principles, constraints and preferred improvement measures. The findings are interpreted as a model of how verified field results can be reported.

Table 2: Demographic and Programme Profile of Respondents (n = 320)

Variable	Category	Frequency	Percentage (%)
Respondent role	Adult learners	296	92.5
Respondent role	Facilitators	24	7.5
Gender	Male	142	44.4
Gender	Female	178	55.6
Age	20-29 years	76	23.8
Age	30-39 years	124	38.8
Age	40-49 years	78	24.4
Age	50 years and above	42	13.1
Employment status	Full-time employment	146	45.6
Employment status	Part-time/self-employed	102	31.9
Employment status	Not currently employed	72	22.5
Primary study arrangement	Weekend classes	182	56.9
Primary study arrangement	Evening classes	94	29.4
Primary study arrangement	Blended/online-intensive	44	13.8



Table 2 shows a respondent group dominated by adult learners, with facilitators included to provide an instructional perspective. Female respondents were slightly more represented than males. More than three-quarters of cases were aged 30 years or older, confirming that the setting contains a substantial mature learner population. Most respondents were employed, self-employed or working part-time, while weekend participation was the most common arrangement. These characteristics reinforce the need for flexible delivery because learning must coexist with work and household obligations.

Table 3: Availability of ICT Resources for Programme Delivery

ICT resource	Mean	Decision	Rank
Smartphones	4.34	High	1
WhatsApp course groups	4.21	High	2
Multimedia projectors	3.62	High	3
Video-conferencing tools	3.11	Moderate	4
Digital library resources	2.94	Moderate	5
Learning management system	2.84	Moderate	6
Computer laboratory access	2.71	Moderate	7
Reliable centre internet	2.38	Low	8

The availability pattern is uneven. Smartphones and WhatsApp course groups recorded the highest means, indicating that mobile communication is the most accessible digital layer. Multimedia projectors were also comparatively available. More structured resources, including the learning-management system, digital library access and computer laboratory use, were only moderate. Reliable centre internet recorded the lowest mean and was the only item classified as low. This suggests that current ICT practice is likely to depend heavily on learners' personal devices and data rather than a fully supported institutional environment.

