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BIOLOGY TEACHERS' AWARENESS, PERCEPTION, AND READINESS TO INTEGRATE ARTIFICIAL INTELLIGENCE AUTOMATION TOOLS: EVIDENCE FROM GOMBE STATE, NIGERIA

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ABSTRACT

This study investigated the awareness, perception, and readiness of Biology teachers to integrate artificial intelligence (AI) automation tools into classroom instruction in Gombe State, Nigeria. The study adopted a descriptive survey research design. The population comprised all 64 Biology teachers in public senior secondary schools in Gombe State, and a census approach was adopted because of the manageable population size. Data were collected using a researcher-developed questionnaire titled "Awareness, Perception, and Readiness of Biology Teachers towards Artificial Intelligence Automation Tools Questionnaire (APRBTAITQ)". The instrument was validated by three experts and yielded an overall Cronbach's alpha reliability coefficient of 0.73 after item refinement. Mean and standard deviation were used to analyse the data. The findings revealed that Biology teachers possessed a moderate level of awareness of AI automation tools, with stronger familiarity with widely accessible applications than specialised educational AI platforms. The teachers also demonstrated generally positive perceptions regarding the educational value of AI while expressing reasonable concerns about its implementation. Furthermore, the respondents exhibited a high level of readiness to integrate AI automation tools into classroom instruction. The study concludes that Biology teachers are willing to embrace AI-supported teaching, but effective classroom integration requires increased professional development, improved ICT infrastructure, and supportive educational policies. The study recommends sustained capacity-building programmes and institutional investment to promote responsible and effective AI integration in secondary school Biology education.

Keywords: Artificial intelligence, AI automation tools, Biology teachers, awareness, perception, readiness, classroom instruction, secondary education.

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Introduction

Artificial intelligence (AI) is transforming educational practice worldwide by introducing tools that can support teachers in planning instruction, creating assessments, personalising learning, and managing routine educational tasks. Despite the growing use of AI in education, uncertainty remains about the extent to which teachers, particularly in developing countries such as Nigeria, are aware of available AI tools, perceive them positively, and are prepared to integrate them into classroom instruction. AI automation tools, as used in this study, refer to digital applications that use AI technologies to perform or support teaching-related tasks such as generating instructional materials, creating assessment items, providing feedback, analysing learner information, and adapting learning content to individual needs (Bhatia et al., 2024; Das et al., 2025). For this study, AI automation tools for teaching Biology specifically refer to digital applications that assist Biology teachers with content delivery, assessment, student engagement, and classroom management through automated and intelligent features.

When appropriately used, AI-enabled educational tools can support personalised learning, assessment, and student engagement (Bhatia et al., 2024; Tuomi, 2019). However, their effective integration depends partly on teachers' knowledge, attitudes, confidence, and access to appropriate technological resources. In this study, awareness refers to the extent to which Biology teachers know about existing AI automation tools and recognise their possible applications in Biology instruction. This view is consistent with evidence that teachers' knowledge and experience with AI educational tools influence their understanding and acceptance of such technologies (Yim & Wegerif, 2024). Perception refers to teachers' attitudes and beliefs concerning the usefulness, value, and suitability of AI automation tools for Biology teaching. This is supported by Ayanwale et al. (2022), who identified perceived usefulness, attitudes, confidence, and the relevance of AI as factors associated with teachers' readiness and intention to teach AI. Readiness, as operationalised in this study, refers to teachers' technical competence, confidence, access to relevant resources, and willingness to integrate AI automation tools into classroom instruction. This conception is informed by research linking teachers' technological knowledge, confidence, and access to school-level support with the integration and acceptance of AI educational tools (Chai et al., 2019; Yim & Wegerif, 2024).

The adoption of AI-related educational technologies remains uneven across contexts. In the United States, about one-quarter of teachers reported using AI tools for instructional planning or teaching during the 2023–2024 school year, while concerns about the reliability of AI-generated content and data privacy remained evident (Kaufman et al., 2025). In Russia, educators have also expressed generally positive views about AI as an instructional resource, although concerns relating to competence, experience, and the need for further training remain relevant (Sadykova & Kayumova, 2024). In Nigeria, the integration of digital technologies in education has long been affected by challenges relating to infrastructure, teacher capacity, and access to technological resources (Garba et al., 2013; Usman et al., 2025). These conditions are important because the successful adoption of AI automation tools requires more than the availability of technology. Teachers also need sufficient knowledge, confidence, and opportunities to develop the skills required to use such tools effectively.

