

Empowering Communities through AI-Driven Adult Learning: A Pathway to Sustainable Entrepreneurship in Rivers State

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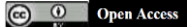
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ABSTRACT

This study examined how AI-driven adult learning empowers communities and advances sustainable entrepreneurship in Rivers State. Three objectives guided the study, from which three research questions were raised. The population of the study comprised 250 adult learners enrolled in community skill-acquisition and vocational training centres across three local government areas of Rivers State. The entire population was studied as a census, without sampling. Data were gathered using a structured, validated instrument titled “Empowering Communities through AI-Driven Adult Learning Questionnaire (ECADALQ)”. The instrument's reliability was established through the Cronbach Alpha method, yielding a coefficient of 0.79. Out of 250 copies of the questionnaire distributed, 231 copies were correctly completed and returned, and these were used for data analysis. Mean and standard deviation statistics were used to analyse the data collected, and items were considered accepted where the mean score was 2.50 and above. Findings revealed that AI-driven adult learning is integrated into community training at a moderate extent, with AI-powered assessment and feedback tools and university- or centre-provided AI platforms recording the highest acceptance, while research-oriented and language-support AI tools recorded lower acceptance. Based on these findings, it was recommended that government agencies, community learning centres, and development partners should subsidise AI-enabled devices and data, strengthen digital infrastructure in rural and semi-urban communities.

Introduction

The rapid advancement of artificial intelligence (AI) is reshaping how adults learn, work, and build livelihoods, particularly in communities where formal education alone has not been sufficient to guarantee economic self-reliance. Adult learning, long recognised as a vehicle for correcting educational disadvantage and equipping citizens with functional skills, is increasingly being reorganised around AI-powered tools that personalise instruction, simplify complex business concepts, and connect learners to markets and mentors beyond their immediate environment (Zawacki-Richter et al., 2019). In Rivers State, where a sizeable proportion of the adult population combines petty trading, artisanal work, and informal enterprise with limited access to structured business education, AI-driven adult learning presents an opportunity to bridge the gap between raw entrepreneurial instinct and the structured knowledge required for sustainable enterprise.

Community empowerment through adult education has historically depended on the availability of trainers, physical learning centres, and printed instructional materials, all of which are unevenly distributed across urban and rural parts of Rivers State. AI-driven platforms loosen this dependency by offering scalable, on-demand instruction through mobile applications, chatbots, and adaptive learning systems that can reach learners in Port Harcourt as easily as in more remote riverine and upland communities (Selwyn, 2021). These tools analyse a learner's pace, prior knowledge, and areas of difficulty to generate individualised learning pathways, thereby making business literacy, financial management, digital marketing, and vocational skill acquisition more accessible to adults who may never have completed formal schooling.

Entrepreneurship remains one of the most viable routes out of poverty for adult populations in Rivers State, given the limited absorption capacity of the formal labour market. Sustainable entrepreneurship, however, requires more than the willingness to start a business; it demands continuous access to market intelligence, financial literacy, digital marketing competence, and adaptive problem-

solving skills (Sterling, 2021). AI-driven adult learning platforms, through features such as market-trend analysis, automated bookkeeping guidance, and simulation-based decision practice, offer adult entrepreneurs a low-cost avenue to acquire these competencies without relinquishing their daily economic activities to attend lengthy formal training programmes.

Global evidence from adaptive learning platforms such as Coursera, Udacity, and various mobile-first vocational training applications demonstrates that AI-supported instruction can significantly improve completion rates and skill retention among adult learners (Holmes et al., 2021). Similar innovations are gradually emerging in Nigeria, where community learning centres, non-governmental organisations, and state-supported skill-acquisition programmes have begun experimenting with AI-enabled chatbots, mobile learning applications, and automated feedback systems to support informal-sector entrepreneurs (Olanrewaju et al., 2022). Nevertheless, the extent to which these tools are actually integrated into community learning in Rivers State, and the degree to which they translate into sustainable entrepreneurial outcomes, remains under-examined.