Figure 2. Mean availability scores for ICT res

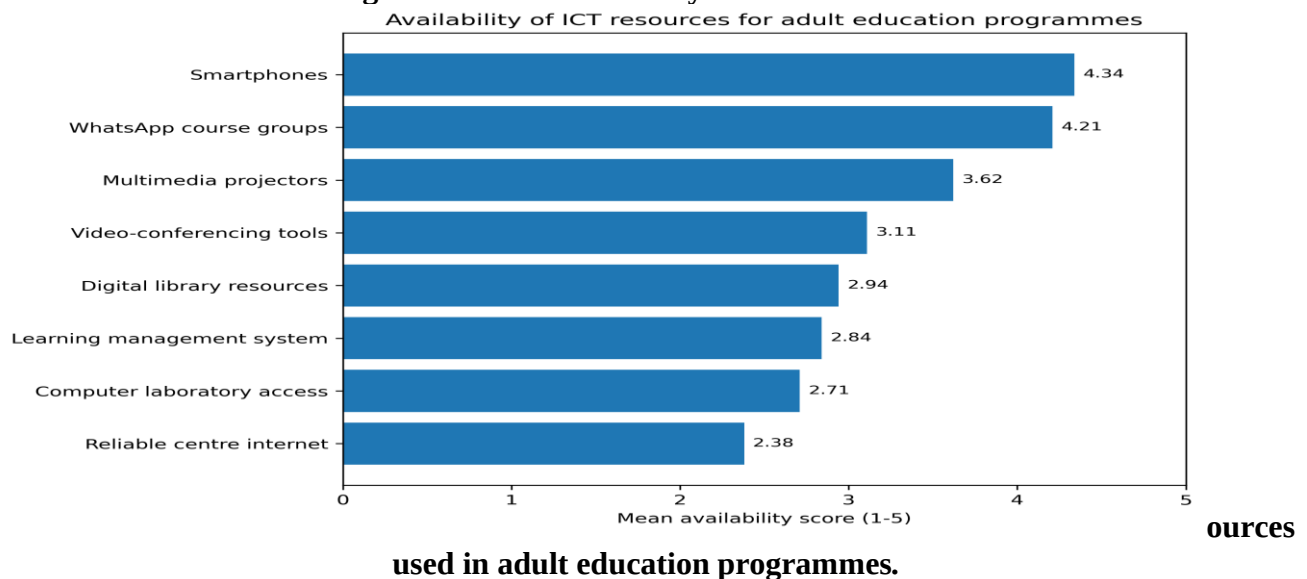




Table 4: Extent of Utilization of ICT-Based Andragogical Approaches

Approach	Mean	Decision	Rank
WhatsApp-supported discussion	3.88	High	1
Multimedia-supported teaching	3.71	High	2
Immediate online feedback	3.43	Moderate	3
Problem-based digital tasks	3.22	Moderate	4
Online peer collaboration	3.18	Moderate	5
Recorded mini-lectures	3.05	Moderate	6
Learner-generated digital projects	2.91	Moderate	7
Self-paced online quizzes	2.74	Moderate	8
Asynchronous LMS modules	2.66	Moderate	9
Virtual mentoring	2.53	Moderate	10
Digital portfolio assessment	2.31	Low	11
Grand mean	3.06	Moderate	-

Table 4 indicates moderate overall utilization. WhatsApp-supported academic discussion and multimedia-supported teaching were the only approaches classified as high. Immediate online feedback, problem-based digital tasks, online collaboration and recorded mini-lectures were used at a moderate level. More structured and learner-centred practices, including virtual mentoring, asynchronous modules and digital portfolio assessment, were weaker. The pattern shows that ICT is present mainly in communication and presentation, while its use for self-paced learning, sustained mentoring and authentic assessment is less developed.

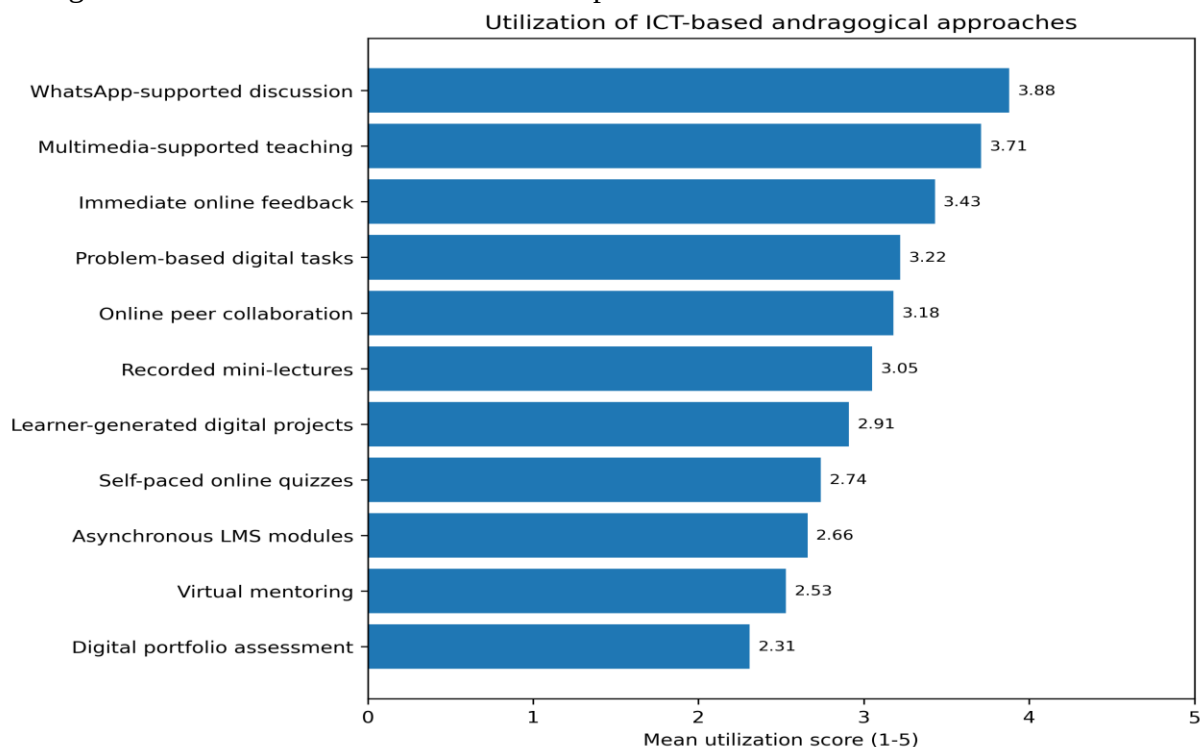


Figure 3. Comparative utilization of ICT-based andragogical approaches.