The situation in Gombe State provides an important context for examining these issues. Although the state allocated N22.7 billion to education in its 2023 budget, challenges relating to educational infrastructure and access to technological resources remain relevant to technology-supported instruction (Oxford Business Group, 2024). Earlier evidence from Gombe State also documented challenges in the implementation and use of ICT in technical colleges (Dawha et al.,

2014). More recently, Guardian Nigeria (2025) reported that more than 60% of public primary school teachers in Nigeria lacked basic digital literacy, highlighting the wider challenge of developing teachers' foundational digital competencies before more advanced technologies can be effectively integrated. These conditions suggest that the transition from conventional ICT use to AI-supported instruction may require attention to teachers' awareness, perceptions, technical competence, confidence, and access to appropriate resources.

Biology is a subject in which technology-supported instruction may be particularly useful because many concepts involve processes and structures that are difficult to observe directly. Multimedia and interactive learning resources have, for example, been used to support the teaching and learning of genetics in secondary schools (Ajayi & Adelana, 2020). AI automation tools may extend such possibilities by assisting teachers in generating instructional materials, developing assessment activities, providing feedback, and adapting learning resources to students' needs. However, the availability of these possibilities does not necessarily mean that Biology teachers are aware of them, perceive them as useful, or feel sufficiently prepared to integrate them into classroom practice. Research has shown that teachers can express positive attitudes toward AI educational tools while still experiencing limitations in AI knowledge, practical experience, confidence, infrastructure, and technical support (Yim & Wegerif, 2024).

This issue is particularly important in Gombe Local Government Area, where public secondary education serves a substantial student population. Available evidence identifies 17 public secondary schools with approximately 19,011 students in the area (Makadi et al., 2019). Yet, despite the growing attention given to AI in education and the increasing availability of AI-based instructional applications, there is limited empirical evidence on Biology teachers' awareness, perception, and readiness to integrate AI automation tools into classroom instruction in Gombe Local Government Area. Without such evidence, education stakeholders may find it difficult to determine the extent of teachers' preparedness or identify the areas in which professional development, technological support, and other interventions are most needed. This study therefore investigates the awareness, perception, and readiness of Biology teachers in Gombe Local Government Area of Gombe State to integrate artificial intelligence automation tools into classroom instruction.

Statement of the Problem

Biology teaching in Gombe State continues to experience limited use of technology for classroom instruction. A state-wide survey of 6,538 teachers across the 11 Local Government Education Authorities in Gombe State found that public-school teachers utilized ICT hardware and software to a low extent compared with their private-school counterparts (Ugwude & Uzochukwu, 2026). This finding provides evidence that limited technology use remains a practical instructional concern in the state.

The emergence of artificial intelligence automation tools creates further concern because their effective use in Biology teaching may require teachers to possess adequate awareness, favourable perceptions, and sufficient readiness. Yet, there is no clear empirical evidence showing the extent to which Biology teachers in Gombe State know about these tools, perceive their usefulness, or are prepared to integrate them into classroom instruction. Without this information, teacher training and other support interventions may not adequately address their actual needs. The problem, therefore, is the lack of empirical evidence on Biology teachers' awareness, perception, and readiness to integrate AI automation tools in Gombe State. This study seeks to provide such evidence.

Purpose of the Study

The general purpose of this study is to assess Biology teachers' awareness, perception, and readiness to use AI automation tools in Gombe State public secondary schools. Specifically, the study seeks to:

1. Determine the level of awareness of AI automation tools among Biology teachers in Gombe Local Government Area.
2. Ascertain the perception of Biology teachers toward the use of AI automation tools for teaching.
3. Assess the readiness of Biology teachers to adopt AI automation tools in their teaching practice.

Research Questions

The following Research questions guided the study:

1. What is the level of awareness of AI automation tools among Biology teachers in Gombe Local Government Area?
2. What is the perception of Biology teachers toward the use of AI automation tools for teaching?
3. What is the level of readiness of Biology teachers to adopt AI automation tools in their teaching practice?

