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APPLICATION OF ARTIFICIAL INTELLIGENCE POWERED TOOLS FOR PRINCIPALS' MANAGEMENT OF SECONDARY SCHOOLS IN ANAMBRA STATE

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Abstract
The study examined principals' application of AI powered tools for secondary schools management in Anambra State. Two research questions guided the study and two hypotheses were tested at 0.05 level of significance. The descriptive survey design was adopted for the study. The population of the study comprised 267 principals of public secondary schools in Anambra State. The entire population was used for the study because it was manageable. The instrument for data collection was a self-structured questionnaire which was validated by three experts. Test of reliability was done using Cronbach Alpha which reported reliability coefficients of 0.86 and 0.88 for Clusters, 1 and 2 respectively with an overall reliability coefficient of 0.87. Mean and Standard deviation and t-test were used to analyse data for the study. Finding of the study revealed that principals applied QuickBooks AI tool in the financial management of secondary schools in Anambra State to a low extent. Finding also showed principals applied BambooHR AI tool for the management of human resources in secondary schools in Anambra State to a low extent. Finding also showed that principals with prior experience in using AI tools reported significantly higher levels of application than those without such experience. Based on these findings, the researchers conclude that principals apply AI-powered tools in secondary school management to a low extent. It was therefore recommended that the Post Primary Schools Service Commission should organise regular training and capacity-building workshops for school principals on the effective use of AI-powered tools like QuickBooks and BambooHR.

Keywords: Application, Artificial Intelligence (AI), Management, School, Tools

Introduction

Education is the cornerstone of national development, driving social, economic and cultural progress by equipping individuals with the knowledge, skills and values needed for societal contribution. In Nigeria, education is vital for sustainable development, empowering citizens to tackle challenges and foster economic growth (Federal Republic of Nigeria, 2013). Formal education in Nigeria operates across primary, secondary and tertiary levels, with secondary education bridging foundational and advanced learning. This study focuses on secondary schools, which prepare students for higher education and productive societal roles.

The National Policy on Education (2013) outlined secondary education's aim to develop mental capacity, character and skills for societal contribution. Okeke-James et al. (2020) defined secondary education as education that promotes intellectual growth, ethical values and practical skills. Ofojebe and Ezugoh (2019) viewed it as a system combining cognitive, affective and psychomotor skills to produce effective citizens. Ajemba et al. (2021) stated that nurturing students' abilities to shape themselves and society positively. Achieving these objectives depends on principals' effective management of human and material resources to create a conducive learning environment.

Principals, as chief administrators of secondary schools, are central to achieving educational goals through effective leadership and prudent resource management. Nakpodia (2016) defined a

principal as the chief executive responsible for implementing plans and policies to meet educational objectives. This definition underscores the administrative authority of the principal and highlights the responsibility of translating educational policies into practical school actions. Oboegbulem and Ogbonnaya (2018) see principals as instructional leaders overseeing curriculum delivery and student welfare. Their view emphasises the academic dimension of the principal's role, particularly in supervising teaching quality and ensuring students' holistic development. Onuma (2016) described principals as facilitators who foster a conducive work environment and promote professional development. This perspective draws attention to the relational and supportive functions of principals in enhancing teachers' competence and morale. Furthermore, principals' roles include strategic planning, staff motivation, resource allocation, and fostering school–community relations (Amadi, 2015; Omemu, 2017). These responsibilities collectively portray the principal as both an administrator and a leader who coordinates human and material resources for effective school functioning. In the context of this study, a principal is therefore conceived as the chief administrative officer responsible for leading, organising, and managing school resources and personnel to achieve educational goals.

School management involves coordinating resources and personnel to achieve institutional objectives efficiently. Bush and Glover (2016) defined school management as applying techniques to meet educational goals. This definition highlights the technical and procedural aspect of management, emphasising the deliberate use of methods and strategies in achieving set objectives. In consonance, Oboegbulem and Ogbonnaya (2018) described school management as creating a vision and supporting staff to foster a positive school culture. This perspective stresses the human and visionary dimensions of management, particularly the role of leadership in shaping school climate. Igbokwe (2020) stated that school management involves systematically organizing resources to enhance productivity. This view underscores the importance of orderliness, coordination and accountability in improving school outcomes. In the context of this study, school management is the strategic coordination of human, material and financial resources to achieve educational objectives efficiently. In the same vein, Ezeugbor et al. (2018) called for strategic planning and supervision for quality education delivery. This call reinforces the need for deliberate planning and consistent oversight in sustaining educational standards.