Table 5: Alignment of Current ICT Practice with Adult Learning Principles

Andragogical dimension	Mean	Decision	Rank
Flexible access to materials and activities	3.68	High	1
Use of learners' prior experience	3.29	Moderate	2
Support for self-directed study	3.14	Moderate	3
Problem-centred learning tasks	3.35	Moderate	4
Immediate workplace or life application	3.44	Moderate	5
Peer collaboration and experience sharing	3.51	High	6
Timely and constructive feedback	3.02	Moderate	7
Learner choice in topics or learning routes	2.77	Moderate	8
Grand mean	3.27	Moderate	-

Flexible access and peer collaboration were the strongest andragogical features. This finding is consistent with the heavy use of mobile communication and weekend programme arrangements. Immediate application, problem-centred tasks and recognition of prior experience were moderate. Learner choice and timely feedback were comparatively weaker. The grand mean indicates that existing ICT use reflects adult learning principles to some extent, but the alignment is not yet strong enough to describe the system as fully learner-directed or personalized.

Table 6: Constraints on Effective ICT-Based Andragogical Practice

Constraint	Mean	Decision	Rank
Unstable internet	4.41	Very serious	1
High cost of data	4.33	Very serious	2
Irregular electricity supply	4.26	Very serious	3
Limited facilitator training	3.92	Serious	4
Inadequate LMS/technical support	3.84	Serious	5
Limited device capability	3.75	Serious	6
Work and family demands	3.68	Serious	7
Low digital confidence	3.42	Moderate	8
Privacy and cyber-safety concerns	3.10	Moderate	9
Resistance to new methods	2.96	Moderate	10

The four leading constraints were unstable internet, high data cost, irregular electricity and limited facilitator training. The first three are infrastructure and affordability issues, while the fourth concerns instructional capacity. Inadequate technical support, device limitations and competing work or family demands were also serious. Privacy concerns and resistance to new methods were lower but still relevant. The results show that improving utilization requires a combination of infrastructure, staff development and learner support; a single intervention will not be sufficient.