Despite the promise of AI-driven adult learning, its adoption in Rivers State communities faces considerable obstacles. The digital divide, characterised by inadequate access to smartphones, data, and reliable electricity, continues to limit the reach of AI-powered platforms among adult learners in low-income and rural households (Ezenwaji & Ofoegbu, 2020). Concerns about data privacy, low digital literacy among older adult learners, and weak institutional support from government agencies and community organisations further complicate the adoption pathway (Baker & Hawn, 2022). Addressing these challenges is essential if AI-driven adult learning is to fulfil its potential as a pathway to sustainable entrepreneurship and community empowerment in Rivers State. It is against this background that this study assesses how AI-driven adult learning empowers communities and advances sustainable entrepreneurship in Rivers State.

Statement of the Problem

Community-based adult learning in Rivers State continues to rely heavily on face-to-face instruction delivered by a limited pool of facilitators, an approach that struggles to reach the large population of adult petty traders, artisans, and informal-sector operators scattered across the state's urban, semi-urban, and rural communities. While AI-driven learning tools have demonstrated global potential to personalise instruction and accelerate skill acquisition, their presence in Rivers State's community learning centres, skill-acquisition programmes, and informal business networks appears fragmented and largely undocumented. Many adult learners who could benefit from AI-supported business training either lack awareness of such tools, cannot afford the devices and data required to access them, or find the available platforms poorly adapted to their literacy levels and local languages.

Consequently, adult entrepreneurs in many communities continue to operate businesses without the benefit of structured financial literacy, market analysis, or digital marketing skills that AI-driven platforms could provide, leaving their enterprises vulnerable to collapse and unable to scale sustainably. Where AI-driven adult learning tools have been introduced, questions remain about whether they genuinely translate into improved entrepreneurial confidence, better business decision-making, and sustainable livelihoods, or whether they merely add another layer of technology without addressing the underlying barriers of cost, infrastructure, and digital literacy. This study, therefore, seeks to bridge this knowledge gap by assessing the extent, impact, and challenges of AI-driven adult learning as a pathway to sustainable entrepreneurship among community learners in Rivers State.

Purpose of the Study

The purpose of this study was to assess how AI-driven adult learning empowers communities and advances sustainable entrepreneurship in Rivers State. Specifically, the objectives of the study were to:

1. Examine the extent of AI-driven adult learning integration in community skill-acquisition and vocational training programmes in Rivers State.
2. Assess the impact of AI-driven adult learning on entrepreneurial skill development and sustainable business outcomes among adult learners.
3. Investigate the challenges associated with the adoption of AI-driven adult learning for entrepreneurship development in Rivers State communities.

Research Questions

This study sought to answer the following research questions:

1. To what extent is AI-driven adult learning integrated into community skill-acquisition and vocational training programmes in Rivers State?
2. To what extent does AI-driven adult learning impact entrepreneurial skill development and sustainable business outcomes among adult learners?
3. What are the challenges associated with the adoption of AI-driven adult learning for entrepreneurship development in Rivers State communities?

Concept of Artificial Intelligence (AI)

Artificial intelligence refers to computer systems designed to simulate human intelligence processes such as learning, reasoning, and problem-solving (Russell & Norvig, 2020). As a transformative technology, AI is reshaping numerous sectors, including education and enterprise development, by enabling systems that can analyse data, recognise patterns, and generate individualised recommendations at a scale that would be impossible for human instructors alone to achieve. In adult and community education, AI manifests through adaptive learning platforms, intelligent chatbots, automated feedback systems, and predictive analytics that identify learners at risk of disengagement (Holmes et al., 2021).

Beyond the classroom, AI is increasingly embedded in tools that support small business operations, including automated bookkeeping applications, AI-powered market research tools, and chatbot-based customer service systems. For adult learners who double as micro-entrepreneurs, exposure to AI through learning platforms often serves a dual purpose: it teaches new skills while simultaneously introducing the very tools that learners can later apply directly in their businesses (Schmid, Wirth & Klamma, 2021). This dual function makes AI-driven adult learning particularly relevant to community empowerment and entrepreneurship development in contexts such as Rivers State, where formal training infrastructure remains limited.