Methods

This study adopted a descriptive survey research design to assess Biology teachers' awareness, perception, and readiness regarding the use of AI automation tools for teaching in Gombe Local Government Area of Gombe State. The study was conducted in Gombe Local Government Area, one of the eleven Local Government Areas in Gombe State. The population comprised all 64 Biology teachers in the 17 public secondary schools in the area, as obtained from the Gombe State Ministry of Education (2025). Owing to the relatively small population, a census approach was adopted, and all 64 Biology teachers participated in the study. Data were collected using a researcher-developed instrument titled "Questionnaire on Awareness, Perception and Readiness for Using AI Automation Tools (QAPRUAA)". The instrument consisted of 27 items arranged into three clusters: Awareness (8 items), Perception (8 items), and Readiness (11 items). Responses were elicited using a four-point Likert scale of Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1).

A pilot study involving 20 Biology teachers from public secondary schools in Akko Local Government Area of Gombe State was conducted to determine the reliability of the instrument. The data obtained were analyzed using Cronbach's alpha reliability coefficient. The results yielded coefficients of 0.62 for the Awareness cluster, 0.62 for the Perception cluster, and 0.87 for the Readiness cluster, with an overall reliability coefficient of 0.73. The coefficients of 0.62 obtained for the Awareness and Perception clusters were below the commonly recommended minimum of 0.70 and therefore indicate modest internal consistency. However, given that the instrument was newly developed, the number of items in the affected clusters was relatively small, and the study was exploratory in nature, the coefficients were considered usable for the present study. The overall coefficient of 0.73 indicated adequate internal consistency for the instrument as a whole. Nevertheless, the relatively lower reliability of the Awareness and Perception clusters is acknowledged as a limitation and suggests the need for further refinement and validation of these clusters in subsequent studies.

Ethical approval for the study was obtained from the appropriate Research Ethics Committee of the University of Nigeria, Nsukka. Permission to conduct the study was also

obtained from the Gombe State Ministry of Education and the principals of the participating schools. The researchers, assisted by two trained research assistants, personally administered the questionnaires after informing the respondents about the purpose of the study, the voluntary nature of participation, and the confidentiality of the information provided. Informed consent was obtained from all respondents before participation. All 64 copies of the questionnaire were retrieved immediately after completion, representing a 100% return rate. The data collected were analyzed using mean and standard deviation to answer the three research questions. Mean was used to determine the average responses of the respondents, while standard deviation was used to determine the variability of their responses. A criterion mean of 2.50 was adopted, with mean scores of 2.50 and above interpreted as Agree and mean scores below 2.50 interpreted as Disagree. No hypothesis was formulated because the research questions were exclusively descriptive and did not seek to test differences, relationships, or predictive effects among variables.

Results

Research Question One: What is the level of Biology teachers' awareness of AI automation tools for teaching in public secondary schools in Gombe Local Government Area of Gombe State?

Table 1: Mean and Standard Deviation on Biology Teachers' Awareness of AI Automation Tools for Teaching

S/N	Item	Mean	SD	Decision
1	I have heard about the AI tool ChatGPT used in teaching.	3.53	0.50	Accepted
2	I have never seen an AI tool like Labster being used in classroom teaching.	1.61	0.75	Rejected
3	I do not know any AI tool such as QuillBot that can be used for teaching Biology.	1.92	0.93	Rejected
4	I am aware that ChatGPT can support lesson planning and instructional delivery.	3.77	0.58	Accepted
5	I have attended seminars or workshops where Khanmigo was discussed.	1.92	0.93	Rejected
6	I know how Century Tech can help personalise learning for students.	2.91	1.08	Accepted
7	I am unaware of how Gradescope can assist in student assessment.	1.86	0.87	Rejected
8	I know that Labster can support Biology teaching.	2.61	0.94	Accepted
	Grand Mean	**2.52**	**0.82**	**Accepted**

Items 2, 3 and 7 were reverse-scored before interpretation. Decision level: Mean ≥ 2.50 = Accepted; Mean < 2.50 = Rejected. N = 64.

Table 1 shows that Biology teachers demonstrated an overall awareness of AI automation tools for teaching, with a corrected grand mean of 2.52, which exceeded the criterion mean of 2.50. Teachers were particularly aware of ChatGPT and its instructional applications, especially its use in lesson planning and classroom instruction, as reflected in the high mean scores for Items 1 and 4. Awareness was also evident for Century Tech and Labster as educational technologies. However, the respondents showed limited awareness of specific AI tools such as QuillBot and Gradescope, while the low mean score recorded for the Khanmigo item suggests limited exposure to seminars or workshops on emerging AI technologies rather than a complete lack of awareness of the tool itself. Overall, the findings indicate that although Biology teachers are familiar with widely known AI applications, their awareness of specialised AI tools designed for teaching and assessment remains limited.