Sadly, this appears to be a problem in Anambra State. In Anambra State, principals face challenges like poor strategic planning, poor financial, human resource and insufficient infrastructure (Irokwe et al., 2024). This indicates structural and administrative weaknesses that may hinder effective school performance. Nwune et al. (2016) attributed these to gaps in management skills, hindering educational progress. This attribution suggests that professional competence plays a crucial role in successful school administration. Obi and Michael (2024) noted that human-resource practices personnel management, teacher supervision and record keeping were poorly implemented by many principals, leading to low teacher morale and reduced school effectiveness. This observation links administrative inefficiency with staff dissatisfaction and weakened institutional outcomes. Similarly, Nwankwo and Okoye (2022) found no significant differences between public and mission secondary schools in HR techniques, with sectors exhibiting sub optimal personnel strategies like inadequate appraisal, poor mentorship and ineffective communication channels. This finding implies that management deficiencies are widespread across different school types. On the other hand, Okpala and Ukandu (2022) reported that principals often fail to keep accurate accounts partly due to lack of digital tools resulting in poor transparency and decision-making. This points to the growing importance of digital competence in modern school administration. They stressed the need for ICT to strengthen record management. Similarly, Irokwe et al. (2024) concluded that principals' poor handling of records and fund utilization undermines administrative performance. This conclusion further emphasises the relationship between accountability practices and overall school effectiveness. Irokwe et al. (2024) recommended deploying ICT for keeping school financial records to improve management. This recommendation suggests a strategic direction for enhancing transparency and efficiency. Cukurova et al. (2023) reported that teacher/administrator adoption of Artificial Intelligence (AI) systems depends on trust, workload concerns, ethics, training and support structures factors which might be likely lacking in current Anambra school administration contexts. This implies that successful integration of AI in school management would require not only technological provision but also institutional readiness and capacity building.

AI-powered tools are technologies leveraging artificial intelligence to perform tasks requiring human-like intelligence, like learning, reasoning and problem-solving. Baker and Smith (2019) defined AI as systems performing cognitive tasks like learning and problem-solving. This definition emphasises the capacity of AI to simulate human intelligence in executing tasks that traditionally require human reasoning. Zawacki-Richter et al. (2019) described AI-powered tools as using machine learning and algorithms for automation and decision-making. This description highlights the technical mechanisms underlying AI systems, particularly their reliance on data-driven algorithms for operational efficiency. Luckin et al. (2016) defined them as tools analysing data to optimise processes. This view draws attention to the analytical strength of AI in improving accuracy, productivity and system performance. Nguyen et al. (2023) defined AI-powered tools as technologies enabling automated tasks and data-driven decisions. This explanation reinforces the role of AI in reducing manual workload while enhancing evidence-based decision-making. Kim et al. (2022) described AI tools as systems supporting complex tasks through data analytics. This perspective underscores the capacity of AI to handle sophisticated responsibilities that require advanced data processing and interpretation. Bond et al. (2019) viewed AI-powered tools as applications enhancing processes via automation and analytics. In the context of this study, AI-powered tools are software or systems using machine learning, natural language processing and data analytics to automate tasks and enhance decision-making in education.

Suggested AI-powered tools for school management include financial management systems, namely QuickBooks AI and SAP Concur, human resource management systems, namely BambooHR and Workday AI, intelligent tutoring systems, chatbots and virtual assistants (Zawacki-Richter et al., 2019; Nguyen et al., 2023). This study focuses on two tools, QuickBooks AI for financial management and BambooHR for human resource management, due to their potential to address financial and personnel management challenges in Anambra State's secondary schools.

QuickBooks AI is an AI-driven financial management system that automates budgeting, tracks expenditures and ensures financial transparency, significantly enhancing school management. O'Mahony (2021) notes its ability to optimize budget allocation by analyzing spending patterns, enabling principals to prioritize critical educational needs like infrastructure upgrades in Anambra State's resource-constrained schools (Akinfolarin, 2017). It provides real-time financial reports, allowing principals to monitor funds and make data-driven decisions to prevent mismanagement (Ifenthaler & Yau, 2020). Nwune et al. (2016) stated that QuickBooks AI detects discrepancies in financial records, ensuring transparency and accountability in fund utilization, addressing issues of financial mismanagement. By automating routine financial tasks, it frees principals to focus on strategic planning, improving school management efficiency. Just like QuickBooks AI, BambooHR is another AI-powered tool.