Concept of Adult Learning and Andragogy

Adult learning, often discussed within the framework of andragogy, is premised on the recognition that adults learn differently from children: they bring prior experience to the learning process, are self-directed, and are motivated primarily by the practical relevance of what they are learning to their immediate life or livelihood needs (Knowles, Holton & Swanson, 2015). Effective adult learning programmes, therefore, emphasise problem-centred instruction, flexibility in pacing, and respect for the learner's existing competence, rather than rigid, one-size-fits-all curricula.

In community contexts, adult learning frequently occurs outside formal institutions, through skill-acquisition centres, cooperative societies, faith-based organisations, and non-governmental development programmes. The learners in these settings are typically balancing family responsibilities, informal trade, or wage labour alongside their studies, which makes flexible, on-demand instructional delivery especially valuable (Merriam & Bierema, 2014). AI-driven learning tools align naturally with andragogical principles because they can be accessed at any time, adjust to a learner's pace, and focus instruction on the practical, problem-centred skills that adult learners most need, such as budgeting, customer relations, and product pricing.

AI-Driven Adult Learning for Community Empowerment

AI-driven adult learning refers to the deployment of adaptive platforms, intelligent tutoring systems, chatbots, and predictive analytics to deliver, personalise, and assess adult instruction outside the traditional classroom. In community empowerment programmes, these tools have been used to widen access to literacy, numeracy, vocational, and entrepreneurship training, particularly where the ratio of facilitators to learners is low (UNESCO, 2022). By analysing a learner's responses and pace, AI systems can recommend specific modules, simplify content for lower-literacy learners, and provide instant feedback that would otherwise require a facilitator's continuous presence.

Several community development initiatives across Sub-Saharan Africa have piloted AI-enabled mobile learning applications to deliver financial literacy and vocational training to informal-sector workers, recording improvements in learner engagement and skill retention compared with purely print-based methods (Olanrewaju, Adebayo & Yusuf, 2022). In Rivers State, similar innovations are beginning to appear in community learning centres and state-supported skill-acquisition schemes, although their reach remains constrained by uneven digital infrastructure across local government areas. Where such tools have been deployed, they have shown particular strength in delivering instant



assessment and feedback, and in adapting instructional pace to the learner's demonstrated ability, both of which are critical for adult learners returning to structured learning after years away from formal education (Chen, 2011).

Concept of Entrepreneurship and Sustainable Entrepreneurship

Entrepreneurship is broadly understood as the process of identifying, creating, and exploiting opportunities to produce goods and services that meet market needs, typically involving the assumption of risk in pursuit of profit and growth (Kuratko, 2016). In developing economies, entrepreneurship is frequently framed not merely as a route to wealth creation but as a survival strategy, given the limited capacity of the formal labour market to absorb the working-age population. Sustainable entrepreneurship extends this concept by emphasising ventures that remain economically viable over the long term while also being socially responsible and environmentally conscious (Shepherd & Patzelt, 2011).

For sustainable entrepreneurship to take root among adult learners in Rivers State, business owners require continuous access to market intelligence, financial management skills, and adaptive problem-solving capacity, competencies that are rarely covered comprehensively by informal apprenticeship alone. Sustainable entrepreneurship also aligns with Sustainable Development Goal 8, which advocates for decent work and inclusive economic growth (United Nations, 2015), and with the broader community empowerment agenda, since resilient small businesses generate employment, retain wealth within local communities, and reduce dependence on external aid. AI-driven adult learning, by lowering the cost and increasing the accessibility of business education, offers a plausible pathway toward this form of sustainable entrepreneurship.

AI and Entrepreneurial Skill Development Among Adult Learners

AI-powered tools are increasingly being applied to support specific entrepreneurial competencies among adult learners. Chatbot-based mentorship platforms provide on-demand guidance on business-plan development, allowing learners to receive structured feedback without needing continuous access to a human business advisor (Huang, Yang & Li, 2021). AI-driven market-analysis tools aggregate data on pricing, demand trends, and competitor activity, helping small-scale entrepreneurs make more informed decisions about what to produce or stock and when to do so (Lu, Wang & Sun, 2020). Similarly, AI-supported financial-literacy applications simplify bookkeeping, cash-flow tracking, and savings planning for entrepreneurs who may have limited formal accounting knowledge.