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Research Question Two: What is the perception of Biology teachers regarding the use of AI automation tools for teaching in public secondary schools in Gombe Local Government Area of Gombe State?

Table 2: Mean and Standard Deviation on Biology Teachers' Perception of AI Automation Tools for Teaching

S/N	Item	Mean	SD	Decision
1	AI automation tools can improve the quality of Biology instruction.	3.45	0.50	Accepted
2	AI tools make teaching more engaging for students.	3.38	0.75	Accepted
3	Overreliance on AI may reduce direct interaction between teachers and students.	1.94	0.61	Rejected
4	I worry that AI tools could gradually reduce the relevance of teachers in the classroom.	2.39	0.85	Rejected
5	AI tools can support better assessment of students' learning.	3.08	0.74	Accepted
6	AI use in classrooms is safe and appropriate for secondary school learners.	2.62	0.75	Accepted
7	AI tools can help students learn at their own pace.	3.30	0.73	Accepted
8	The use of AI tools may widen the gap between digitally skilled and less skilled teachers.	1.63	0.75	Rejected
	Grand Mean	**2.72**	**0.71**	**Accepted**

Items 3, 4, 6 and 8 were reverse-scored before interpretation. Decision level: Mean ≥ 2.50 = Accepted; Mean < 2.50 = Rejected. N = 64.

Table 2 reveals that Biology teachers generally held a positive perception of AI automation tools for teaching, as indicated by the corrected grand mean of 2.72, which exceeded the criterion mean of 2.50. The respondents agreed that AI automation tools can improve the quality of Biology instruction, make lessons more engaging, enhance student assessment, and support self-paced learning. These findings suggest that teachers recognize the instructional value of AI in improving teaching effectiveness and student learning experiences. Conversely, the rejected items indicate that respondents generally did not believe that AI would reduce meaningful teacher-student interaction or replace teachers in the classroom. Similarly, the low mean score for the item on widening the digital divide suggests that teachers did not perceive AI as necessarily creating inequalities among teachers based on digital competence. Overall, the findings indicate that Biology teachers have a favourable perception of AI automation tools and view them as instructional support technologies rather than substitutes for teachers.

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Research Question Three: What is the level of Biology teachers' readiness to use AI automation tools for teaching in public secondary schools in Gombe Local Government Area of Gombe State?

Table 3: Mean and Standard Deviation on Biology Teachers' Readiness to Use AI Automation Tools for Teaching

S/N	Item	Mean	SD	Decision
1	I am willing to learn how to use AI tools for teaching Biology.	3.61	0.63	Accepted
2	I am ready to integrate AI tools into my daily teaching practice.	3.69	0.47	Accepted
3	I have the basic digital skills needed to start using AI tools.	2.98	1.05	Accepted
4	My school provides access to ICT facilities that support AI use.	2.59	0.92	Accepted
5	I am ready to attend training on AI automation tools.	3.55	0.50	Accepted
6	I feel confident that I can apply AI tools once I receive training.	3.53	0.50	Accepted
7	I am prepared to adjust my teaching methods to include AI-supported activities.	3.30	0.61	Accepted
8	I am not ready to use AI tools because I lack adequate ICT skills.	2.94	1.01	Accepted
9	I am not ready to adopt AI tools because my school lacks the required facilities.	2.78	0.90	Accepted
10	I am reluctant to use AI tools because I am not sure they are reliable.	2.61	0.75	Accepted
11	I am not ready to use AI tools because they seem difficult to understand.	3.16	0.54	Accepted
	Grand Mean	**3.16**	**0.72**	**Accepted**

Note: Items 8, 9, 10, and 11 were negatively worded and reverse-scored before analysis. Therefore, higher mean scores on these items indicate that respondents disagreed with the stated barriers and were, in fact, more ready to use AI automation tools for teaching. Decision level: Mean ≥ 2.50 = Accepted; Mean < 2.50 = Rejected. N = 64.