BambooHR is an AI-driven human resource management system that streamlines staff recruitment, scheduling, performance evaluation and professional development, optimizing school management processes. Chen et al. (2023) stated that the BambooHR has the ability to automate administrative HR tasks, reducing principals' workload and addressing inefficiencies noted in Anambra State (Nwune et al., 2016). It analyzes staff performance data to identify training needs, enabling targeted professional development to enhance teacher motivation, a critical issue in the region (Akinfolarin, 2017). BambooHR optimizes staff scheduling by predicting workload demands, ensuring efficient allocation of human resources in schools with limited personnel (Gkontzis et al., 2019). By providing insights into staff engagement and performance, it supports principals in fostering a motivated workforce, aligning with the need for improved school culture (Oboegbulem & Ogbonnaya, 2018). In the context of this study, BambooHR is an AI-powered HR management software that automates staff management tasks, optimizes scheduling and supports performance evaluation in schools. Despite their potential, factors like experience with AI could influence principals' use of AI-powered tools in school management.

Experience with AI refers to the practical knowledge, skills and familiarity educators gain through direct interaction with AI-powered tools in professional or educational settings. Zawacki-Richter et al. (2019) defined it as the extent of hands-on engagement with AI systems, influencing confidence and competence in their application. Popenici and Kerr (2017) described experience as the cumulative exposure to AI technologies, shaping attitudes toward their adoption. Kim et al. (2022) viewed it as the level of proficiency developed through training and use of AI tools, impacting their

integration into work processes. In the context of this study, experience with AI is the practical familiarity and competence principals develop through interacting with AI-powered tools for administrative or educational purposes. Kim et al. (2022) noted that educators' limited experience with AI tools hinders integration. It is uncertain whether principals in public secondary schools adopt tools like QuickBooks AI and BambooHR. It is against this background that the researchers investigated the application of artificial intelligence powered tools for principals' management of secondary schools in Anambra State.

Statement of the Problem

Secondary school management in Anambra State appears to face significant inefficiencies, particularly in financial and human resource administration, which may undermine the delivery of quality education. From field observation by the researcher, challenges such as poor infrastructure maintenance, weak staff supervision and irregular curriculum implementation are evident in many schools. These issues suggest mismanaged budgets and inadequate oversight. Challenges in financial management such as misappropriation of funds, delayed budget execution and poor record keeping reportedly result in shortages of essential resources and a decline in stakeholder trust. Similarly, ineffective human resource practices including delayed recruitment, manual scheduling and the absence of performance evaluation appear to lower teacher morale and disrupt academic continuity. These issues collectively affect school operations, compromise teaching and learning quality and threaten students' academic outcomes. The persistence of these problems raises concerns about the administrative capacity of school principals and the tools at their disposal. It is against this background that the researchers investigated the application of artificial intelligence powered tools for principals' management of secondary schools in Anambra State.

Purpose of the Study

The main purpose of the study was to examine the application of artificial intelligence powered tools for principals' management of secondary schools in Anambra State.

Specifically, the study:

1. examined principals' application of QuickBooks AI tool in the financial management of secondary schools in Anambra State.
2. ascertained principals' application of BambooHR AI tool in the management of human resources in secondary schools in Anambra State.

Research Questions

The following research questions guided the study:

1. To what extent do principals apply QuickBooks AI tool in the financial management of secondary schools in Anambra State?
2. To what extent do principals apply BambooHR AI tool in the management of human resources in secondary schools in Anambra State?

Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance:

1. There is no significant difference in the opinions of principals with experience with AI powered tools and principals without experience with AI powered tools on their application of QuickBooks AI tool in the financial management of secondary schools in Anambra State.

2. There is no significant difference in the opinions of principals with experience with AI powered tools and principals without experience with AI powered tools on their application of BambooHR AI tool in the management of human resources in secondary schools in Anambra State.