Simulation-based AI tools allow adult learners to practise business decision-making, such as pricing strategies or inventory management, in a risk-free virtual environment before applying the lessons to their actual enterprises (Fischer, Kollar & Wecker, 2022). AI-driven digital marketing tools, including automated social media content generators and customer-engagement chatbots, further extend the reach of micro-enterprises beyond their immediate physical location, a particularly valuable capability for community-based entrepreneurs seeking to access wider markets. Despite these documented benefits, several studies caution that the effectiveness of AI-driven entrepreneurial skill development depends heavily on the learner's baseline digital literacy, the availability of reliable devices and connectivity, and the degree of localisation of the AI tools to the learner's language and market context (Selwyn, 2020; Chen, Li & Tang, 2021).

Barriers to AI Adoption in Community and Adult Education

While AI-driven adult learning holds considerable promise, its adoption in developing regions such as Rivers State is constrained by several interlocking barriers. The digital divide, comprising inadequate access to smartphones, computers, and stable internet connectivity, remains one of the most significant obstacles to reaching adult learners in low-income and rural communities (Ezenwaji & Ofoegbu, 2020). The cost of AI-enabled devices and mobile data further compounds this divide, often placing AI-driven learning tools out of reach for the very populations who stand to benefit most from them (Oke & Fernandes, 2020).

Low digital literacy, particularly among older adult learners who did not grow up with digital technology, limits the ability of many community members to navigate AI-powered platforms confidently, even where devices and connectivity are available (Baker & Hawn, 2022). Concerns about data privacy and the security of personal and financial information shared with AI platforms also discourage adoption, especially among entrepreneurs who are cautious about sharing sensitive business data (Selwyn, 2019). Additionally, weak institutional support, in the form of limited government

investment in digital infrastructure and inconsistent integration of AI tools into community learning programmes, slows the pace at which these technologies reach adult learners at scale (Olanrewaju et al., 2022). Addressing these barriers requires coordinated intervention from government, community organisations, and private-sector technology providers.

Theoretical Framework

This study is anchored on Knowles' Andragogy Theory (1984) and Rogers' Diffusion of Innovation Theory (2003). Andragogy Theory holds that adult learners are self-directed, experience-driven, and motivated by the immediate applicability of what they learn to real-life problems, which explains why adult learners in this study respond more favourably to AI-driven features that offer instant feedback and practical, problem-centred practice than to features that are abstract or detached from their daily entrepreneurial concerns. The theory further suggests that adult learning interventions succeed to the extent that they respect learners' prior experience and allow them to apply new knowledge immediately, a principle that AI-driven simulation and progress-tracking tools appear to satisfy more readily than networking or purely informational features.

Rogers' Diffusion of Innovation Theory complements this framework by explaining why AI-driven adult learning tools are being adopted unevenly across Rivers State communities. The theory identifies relative advantage, compatibility, complexity, trialability, and observability as the key attributes that determine the rate at which an innovation is adopted within a social system. Applied to this study, AI-driven adult learning tools that are compatible with learners' existing routines and that can be trialled at low cost, such as instant-feedback assessment features, show higher adoption, while tools requiring greater complexity, sustained connectivity, or a critical mass of active users, such as AI-supported networking platforms, show slower diffusion. Together, these two theories provide a coherent lens for interpreting both the motivational dynamics of adult learners and the structural pace at which AI-driven innovations spread through community learning systems in Rivers State.

AI-Driven Adult Learning and Rural-Urban Disparities in Rivers State

Rivers State presents a markedly uneven digital landscape, with Port Harcourt and its immediate environs enjoying comparatively better mobile network coverage, electricity supply, and access to smartphone-owning youth who can assist older relatives in navigating digital platforms, while riverine and upland communities in local government areas further from the state capital often contend with epileptic power supply and patchy network coverage (Ezenwaji & Ofoegbu, 2020). This urban-rural disparity has direct implications for the reach of AI-driven adult learning, since adaptive learning platforms and chatbot-based mentorship tools depend on consistent internet connectivity to function effectively.