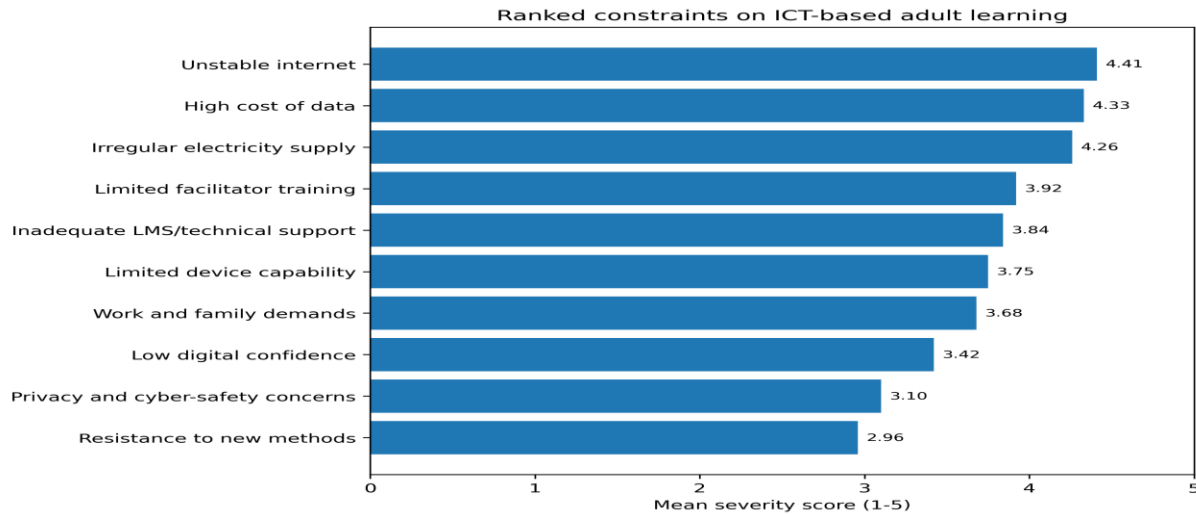


Figure 4. Ranked constraints on ICT-supported adult education.

Table 7: Preferred Institutional Interventions

Intervention	Frequency	Percentage (%)
Subsidised data access	86	26.9
Facilitator digital training	69	21.6
Redesigned blended courses	59	18.4
LMS and technical support	47	14.7
Device loan or shared labs	34	10.6
Adult-learner digital orientation	25	7.8

Subsidised data access was the most frequently selected intervention, followed by facilitator digital training and redesigned blended courses. Learners and facilitators therefore appear to recognize that affordability and instructional quality are connected. Technical support and device-sharing arrangements were also important. The lower ranking of learner orientation does not mean it is unnecessary; rather, respondents may view data and course design as more immediate barriers.

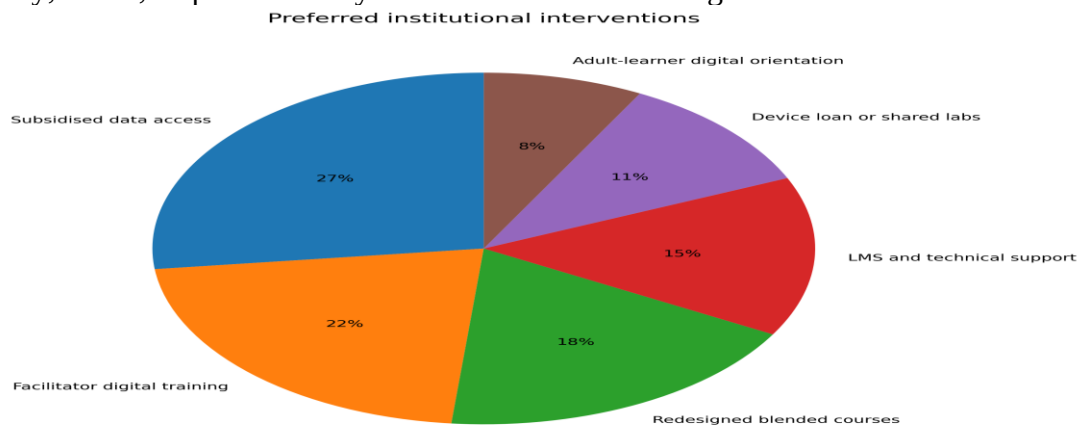


Figure 5. Distribution of preferred measures for improving ICT-based adult education.



Table 8: ICT-Andragogy Improvement Matrix

Evidence from analysis	Recommended response	Responsible actors
Mobile communication is widely available but often informal.	Create separate announcement and academic discussion channels; provide weekly prompts, moderation rules and summaries.	Programme coordinators and course facilitators
LMS use is inconsistent and internet access is weak.	Adopt a low-bandwidth LMS structure with downloadable modules, offline-friendly files and scheduled support periods.	Centre management and university ICT unit
Digital practice is concentrated on presentation rather than active learning.	Redesign selected courses around cases, projects, peer review, reflection and workplace application.	Departments, facilitators and instructional designers
Facilitator preparation is uneven.	Provide practical training on adult-centred digital design, online presence, feedback, assessment and accessibility.	Centre management and staff-development unit
Data cost and device inequality limit participation.	Introduce negotiated data support, shared laboratory periods, device-loan arrangements and printable alternatives.	University management and external partners
Learner choice, mentoring and portfolio assessment are limited.	Pilot virtual office hours, learner-selected projects and digital portfolios in a small number of programmes.	Facilitators, programme advisers and quality-assurance unit

Discussion of Findings

The first major finding is that mobile technologies are more available than institutionally managed digital systems. Smartphones and WhatsApp groups ranked well above reliable internet, computer laboratories and the learning-management system. This is a familiar pattern in adult education environments where learners use personal devices as their main point of digital access. Mobile communication offers a practical foundation for flexible delivery, but it can also lead to fragmented learning if content, discussion and assessment are scattered across informal channels.

