

Artificial Intelligence in Technical and Vocational Education: Implications for Teaching Effectiveness, Skills Acquisition, and Workforce Readiness in Government Technical Schools in Mfoundi Division, Yaoundé, Cameroon

Endali Ruth Etoh

Faculty of Education, Department of Curriculum and Evaluation, University of Yaoundé I, Yaoundé, Cameroon

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ABSTRACT

Artificial Intelligence (AI) has emerged as one of the most transformative technologies of the twenty first century, revolutionizing education through intelligent teaching, personalized learning, automated assessment, and enhanced skills development (UNESCO, 2021; Holmes et al., 2022). Within Technical and Vocational Education and Training (TVET), Artificial Intelligence is increasingly recognized as an important educational innovation capable of improving teaching effectiveness, facilitating practical skills acquisition, and preparing learners for occupations shaped by automation and digital transformation (OECD, 2023). The increasing demand for technologically competent graduates has compelled educational institutions to integrate Artificial Intelligence into instructional processes to equip learners with technical competence, digital literacy, creativity, critical thinking, communication, collaboration, and problem solving skills required in the twenty first century labour market (ILO, 2024; World Economic Forum, 2025). Despite these global developments, the integration of Artificial Intelligence into Government Technical Schools in Mfoundi Division, Yaoundé, remains limited, although the division constitutes the educational and administrative centre of Cameroon with a high concentration of secondary and technical institutions. This study examined the influence of Artificial Intelligence on teaching effectiveness, skills acquisition, and workforce readiness in Government Technical Schools in Mfoundi Division, Yaoundé. Specifically, the study sought to determine the extent to which Artificial Intelligence improves teaching effectiveness, promotes learners' acquisition of technical and employability skills, and identifies the major institutional challenges affecting its integration into Technical and Vocational Education and Training. The study adopted a mixed methods research design involving 327 respondents selected through appropriate sampling procedures. Data were collected using structured questionnaires, semi structured interviews, and focus group discussions. Quantitative data were analysed using descriptive and inferential statistics, while qualitative data were analysed using thematic analysis to complement the quantitative findings (Creswell & Creswell, 2023). The findings revealed that Artificial Intelligence significantly improves teaching effectiveness by enhancing lesson preparation, facilitating learner centered instruction, increasing classroom interaction, strengthening continuous assessment, and improving access to quality instructional resources. The study further established that Artificial Intelligence contributes significantly to the acquisition of technical competence, digital literacy, communication, creativity, collaboration, critical thinking, and problem solving skills that are increasingly demanded by contemporary industries (UNESCO, 2021; World Economic Forum, 2025). Nevertheless, inadequate digital infrastructure, limited teacher competence, insufficient financial resources, weak institutional support, and inconsistent policy implementation remain major barriers to the effective integration of Artificial Intelligence within Government Technical Schools. The study concludes that Artificial Intelligence possesses enormous potential to transform Technical and Vocational Education and Training in Mfoundi Division by improving teaching effectiveness, strengthening learners' skills acquisition, and enhancing workforce readiness. The study recommends increased government investment in digital infrastructure, continuous professional development for teachers, curriculum reforms that integrate Artificial Intelligence competencies, stronger collaboration between educational institutions and industry, and

comprehensive national policies that promote responsible and equitable implementation of Artificial Intelligence in Technical and Vocational Education and Training.

Keywords: Artificial Intelligence, Technical and Vocational Education and Training, Teaching Effectiveness, Skills Acquisition, Workforce Readiness, Government Technical Schools, Mfoundi Division, Yaoundé, Cameroon, Digital Transformation.

INTRODUCTION

Artificial Intelligence (AI) has become one of the most significant technological innovations of the twenty first century, transforming education, industry, healthcare, agriculture, finance, and other sectors through intelligent systems capable of learning, reasoning, problem solving, and decision making (Russell & Norvig, 2021). In education, AI is increasingly influencing the way teachers deliver instruction, learners acquire knowledge, and institutions manage educational processes. AI powered technologies such as intelligent tutoring systems, adaptive learning platforms, virtual laboratories, automated assessment tools, and generative AI applications have created opportunities to improve teaching effectiveness, learner engagement, personalized learning, and educational quality (UNESCO, 2021; Holmes et al., 2022). Consequently, educational systems across the world are integrating Artificial Intelligence into teaching and learning to prepare learners for a rapidly evolving digital society. The growing adoption of Artificial Intelligence is closely associated with the Fourth Industrial Revolution, which is characterized by automation, robotics, machine learning, cloud computing, big data, and the Internet of Things (Schwab, 2016). These technological developments have fundamentally transformed labour markets by changing the nature of work and increasing the demand for employees with advanced digital competencies, critical thinking, creativity, innovation, communication, collaboration, and problem solving skills (World Economic Forum, 2025). While AI continues to automate repetitive and routine tasks, it simultaneously creates new employment opportunities requiring technological competence and lifelong learning. Educational institutions therefore have the responsibility to prepare learners with competencies that correspond to the changing needs of industries and the future workforce (ILO, 2024).