Community learning centres located in urban and peri-urban parts of Rivers State have generally found it easier to pilot AI-powered platforms, often in partnership with private technology providers or non-governmental organisations, whereas centres in more remote communities frequently continue to rely on printed materials and face-to-face instruction, even where learners express interest in AI-supported training (Olanrewaju, Adebayo & Yusuf, 2022). This disparity risks widening existing inequality if left unaddressed, since adult entrepreneurs in better-connected communities gain progressively greater access to market intelligence, digital marketing capability, and financial-literacy tools than their counterparts in remote communities, potentially deepening rather than narrowing the economic gap between different parts of the state. Deliberate investment in offline-capable AI applications and community-based internet access points, alongside continued expansion of the electricity grid, would help ensure that the benefits of AI-driven adult learning are more evenly distributed across Rivers State's diverse communities.

Methodology

The study adopted a descriptive survey research design. The population of the study comprised 250 adult learners enrolled in community skill-acquisition and vocational training centres across three local government areas of Rivers State, drawn from programmes covering trading, tailoring, catering, agro-processing, and small-scale digital services. Given the manageable size of the population, the entire population was studied as a census, without further sampling. A purposive technique was used to select learning centres with an existing record of introducing AI-based tools, such as mobile learning applications and chatbot-supported instruction, into their training activities.

Data were gathered using a structured instrument titled “Empowering Communities through AI-Driven Adult Learning Questionnaire (ECADALQ),” developed on a four-point Likert scale of Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). The instrument was divided into three sections corresponding to the three research questions: extent of AI-driven adult learning integration, impact on entrepreneurial skill development and sustainable business outcomes, and challenges to adoption. The instrument was subjected to face and content validation by experts in adult education and educational technology, who reviewed it for clarity, relevance, and alignment with the study's objectives.

A pilot study involving twenty adult learners who were not part of the main study population was conducted to establish the reliability of the instrument. Data from the pilot study were analysed using Cronbach's Alpha coefficient, which yielded a reliability rating of 0.79, indicating that the instrument was sufficiently reliable for the main study. Out of 250 copies of the questionnaire distributed to the census population, 231 copies were retrieved as duly completed and were used for data analysis, while 19 copies were either not returned or were improperly filled and were therefore excluded. Data collected were analysed using mean and standard deviation statistics, with the Statistical Package for Social Sciences (SPSS) software employed for computation. A criterion mean of 2.50 was adopted as the benchmark for decision-making: item means of 2.50 and above were considered accepted (High Extent or Agree, depending on the research question), while means below 2.50 were considered rejected (Low Extent or Disagree).

Results

Research Question 1: To what extent is AI-driven adult learning integrated into community skill-acquisition and vocational training programmes in Rivers State?

Table 1: Extent of AI-Driven Adult Learning Integration in Community Skill-Acquisition Programmes

S/N	Items	SAA	D	SD	Total	Mean	Remark
1	Community learning centres in my area provide AI-based platforms for adult literacy and vocational skill training.	69 74	55	33	231	2.77	High Extent
2	I actively use AI-powered learning applications (e.g., chatbots, mobile learning apps) for business skill acquisition.	37 51	67	76	231	2.21	Low Extent
3	AI-powered platforms recommend vocational or business courses tailored to my learning needs.	49 62	65	55	231	2.45	Low Extent
4	AI-driven training tools adapt content and pace to my prior knowledge and learning speed.	44 67	62	58	231	2.42	Low Extent
5	AI-driven assessment tools give me instant feedback on my skill-acquisition progress.	67 76	55	33	231	2.77	High Extent
6	AI-powered translation or voice-assistance tools help me learn in my preferred local language.	32 44	72	83	231	2.11	Low Extent
7	AI-driven learning environments improve my ability to solve real business problems.	30 49	74	78	231	2.13	Low Extent
8	My motivation to acquire new entrepreneurial skills has increased because of AI-supported training.	60 69	55	47	231	2.61	High Extent
Grand Mean						2.43	Low Extent

Table 1 shows a grand mean of 2.43 on a four-point scale, indicating that AI-driven adult learning tools are integrated into community skill-acquisition and vocational training programmes in Rivers State to a moderate, and in places uneven, extent. Instant AI-driven feedback on skill-acquisition progress and the provision of AI-based platforms by community learning centres recorded the highest acceptance among the eight items, with means of 2.77 and 2.77 respectively, suggesting that where AI tools have been introduced, learners particularly value the immediacy of feedback on their progress. Learners' motivation to acquire new entrepreneurial skills through AI-supported training was also rated favourably, with a mean of 2.61.