The finding supports the argument that technology adoption should begin with context rather than with assumptions about ideal infrastructure. UNESCO's 2023 technology report stresses relevance and equity in educational technology decisions. For the Centre, a mobile-first approach is realistic, but it should not mean a messaging-only model. Course groups should link learners to organized modules, concise resources and clear assessment procedures. Materials need to be readable on small screens and downloadable for later use.

The second finding is the moderate overall utilization of ICT-based andragogical approaches. High use of WhatsApp discussion and multimedia presentation indicates that facilitators have begun to extend communication and content delivery beyond traditional speech and print. However, the lower use of virtual mentoring, asynchronous modules and digital portfolios shows that the deeper possibilities of ICT have not been fully developed. Technology is used more as a channel than as a learning environment.

This distinction is important. Andragogical utilization requires opportunities for self-direction, reflection, collaboration and application. Rodrigo et al. (2024) found that a MOOC became useful within a formal course because it was connected to carefully designed assignments and collaboration. Chaipidech et al. (2022) also showed that personalized digital support could improve adult professional



learning. The present pattern suggests that facilitators at the Centre may require support in moving from basic communication and presentation to the design of structured learner activity.

The third finding concerns alignment with adult learning principles. Flexible access and peer collaboration were the strongest dimensions, while learner choice and timely feedback were weaker. This outcome is understandable. Messaging platforms make it easy to distribute materials and create group communication, but meaningful choice and feedback require more instructional planning and time. A facilitator must design options, monitor participation, respond to questions and provide useful comments. Where teaching loads are high or digital systems are poorly organized, feedback may be delayed and learner choice may be limited.

The moderate recognition of prior experience also deserves attention. Adults bring valuable occupational and community knowledge, but ICT-supported tasks may still ask them to reproduce lecture content rather than interpret their experience. Akintolu and Letseka (2021) argue that adult-friendly teaching should explicitly draw on experience and involve learners in learning decisions. Digital case discussions, reflective voice notes and workplace projects can make this principle visible in programme delivery.

The fourth finding is the severity of internet instability, data cost and electricity supply. These barriers directly affect continuity. A learner may be willing to participate but unable to join a live session, download a large file or submit work before a deadline. Addae et al. (2025) similarly found that connectivity and limited digital-tool knowledge reduced the readiness of mature distance learners in Ghana. Karger et al. (2024) warn that online platforms can introduce new participation inequalities. The Centre should therefore avoid equating non-participation with lack of motivation until access conditions have been considered.

The importance of the home and personal learning environment is also relevant. Keser Aschenberger et al. (2023) found that equipment, study space and physical conditions influenced motivation and well-being among continuing education students. Adult learners in Calabar may study in homes or workplaces that do not provide a quiet, stable or electrically powered environment. Blended design should offer asynchronous alternatives, flexible deadlines where appropriate and access to designated campus spaces.

The fifth finding is that facilitator preparation is a leading institutional constraint. Digital competence for teaching is different from the ability to use a phone or prepare slides. Facilitators need to know how to divide a course into manageable online and classroom components, establish social presence, design collaborative activity, prevent overload and assess authentic work. Van der Stap et al. (2024) identified teacher presence, preparatory collaboration and intentional distribution of activities as validated strategies for adult blended courses. Training at the Centre should therefore be organized around actual course redesign rather than generic demonstrations of software.

The preferences for subsidised data, facilitator training and blended course redesign point toward a combined solution. Learners do not simply request more technology; they request conditions that make it usable. Wu et al. (2023) showed that perceived usefulness and ease of use influence learning effectiveness. When data are affordable, platforms are simple and activities are relevant, participation becomes more likely. When any of these conditions is absent, even motivated adults may withdraw.