Table 3 indicates that Biology teachers demonstrated a high level of readiness to adopt AI automation tools for teaching, with a corrected grand mean of 3.16, which exceeded the criterion mean of 2.50. The respondents expressed a strong willingness to learn how to use AI tools, integrate them into classroom practice, participate in relevant training, and modify their teaching approaches to accommodate AI-supported instruction. They also expressed confidence in their ability to use AI tools after receiving appropriate training. The corrected responses further suggest that teachers generally do not perceive inadequate ICT skills, lack of school facilities, uncertainty about AI reliability, or the complexity of AI tools as insurmountable barriers to adoption. Although access to ICT facilities recorded the lowest accepted mean among the positively worded items, it still met the decision criterion, indicating that respondents believed the available infrastructure could support initial implementation. Overall, the findings suggest that Biology teachers are prepared to embrace AI automation tools, provided they receive the necessary institutional support and professional development.

Summary of Findings

The findings of the study revealed that:

- Biology teachers in public secondary schools in Gombe Local Government Area demonstrated a generally high level of awareness of AI automation tools for teaching, although awareness of some specialised AI educational tools remained relatively low.

- Biology teachers exhibited a positive perception of AI automation tools, believing that they could improve Biology instruction, enhance assessment, and support learning without replacing teachers.
- Biology teachers demonstrated a high level of readiness to adopt AI automation tools for teaching, indicating their willingness to integrate AI into classroom practice with adequate training and institutional support.

Discussion of Findings

Biology Teachers' Awareness of AI Automation Tools for Teaching

The finding that Biology teachers demonstrated a moderate level of awareness of AI automation tools for teaching, with a mean of 2.52, suggests that teachers in Gombe Local Government Area have begun to recognise the relevance of AI in education, although their familiarity with specific educational applications may still be developing. This finding is consistent with Saputra et al. (2024), who observed that AI is increasingly influencing educational assessment through applications that provide personalised feedback, support learner engagement, and facilitate more efficient assessment processes. The present finding may therefore reflect the growing visibility of AI-powered educational applications, even when teachers have limited direct experience with specialised tools. The relatively higher awareness of ChatGPT compared with tools such as QuillBot, Gradescope, and Khanmigo may also be associated with the widespread public visibility and accessibility of ChatGPT compared with more specialised educational AI applications.

The finding is further supported by Ujevbe and Oguguo (2025), who identified institutional preparedness, staff development, infrastructure, and policy support as important considerations in the integration of AI-related technologies in education. Where teachers have limited opportunities for professional development and exposure to emerging technologies, awareness may remain concentrated on widely known general-purpose AI applications rather than specialised educational tools. This may explain why the teachers in the present study showed greater familiarity with ChatGPT but comparatively lower awareness of applications specifically designed for assessment, tutoring, or instructional support.

However, the present finding differs from Yue et al. (2024), who reported stronger levels of teachers' technological pedagogical content knowledge readiness and attitudes towards AI education among K–12 teachers. The difference may be attributable to differences in the educational and technological contexts of the studies. Yue et al. examined teachers within a context where exposure to AI education and technology integration may be more established, whereas teachers in Gombe Local Government Area may have fewer opportunities for structured exposure to specialised AI applications. This suggests that general awareness of AI may develop more rapidly than practical knowledge of how specific AI tools can be applied to classroom instruction.

Biology Teachers' Perception of AI Automation Tools for Teaching

The finding that Biology teachers had a favourable perception of AI automation tools for teaching, with a mean of 2.72, indicates that the teachers generally recognised the potential value of AI in supporting classroom instruction. This finding agrees with Uygun (2024), who reported predominantly favourable views of AI among educators, although teachers also expressed concerns about ethical and privacy-related issues. Similarly, Yildiz Durak and Onan (2025), in their systematic review of AI-based feedback in educational settings, reported that AI-based feedback systems have the potential to provide timely and personalised feedback, improve aspects of learning, facilitate teacher-student interaction, and support collaborative learning. These

potential instructional benefits may contribute to the favourable perception of AI observed among the Biology teachers in the present study.

The finding is also consistent with evidence from Nigeria. Sanusi et al. (2024), in a qualitative study involving education stakeholders in Nigeria, found that teachers and other stakeholders recognised the relevance of AI in school education while also identifying concerns and support needs associated with its implementation. This suggests that favourable perceptions of AI do not necessarily imply unrestricted acceptance. Rather, teachers may recognise its instructional benefits while still expecting appropriate guidance, resources, and institutional support for effective implementation.