Conversely, active personal use of AI-powered learning applications such as chatbots and mobile learning apps recorded one of the lowest means (2.21), as did the availability of AI-powered translation or voice-assistance tools in local languages (2.11) and the use of AI-driven environments to improve real business problem-solving (2.13). These lower scores suggest that while institutions may be introducing AI platforms, actual personal adoption by learners, and the adaptation of these tools to local languages and practical problem-solving, remain limited.

Research Question 2: To what extent does AI-driven adult learning impact entrepreneurial skill development and sustainable business outcomes among adult learners?

Table 2: Impact of AI-Driven Adult Learning on Entrepreneurial Skill Development and Sustainable Business Outcomes

S/N	Items	SAA	D	SD	Total	Mean	Remark
1	AI-powered mentorship chatbots have improved my understanding of business-plan development.	53 55	65	58	231	2.45	Low Impact
2	AI-driven market-analysis tools help me identify viable business opportunities in my community.	49 58	67	57	231	2.43	Low Impact
3	AI-supported financial-literacy tools improve my ability to manage business finances and records.	55 51	65	60	231	2.44	Low Impact
4	AI-driven digital-marketing tools have expanded my ability to reach customers online.	53 46	67	65	231	2.38	Low Impact
5	AI-powered simulations allow me to practise entrepreneurial decision-making without real business risk.	51 67	62	51	231	2.51	High Impact
6	AI-driven progress tracking and goal-setting motivate me to complete my entrepreneurship training.	65 55	62	49	231	2.59	High Impact
7	AI-supported networking platforms connect me with other entrepreneurs, mentors, and suppliers.	44 46	69	72	231	2.27	Low Impact
8	My confidence in starting or sustaining a business has grown because of AI-supported learning.	62 60	60	49	231	2.58	High Impact
Grand Mean						2.46	Low Impact

Table 2 reveals a grand mean of 2.46, indicating that AI-driven adult learning has a moderate impact on entrepreneurial skill development and sustainable business outcomes among adult learners in Rivers State. AI-driven progress tracking and goal-setting recorded the highest mean (2.59), followed by growth in learners' confidence to start or sustain a business (2.58) and the use of AI-powered

simulations to practise entrepreneurial decision-making without real business risk (2.51). These results suggest that adult learners respond well to AI features that track their development and allow low-risk practice of business decisions.

On the other hand, AI-supported networking platforms that connect learners with other entrepreneurs, mentors, and suppliers recorded the lowest mean (2.27), suggesting that the collaborative and networking dimensions of AI-driven adult learning remain underdeveloped in the study area. AI-driven digital-marketing tools also recorded a comparatively low mean (2.38), indicating that many learners are yet to fully exploit AI-powered tools to expand their customer reach online.

Research Question 3: What are the challenges associated with the adoption of AI-driven adult learning for entrepreneurship development in Rivers State communities?

Table 3: Challenges Associated with the Adoption of AI-Driven Adult Learning for Entrepreneurship Development

S/N	Items	SA	A	D	SD	Total	Mean	Remark
1	The high cost of smartphones, data, and AI-enabled devices discourages my use of AI-driven learning tools.	69	55	55	52	231	2.61	Agree
2	I worry about data privacy and security when I use AI-powered platforms for business training.	74	69	46	42	231	2.76	Agree
3	Insufficient technical support limits my ability to use AI-based learning tools effectively.	55	65	60	51	231	2.54	Agree
4	Poor internet connectivity and unreliable electricity supply limit my access to AI-driven training.	72	67	49	43	231	2.73	Agree
5	Low digital literacy limits my ability to navigate AI-powered learning platforms confidently.	62	67	55	47	231	2.62	Agree
6	Limited government and institutional support hinders the integration of AI into community learning centres.	65	65	55	46	231	2.65	Agree
7	Language and literacy barriers limit how much I benefit from AI-driven learning content.	44	55	67	65	231	2.34	Disagree
8	Ethical concerns about AI decision-making reduce my trust in AI-generated business advice.	51	46	67	67	231	2.35	Disagree
Grand Mean							2.58	Agree

Table 3 shows a grand mean of 2.58, confirming that adult learners in Rivers State communities generally agree that several challenges hinder the adoption of AI-driven adult learning for entrepreneurship development. Concerns about data privacy and security when using AI-powered platforms recorded the highest mean (2.76), followed by poor internet connectivity and unreliable electricity supply (2.73) and low digital literacy in navigating AI-powered platforms (2.62). These findings point to infrastructural and confidence-related barriers as the most pressing challenges facing learners.