Methods

The descriptive survey research design was adopted for the study. The study was conducted in Anambra State. The population of the study comprised 267 public secondary school principals (159 males and 108 females) in Anambra State. The entire population of the study was used without sampling. The researchers used a self-structured questionnaire to collect data for the study. The questionnaire is titled "Principals Application of Artificial Intelligence Powered Tools for Secondary

School Management Questionnaire (PAAIPTSSMQ)" The instrument has two sections, A and B. Section A contains one item on the respondents experience with AI. Section B contains 20 items in two clusters, 1 and 2. Cluster 1 contains 10 items on principals' application of QuickBooks AI tool in the financial management of secondary schools. Cluster 2 contains 10 items on principals' application of QuickBooks AI tool in the financial management of secondary schools. The instrument is structured on a 4-point rating scale of Very High Extent (VHE), High Extent (HE), Low Extent (LE) and Very Low Extent (VLE). To ensure the face validity of the instrument, the instrument was carefully reviewed by three lecturers in the Department of Educational Management and Policy, Nnamdi Azikiwe University, Awka who assessed it for clarity, relevance and completeness. After validation, a pilot test was conducted involving 20 public secondary school principals in Enugu State. Test of reliability was done using Cronbach Alpha which reported reliability coefficients of 0.86 and 0.88 for Clusters, 1 and 2 respectively with an overall reliability coefficient of 0.87. The questionnaire was administered directly to respondents, with 215 out of 267 copies returned in good condition. Data was analysed using mean, standard deviation and t-test. Mean scores were used to answer the research questions while the standard deviation was used to check the homogeneity or non-homogeneity of the respondents' opinions. A mean score of 2.50 or above indicated high extent while a mean score below 2.50 indicated low extent. To test the null hypotheses, t-test statistics were applied at a 0.05 level of significance. A p-value below 0.05 led to the rejection of the null hypothesis, indicating a significant difference between groups. A p-value of 0.05 or above meant the null hypothesis was not rejected, suggesting no significant difference between the groups compared.

Results

Research Question One

To what extent do principals apply QuickBooks AI tool in the financial management of secondary schools in Anambra State?

Table 1: Respondents Mean Ratings on the Extent Principals Apply QuickBooks AI tool in the financial management of secondary schools in Anambra State (N=213)

S/N	Item Statements	Mean	SD	Remarks
1	Principals use QuickBooks AI to prepare annual school budgets.	2.13	0.84	Low Extent
2	Principals employ QuickBooks AI for tracking income and expenditure.	2.08	0.92	Low Extent
3	Principals generate automated financial reports using QuickBooks AI.	1.94	0.89	Low Extent
4	QuickBooks AI is used to monitor fund disbursement for school projects.	2.17	0.81	Low Extent
5	Principals use QuickBooks AI to ensure transparency in financial records.	2.04	0.93	Low Extent
6	QuickBooks AI is applied for auditing school accounts regularly.	1.88	0.87	Low Extent
7	Principals utilize QuickBooks AI to analyze cost-effectiveness of expenses.	2.22	0.90	Low Extent
8	QuickBooks AI is used for secure digital storage of financial data.	2.16	0.86	Low Extent
9	Principals apply QuickBooks AI in managing petty cash and day-to-day expenses.	2.19	0.83	Low Extent
10	Training is provided for principals on the use of QuickBooks AI.	2.05	0.91	Low Extent
	Cluster Mean	**2.11**	**0.88**	**Low Extent**

The result in Table 1 show that all the items recorded mean scores below the benchmark of 2.50. The respondents applied items 1-10 to a low extent with mean ratings ranging between 1.88 and 2.22. The standard deviation score ranging between 0.81 and 0.92 show that the respondents opinions were close. The cluster mean of 2.11 indicates that principals apply QuickBooks AI tool in the financial management of secondary schools in Anambra State to a low extent

Research Question Two

To what extent do principals apply BambooHR AI tool for the management of human resources in secondary schools in Anambra State?