The findings ultimately support a phased rather than abrupt approach to digital transformation. The Centre should first standardize communication and materials in a low-bandwidth format, then pilot a small number of redesigned blended courses. Evidence from the pilot can guide expansion. A gradual



approach allows facilitators to develop confidence, learners to receive orientation and technical problems to be resolved before the system is scaled.

Implications for Policy and Practice

The results imply that the Centre needs a clear policy for blended and ICT-supported delivery. Such a policy should define minimum digital expectations for each course, approved communication channels, file-size and accessibility standards, response times, assessment procedures and alternatives for learners facing access difficulties. Standardization would reduce confusion without forcing every discipline into the same teaching method.

Staff development should be linked to course production. Each participating facilitator could leave a training programme with a redesigned module containing a short orientation, learning outcomes, low-bandwidth resources, an experience-based activity, a collaborative task and a feedback plan. This practical model is more likely to change teaching than a one-day lecture on educational technology.

Quality assurance should also evaluate the learner experience. Course review should ask whether adults can find materials easily, understand instructions, participate with limited data, connect learning with practical problems and receive useful feedback. Digital activity records can support evaluation, but they should be interpreted carefully because low participation may reflect access constraints.

Partnerships may help address affordability. The University could explore educational data arrangements, shared device laboratories, evening access to ICT facilities and support from alumni, professional bodies or technology companies. These measures should be accompanied by privacy safeguards and transparent criteria for learner support.

Contribution to Knowledge

This article contributes by separating four issues that are often combined: ICT availability, actual utilization, alignment with adult learning principles and the contextual conditions that shape participation. The distinction shows why a programme may possess digital tools without achieving adult-centred digital learning. It also provides an ICT-Andragogy Improvement Matrix that links observed gaps with practical institutional responses.

The study further locates international evidence on adult digital learning within the specific setting of a Nigerian university continuing education centre. It emphasizes a mobile-first, low-bandwidth and blended model that respects adult learners' work and family responsibilities while gradually expanding structured online learning.

Conclusion

ICT has clear potential to make adult education at the University of Calabar Continuing Education Centre more flexible, connected and practical. The illustrative findings show, however, that current use is stronger in mobile communication and multimedia presentation than in self-paced learning, virtual mentoring and digital portfolio assessment. The system therefore reflects an early or intermediate stage of digital integration.

Effective improvement requires more than additional equipment. The Centre must combine access, usability and andragogical design. Adult learners need low-cost connectivity, clear orientation, flexible options and meaningful interaction. Facilitators need practical support for designing problem-centred activities, using learners' experience, maintaining online presence and providing timely feedback. Institutional leaders need policies and technical systems that make these practices consistent.



A blended, mobile-friendly and gradually implemented model is the most realistic direction. When technology is chosen because it solves a learning problem and is used in a manner that respects adult learners, it can strengthen participation and learning transfer. When it merely transfers conventional lectures to digital platforms, its contribution will remain limited.

Recommendations

1. The Centre should adopt a low-bandwidth blended-learning policy that sets minimum standards for digital communication, resources, activities, feedback and access alternatives.
2. Facilitator training should focus on adult-centred course redesign, including problem-based tasks, experience sharing, online collaboration, social presence and authentic assessment.
3. Course materials should be mobile-friendly, downloadable and compressed so that learners can study without continuous internet access.
4. The University should strengthen reliable internet access at designated learning hubs and explore subsidised data arrangements for adult learners.
5. Each programme should provide a short digital orientation covering platform navigation, online study planning, communication etiquette, privacy and responsible use of information.
6. Selected courses should pilot virtual mentoring, self-paced modules and digital portfolio assessment before wider implementation.
7. The Centre should collect verified annual data on learner access, participation, satisfaction and course completion to guide continuous improvement.

Limitations and Future Research

The numerical analysis in this manuscript is illustrative and cannot substitute for field evidence. A publishable empirical version should use verified enrolment data, validated instruments and ethically collected responses. Self-reported utilization may also differ from actual platform records or classroom observation.

Future research should compare programmes, age groups and employment categories; combine surveys with facilitator interviews and digital activity logs; and examine whether specific blended-learning interventions improve participation, achievement and completion. Longitudinal studies would be particularly useful for determining whether improvements are sustained after initial training and technical support.

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