The high cost of smartphones, data, and AI-enabled devices also recorded a mean of 2.61, reflecting the affordability barrier that continues to limit access to AI-driven learning among lower-income adult learners. By contrast, language and literacy barriers (2.34) and ethical concerns about AI decision-making (2.35) recorded comparatively lower means, suggesting that although these are

recognised challenges, they are perceived as somewhat less pressing than the cost, infrastructure, and digital-literacy barriers identified above.

Discussion of Findings

The findings of this study on the extent of AI-driven adult learning integration, with a grand mean of 2.43, align with prior research suggesting that AI adoption in community and adult education across developing regions remains at an early and uneven stage (Zawacki-Richter et al., 2019). The comparatively strong performance of instant feedback and institutionally provided AI platforms echoes Holmes et al. (2021), who found that AI-powered assessment tools are often among the first AI applications to be embraced in resource-constrained educational settings because they directly reduce the workload of scarce human facilitators. However, the low mean recorded for personal, active use of AI-powered learning applications suggests a gap between institutional provision and individual adoption, a pattern also observed by Selwyn (2020), who noted that the mere availability of AI tools does not automatically translate into sustained learner engagement without deliberate digital-literacy support.

The moderate impact of AI-driven adult learning on entrepreneurial skill development found in this study is consistent with Huang, Yang and Li (2021), who reported that AI-powered mentorship and progress-tracking tools meaningfully improve learner motivation and completion, even where deeper competencies such as networking and market access lag behind. The relatively low acceptance of AI-supported networking platforms in this study mirrors findings by Fischer, Kollar and Wecker (2022), who observed that collaborative AI features require a critical mass of active users and reliable connectivity to function effectively, conditions that may not yet be fully present in the community learning centres studied. Similarly, the modest performance of AI-driven digital-marketing tools supports Lu, Wang and Sun (2020), who found that entrepreneurs in early-stage digital adoption often prioritise core operational tools, such as bookkeeping and inventory management, before extending AI use into marketing and customer engagement.

The challenges identified in this study, particularly data privacy concerns, poor infrastructure, and low digital literacy, corroborate the findings of Baker and Hawn (2022) and Ezenwaji and Ofoegbu (2020), both of which identified infrastructural deficits and digital-literacy gaps as central obstacles to AI adoption in African educational contexts. The prominence of cost-related barriers in this study is consistent with Oke and Fernandes (2020), who argued that the affordability of AI-enabled devices and data remains one of the most persistent constraints on equitable access to AI-driven learning in developing economies. Taken together, these findings suggest that while AI-driven adult learning holds genuine promise for advancing sustainable entrepreneurship in Rivers State, its benefits will remain unevenly distributed unless deliberate policy attention is paid to affordability, infrastructure, digital literacy, and the localisation of AI tools to the needs of community-based entrepreneurs.

Conclusion

The study concludes that AI-driven adult learning holds considerable promise as a pathway to sustainable entrepreneurship and community empowerment in Rivers State, particularly through features such as instant feedback, progress tracking, and simulation-based decision practice, all of which recorded relatively strong acceptance among adult learners. However, the moderate overall extent of integration, coupled with the comparatively weak adoption of networking, marketing, and language-support features, indicates that AI-driven adult learning has not yet reached its full transformative potential in the state. Persistent challenges, including the high cost of devices and data, data privacy concerns, poor infrastructure, low digital literacy, and weak institutional support, must be addressed if AI-driven adult learning is to translate more fully into resilient, sustainable enterprises and empowered communities across Rivers State.

Recommendations

Based on the findings and conclusion of the study, the following recommendations were made:

1. Government agencies, community learning centres, and development partners should subsidise AI-enabled devices and mobile data for adult learners, particularly in low-income and rural communities, to reduce the affordability barrier to AI-driven adult learning.