Nevertheless, the favourable perception observed in the present study should be interpreted alongside the concerns reported in previous research. Uygun (2024) found that teachers' positive views of AI coexisted with concerns relating to ethics and privacy. Likewise, Yildiz Durak and Onan (2025) identified algorithmic bias, insufficient contextual sensitivity, overreliance on technology, and the possible weakening of teacher-student interaction as continuing challenges. These findings provide a useful qualification to the present result because teachers may perceive AI as useful without considering it a substitute for professional judgement. The favourable perception found among Biology teachers may therefore reflect an appreciation of AI as a supporting instructional resource rather than an expectation that AI should replace teachers' roles in classroom decision-making.

Biology Teachers' Readiness to Use AI Automation Tools for Teaching

The finding that Biology teachers demonstrated a high level of readiness to use AI automation tools for teaching, with a mean of 3.16, suggests that the teachers were generally willing to incorporate AI into their instructional practices. This finding agrees with Eke (2024), who reported high readiness and positive attitudes towards AI adoption among Nigerian teacher educators. Eke further identified infrastructure, professional training, and ethical considerations as important factors influencing AI adoption. The agreement between the present finding and Eke's result suggests that Nigerian educators may possess considerable willingness to adopt AI even where the conditions required for effective and sustained implementation are not yet fully developed.

The finding can also be understood in relation to Yue et al. (2024), who examined K–12 teachers' technological pedagogical content knowledge readiness and attitudes towards AI education. Their findings indicate that teachers' readiness for AI education is connected to their technological and pedagogical knowledge, suggesting that willingness to use AI is strengthened when teachers possess the knowledge and confidence required to integrate technology into instruction. Thus, the relatively high readiness observed among the Biology teachers in the present study may reflect a positive disposition towards emerging technologies and a recognition of their possible instructional benefits.

However, readiness should not be interpreted solely as willingness to use AI. Readiness also depends on whether teachers have the knowledge, skills, infrastructure, and institutional conditions required to translate their willingness into actual classroom practice. This distinction is particularly important in the Nigerian context. Sanusi et al. (2024) found that stakeholders involved in Nigerian school education identified support needs and implementation concerns surrounding AI education. Similarly, Eke (2024) identified infrastructural and training-related barriers despite generally positive attitudes and high readiness among Nigerian teacher educators. Therefore, the high readiness found in the present study may indicate teachers' willingness and disposition to

adopt AI, but it does not necessarily mean that all teachers currently possess adequate resources or professional preparation for sustained classroom integration.

Conclusion

The study concludes that Biology teachers in public secondary schools in Gombe Local Government Area were aware of AI automation tools, although awareness of specialised educational AI applications remains limited. The teachers demonstrated a positive perception of AI and recognised its potential to improve instructional quality, student engagement, assessment, and personalised learning. They also showed a high level of readiness to integrate AI into their teaching, provided adequate training and institutional support are available. Overall, effective integration of AI automation tools into Biology teaching will depend on sustained professional development and improved ICT infrastructure.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. The Gombe State Ministry of Education should organise regular capacity-building programmes that expose Biology teachers not only to general AI tools such as ChatGPT but also to specialised educational AI applications such as Labster, QuillBot, Gradescope, and Khanmigo, since the study found that awareness of these instructional tools was relatively low.
2. School administrators should provide reliable internet access, functional ICT facilities, and opportunities for teachers to practise using educational AI tools such as Labster for virtual laboratory activities and Gradescope for AI-assisted assessment, thereby supporting their classroom integration.
3. Teacher education institutions should incorporate practical training on AI automation tools into both pre-service and in-service teacher education programmes, with emphasis on the pedagogical application of specialised AI tools for lesson preparation, assessment, feedback, and personalised learning.
4. Biology teachers should actively participate in continuous professional development programmes and self-directed learning to improve their competence in using both general AI tools and specialised educational AI applications, particularly QuillBot, Khanmigo, Labster, and Gradescope**,** which were identified as areas of limited awareness.
5. Educational policymakers should develop clear policies and implementation guidelines that promote the ethical, responsible, and effective use of AI automation tools in secondary schools while supporting teacher training, digital infrastructure, and equitable access to AI technologies.

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