Table 2: Respondents Mean Ratings on the Extent Principals Apply BambooHR AI Tool for the Management of Human Resources in Secondary Schools in Anambra State (N=213)

S/N	Item Statements: Principals' apply BambooHR AI tool in human resource management as follows:	Mean	SD	Remarks
11	To facilitate staff recruitment processes.	2.11	0.82	Low Extent
12	For processing and managing staff onboarding activities.	2.09	0.87	Low Extent
13	In scheduling and assigning staff duties.	2.14	0.91	Low Extent
14	For monitoring staff attendance records.	2.23	0.88	Low Extent
15	To track and manage staff leave requests.	2.25	0.85	Low Extent

16	For storing and retrieving staff records digitally.	2.18	0.90	Low Extent
17	To conduct staff performance evaluations.	2.06	0.94	Low Extent
18	For providing timely feedback on staff performance.	2.04	0.89	Low Extent
19	To identify and document staff training needs.	2.12	0.93	Low Extent
20	For receiving training on the application of BambooHR AI in managing human resources.	1.98	0.95	Low Extent
	Cluster Mean	**2.12**	**0.89**	**Low Extent**

The result in Table 2 show that all the items recorded mean scores below the benchmark of 2.50. The respondents applied items 11-20 to a low extent with mean ratings ranging between 1.98 and 2.25. The standard deviation score ranging between 0.82 and 0.95 show that the respondents opinions were close.. The cluster mean of 2.12 indicates that principals apply BambooHR AI tool for the management of human resources in secondary schools in Anambra State to a low extent.

Hypothesis One

There is no significant difference in the opinions of principals with experience with AI powered tools and principals without experience with AI powered tools on their application of QuickBooks AI tool in the financial management of secondary schools in Anambra State.

Table 3: Independent Samples t-test on the Opinions of Principals with and without AI Experience Regarding the Application of QuickBooks AI Tool in the Financial Management of Secondary Schools in Anambra State

Group	N	Mean	SD	df	t-value	p-value	Decision
Principals with AI experience	86	2.43	0.72				
				211	5.015	0.000	Reject Ho
Principals without AI experience	127	1.92	0.81				

The result of the independent samples t-test in Table 3 shows a t-value of 5.015 with a p-value of 0.000, which is less than the 0.05 significance level. This implies that the null hypothesis is rejected. Principals with AI experience reported a higher level of application than their counterparts without such experience. This suggests that familiarity and exposure to AI tools positively influence the adoption of financial management technologies in schools. Therefore, there is a significant difference in the opinions of principals with AI experience and those without experience with AI powered tools on their application of QuickBooks AI tool in the financial management of secondary schools in Anambra State.

Hypothesis Two

There is no significant difference in the opinions of principals with experience with AI powered tools and principals without experience with AI powered tools on their application of BambooHR AI tool in the management of human resources in secondary schools in Anambra State.

Table 4: Independent Samples t-test on the Opinions of Principals with and without AI Experience Regarding the Application of BambooHR AI Tool in the Management of Human Resources in Secondary Schools in Anambra State

Group	N	Mean	SD	df	t-value	p-value	Decision
Principals with AI experience	86	2.37	0.75				
				211	3.684	0.000	Reject Ho
Principals without AI experience	127	1.96	0.83				

As shown in Table 4, the t-test yielded a t-value of 3.684 with a p-value of 0.000, which is less than the 0.05 level of significance. Principals with AI experience reported higher usage of BambooHR AI, suggesting that prior exposure to AI-powered tools enhances the likelihood of adopting digital solutions in human resource management. Therefore, the null hypothesis was rejected. This means there is a significant difference in the opinions of principals with AI experience and those without regarding the application of the BambooHR AI tool in in the management of human resources in secondary schools in Anambra State.

Discussion

The findings of this study revealed that principals apply QuickBooks AI tool in the financial management of secondary schools in Anambra State to a low extent. This result suggests that most school leaders have not fully adopted AI-based financial tools that could enhance accuracy, transparency and efficiency in financial operations. Two key factors may explain this outcome. First,

there is a widespread lack of adequate training and exposure to digital financial management systems among school principals, which restricts their ability to use tools like QuickBooks effectively. Second, infrastructural deficits, including limited internet access and low ICT investment in public schools, constrain the successful deployment of such tools. This finding is consistent with Okpala and Ukandu (2022) who reported that principals often fail to keep accurate financial records partly due to the absence of digital tools, resulting in poor transparency and weakened decision-making. They stressed the need for ICT integration to strengthen financial record management. Similarly, Irokwe et al. (2024) concluded that poor handling of financial records and fund utilisation by school administrators significantly undermines effective school management.