Technical and Vocational Education and Training (TVET) occupies a strategic position in this transformation because it focuses on developing practical knowledge, occupational competence, entrepreneurship, and employability skills that contribute directly to national development (UNESCO UNEVOC, 2022). As industries increasingly embrace intelligent technologies, Technical and Vocational Education institutions are expected to modernize their instructional practices by integrating Artificial Intelligence into teaching, practical training, and assessment. AI supported instructional technologies provide learners with opportunities to participate in virtual simulations, intelligent practical exercises, adaptive learning activities, and collaborative problem solving that closely replicate real industrial environments (OECD, 2023). Teaching effectiveness remains one of the major determinants of educational quality in Technical and Vocational Education. Effective teaching promotes learner engagement, improves academic achievement, strengthens practical competence, and enhances employability outcomes (Stronge, 2018). Artificial Intelligence has demonstrated considerable potential for improving teaching effectiveness by supporting lesson preparation, facilitating personalized instruction, monitoring learner progress, providing immediate feedback, and reducing teachers' administrative workload (Luckin, 2018; Holmes et al., 2022). These capabilities enable teachers to devote greater attention to mentoring, classroom interaction, and practical demonstrations that improve learning outcomes.

Artificial Intelligence also plays an increasingly important role in promoting skills acquisition. Contemporary employers require graduates who possess not only occupational competence but also digital literacy, analytical reasoning, creativity, innovation, communication, teamwork, adaptability, and entrepreneurial abilities (World Economic Forum, 2025). AI supported learning environments enable learners to develop these competencies through project based learning, intelligent simulations, virtual laboratories, collaborative activities, and authentic workplace experiences. Consequently, Artificial Intelligence has become an important educational resource for strengthening workforce readiness within Technical and Vocational Education. Despite these opportunities, the integration of Artificial Intelligence within many developing countries remains constrained by inadequate digital infrastructure, limited internet connectivity, insufficient teacher competence, inadequate financial resources, and weak institutional support (UNESCO, 2023). These challenges are particularly evident in many Technical and

Vocational Education institutions where shortages of modern technological facilities continue to affect instructional quality and practical skills development.

In Cameroon, the government has undertaken significant reforms aimed at improving Technical and Vocational Education through curriculum modernization, promotion of entrepreneurship, expansion of technical institutions, and integration of Information and Communication Technologies into education. However, the adoption of Artificial Intelligence within Government Technical Schools remains at an early stage. Many institutions continue to experience inadequate technological infrastructure, insufficient digital learning resources, limited teacher preparedness, and inadequate policy implementation. These constraints reduce opportunities for learners to acquire future oriented competencies required for participation in the digital economy. Mfoundi Division, located in the Centre Region of Cameroon, hosts a large concentration of Government Technical Schools that serve learners from diverse educational, social, and economic backgrounds. As the administrative and economic centre of the country, Yaoundé provides an appropriate setting for examining how Artificial Intelligence can contribute to improving teaching effectiveness, strengthening learners' acquisition of technical and employability skills, and preparing graduates for technology driven workplaces. However, empirical evidence regarding the implementation and educational impact of Artificial Intelligence within Government Technical Schools in Mfoundi Division remains limited.

Although several studies have examined Artificial Intelligence in higher education and digital learning environments, relatively few have focused on Technical and Vocational Education in Cameroon. Existing studies have paid limited attention to the relationship between Artificial Intelligence, teaching effectiveness, skills acquisition, and workforce readiness within Government Technical Schools. This knowledge gap limits evidence based policy formulation, curriculum improvement, teacher professional development, and institutional investment in Artificial Intelligence supported education. It is against this background that this study examined the influence of Artificial Intelligence on teaching effectiveness, skills acquisition, and workforce readiness in Government Technical Schools in Mfoundi Division, Yaoundé, Cameroon. Specifically, the study sought to determine the extent to which Artificial Intelligence improves instructional effectiveness, promotes learners' acquisition of technical and employability skills, and enhances workforce readiness while identifying the challenges affecting its successful integration into Technical and Vocational Education. The findings are expected to contribute to educational policy, curriculum development, institutional planning, and future research aimed at strengthening Technical and Vocational Education in Cameroon.