2. Community learning centres and technology providers should strengthen data-security safeguards on AI-powered platforms and communicate these safeguards clearly to learners, in order to build the trust required for sustained adoption of AI-driven business training.

3. Policymakers and community organisations should invest in continuous digital-literacy training alongside AI-driven adult learning programmes, and should prioritise the localisation of AI tools, including language support and offline-capable applications, to ensure that AI-driven learning translates more fully into sustainable entrepreneurship and community empowerment across Rivers State.

References

1. Baker, R. S., & Hawn, A. (2022). Algorithmic bias in education. *International Journal of Artificial Intelligence in Education*, 32(4), 1052–1092.
2. Chen, L. H. (2011). Enhancement of student learning performance using personalized diagnosis and remedial learning system. *Computers & Education*, 56(1), 289–299.
3. Chen, L., Li, X., & Tang, Y. (2021). Barriers to AI adoption in higher education: A case study. *Educational Technology Research and Development*, 69(2), 311–329.
4. Ezenwaji, I. O., & Ofoegbu, M. (2020). The challenges of digital learning infrastructure in Nigerian universities. *African Journal of Education and Information Management*, 15(2), 112–130.
5. Fischer, C., Kollar, I., & Wecker, C. (2022). AI-supported collaborative learning: Effects on engagement and knowledge sharing. *Journal of Learning Sciences*, 31(3), 345–367.
6. Holmes, W., Porayska-Pomsta, K., Holstein, K., Sutherland, E., Baker, T., Shum, S. B., ... Koedinger, K. R. (2021). Ethics of AI in education: Towards a community-wide framework. *International Journal of Artificial Intelligence in Education*, 1–23.
7. Huang, R., Yang, J., & Li, X. (2021). The role of AI-driven chatbots in enhancing learner engagement and motivation. *Journal of Educational Technology & Society*, 24(4), 68–81.
8. Knowles, M. S., Holton, E. F., & Swanson, R. A. (2015). *The adult learner: The definitive classic in adult education and human resource development* (8th ed.). Routledge.
9. Kuratko, D. F. (2016). *Entrepreneurship: Theory, process, and practice* (10th ed.). Cengage Learning.
10. Lu, Y., Wang, X., & Sun, H. (2020). AI in academic and market research: A bibliometric analysis. *Scientometrics*, 125(4), 1567–1585.
11. Merriam, S. B., & Bierema, L. L. (2014). *Adult learning: Linking theory and practice*. Jossey-Bass.
12. Oke, A., & Fernandes, J. (2020). Financial barriers to AI-driven learning: A global perspective. *Journal of Educational Finance*, 45(1), 33–50.
13. Olanrewaju, O., Adebayo, T., & Yusuf, A. (2022). Assessing digital readiness for AI-powered learning in Nigerian communities. *Journal of Higher Education Policy*, 17(1), 55–72.
14. Russell, S., & Norvig, P. (2020). *Artificial intelligence: A modern approach* (4th ed.). Pearson.
15. Schmid, U., Wirth, J., & Klamma, R. (2021). Adaptive learning systems: The AI revolution in personalized education. *Educational Review*, 73(2), 198–214.
16. Selwyn, N. (2019). Should robots replace teachers? AI and the future of education. *Learning, Media and Technology*, 44(1), 77–91.
17. Selwyn, N. (2020). *Education and technology: Key issues and debates* (3rd ed.). Bloomsbury.
18. Selwyn, N. (2021). *AI and education: The reality behind the hype*. Polity Press.
19. Shepherd, D. A., & Patzelt, H. (2011). The new field of sustainable entrepreneurship: Studying entrepreneurial action linking “what is to be sustained” with “what is to be developed.” *Entrepreneurship Theory and Practice*, 35(1), 137–163.
20. Sterling, S. (2021). *Sustainable education: Re-visioning learning and change*. Green Books.
21. UNESCO. (2022). *Bridging the digital divide: AI and education in the global south*. United Nations Educational, Scientific and Cultural Organization.
22. United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. United Nations.
23. Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education. *International Journal of Educational Technology in Higher Education*, 16(1), 39–60.