Furthermore, the study revealed a statistically significant difference in the opinions of principals with experience using AI-powered tools and those without such experience concerning the application of QuickBooks AI tool in the financial management of secondary schools in Anambra State. Principals with prior experience reported a higher mean score, indicating a greater extent of use and appreciation for the tool's potential. This difference may stem from their familiarity, digital confidence and awareness of the practical benefits of AI in financial administration. On the other hand, principals without such experience may feel uncertain or unprepared to adopt new technologies. This finding is in line with Irokwe et al. (2024) who found that exposure to digital tools plays a vital role in determining adoption levels among school heads. Their study emphasised the importance of building administrators' capacity in digital financial systems to ensure efficient and accountable school management. The implication of these findings is that while tools like QuickBooks offer strategic advantages for school finance, successful adoption depends on prior exposure, digital literacy and supportive infrastructure. In light of these findings, it becomes clear that digital competence training, technical support and investment in ICT infrastructure are essential to improve financial management practices in secondary schools. The insights offered by Okpala and Ukandu (2022) and Irokwe et al. (2024) highlighted the urgency of equipping school leaders with the tools and skills needed to transition from traditional bookkeeping to AI-driven systems that enhance performance and accountability.

The findings of the study revealed that principals apply the BambooHR AI tool for human resource management in secondary schools in Anambra State to a low extent. This indicates a limited integration of AI in core human resource functions such as teacher supervision, staff record keeping, performance appraisal and personnel communication. Two major reasons may explain this low level of application. First, many principals may lack the requisite knowledge or training to operate AI-based human resource systems. Second, there is often inadequate investment in technological infrastructure and support systems within secondary schools, which limits the adoption of tools like BambooHR. This finding is in consonance with Nwune et al. (2016) who attributed poor human resource practices in schools to gaps in management skills, which in turn hinder educational progress. They emphasised the need for continuous training of school heads in modern administrative techniques. Similarly, Obi and Michael (2024) observed that essential human-resource functions such as personnel management, teacher supervision and record keeping were poorly executed by many school principals. This poor implementation, they noted, results in low teacher morale and diminished school effectiveness. The lack of structured AI support tools may further worsen these inefficiencies.

Furthermore, the study showed a statistically significant difference in the opinions of principals with experience in AI tools and those without experience, regarding the application of BambooHR for human resource management. Principals with AI experience indicated a higher level of application of the BambooHR tool, suggesting that exposure plays a critical role in the adoption of technology for school personnel management. Those without such experience likely face challenges in understanding the tool's functions and benefits, hence their minimal use. This supports the findings of Nwankwo and Okoye (2022), who reported that both public and mission secondary schools demonstrated suboptimal human resource strategies. These included inadequate performance appraisals, lack of structured mentorship and weak communication systems. They found no significant institutional differences, suggesting that ineffective personnel practices were widespread and systemic. The significant difference in this study between AI-experienced and non-experienced principals reflects a broader issue: successful integration of AI in human resource management requires both familiarity and functional support systems.

Conclusion

The researchers conclude that principals apply AI-powered tools in secondary school management in Anambra State to a low extent. This low level of application was evident in low extent of application of QuickBooks in the financial management of secondary schools and the low extent of application of using BambooHR in the management of human resource. However, principals with prior experience in using AI tools reported significantly higher levels of application than those without such experience. Despite the promising potential of AI to enhance administrative efficiency, its adoption in secondary schools in the state remains insufficient and inconsistent.

Recommendations

Based on the findings of the study, the researchers recommended that:

1. The Post Primary Schools Service Commission (PPSSC) and the Anambra State Ministry of Education should organise regular training and capacity-building workshops for school principals on the effective use of AI-powered tools like QuickBooks and BambooHR.
2. The Anambra State Government should ensure that adequate infrastructure including reliable internet access, functional computer systems and stable electricity should be provided to all public secondary schools to support the integration of AI tools in management tasks.
3. The PPSSC in conjunction with secondary school principals of secondary school should ensure that school management policies are revised to include the use of AI tools as part of standard administrative practices, ensuring consistency and compliance across schools.
4. Principals who are experienced in AI tool application should be encouraged to mentor and guide their colleagues through peer-learning platforms and collaborative workshops

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