LITERATURE REVIEW

Concept of Artificial Intelligence

Artificial Intelligence (AI) refers to the ability of computer systems and machines to perform tasks that normally require human intelligence, including learning, reasoning, problem solving, decision making, language understanding, and pattern recognition (Russell & Norvig, 2021). According to UNESCO (2021), Artificial Intelligence encompasses technologies that enable machines to simulate human cognitive functions in ways that support decision-making, communication, and automation across different sectors. In education, AI has become an important technological innovation that enhances instructional delivery, facilitates personalized learning, improves learner assessment, and supports educational management (Holmes et al., 2022). The rapid advancement of Artificial Intelligence has transformed educational systems worldwide by introducing intelligent tutoring systems, adaptive learning platforms, virtual assistants, automated grading systems, predictive learning analytics, and generative AI applications. These technologies provide learners with individualized learning experiences while enabling teachers to improve instructional planning and monitor learners' academic progress more efficiently (Zawacki Richter et al., 2019). Consequently, Artificial Intelligence is increasingly recognized as an essential component of educational transformation and digital innovation.

Artificial Intelligence in Technical and Vocational Education and Training

Technical and Vocational Education and Training (TVET) aims to equip learners with occupational competencies, technical expertise, entrepreneurial abilities, and employability skills necessary for economic growth and industrial development (UNESCO UNEVOC, 2022). The emergence of Artificial Intelligence has

significantly influenced the delivery of Technical and Vocational Education by introducing innovative instructional approaches that improve practical learning experiences and strengthen workforce preparation. Artificial Intelligence supports TVET through intelligent simulations, virtual laboratories, adaptive practical exercises, and computer aided design, robotics, predictive maintenance systems, and AI supported assessment tools (OECD, 2023). These technologies enable learners to practice technical operations within realistic learning environments before applying their competencies in actual workplaces. Such learning experiences improve learners' confidence, practical competence, and readiness for employment. According to UNESCO UNEVOC (2022), the integration of Artificial Intelligence into Technical and Vocational Education strengthens competency based learning by bridging the gap between classroom instruction and industrial practice. However, successful implementation depends on adequate infrastructure, teacher competence, institutional leadership, supportive government policies, and collaboration between educational institutions and industry.

Artificial Intelligence and Teaching Effectiveness

Teaching effectiveness refers to the ability of teachers to facilitate meaningful learning experiences that promote learners' academic achievement, practical competence, motivation, and overall educational development (Stronge, 2018). Effective teaching requires appropriate instructional planning, mastery of subject content, learner centred pedagogical approaches, effective classroom management, continuous assessment, and constructive feedback. Artificial Intelligence contributes significantly to teaching effectiveness by assisting teachers in lesson preparation, instructional planning, assessment, learner performance monitoring, and classroom management (Luckin, 2018). AI powered educational platforms analyse learner performance and recommend instructional interventions that address learners' individual needs. Teachers are therefore able to provide personalized learning experiences that improve learner participation and academic performance (Holmes et al., 2022). Several empirical studies have demonstrated positive relationships between Artificial Intelligence and teaching effectiveness. Zawacki Richter et al. (2019), in a systematic review of Artificial Intelligence applications in education, concluded that AI enhances learner engagement, personalized learning, and instructional decision-making. Similarly, Chen et al. (2020) reported that AI supported learning environments significantly improve learners' academic achievement and classroom interaction by providing timely feedback and adaptive instructional support.

Artificial Intelligence and Skills Acquisition

Skills acquisition is a fundamental objective of Technical and Vocational Education because it prepares learners with practical competencies required for employment, entrepreneurship, and lifelong career development (UNESCO UNEVOC, 2022). Traditionally, TVET emphasized technical competence and occupational proficiency. However, the digital transformation of industries has expanded the concept of skills acquisition to include digital literacy, critical thinking, creativity, collaboration, communication, innovation, adaptability, and entrepreneurial competence (World Economic Forum, 2025). Artificial Intelligence facilitates skills acquisition by creating interactive learning environments where learners solve authentic workplace problems using intelligent technologies. Virtual laboratories, simulation software, intelligent tutoring systems, and generative AI applications enable learners to develop practical competencies through repeated practice, experimentation, and immediate feedback (Holmes et al., 2022). These technologies strengthen learners' confidence while improving occupational competence and workplace preparedness. Empirical evidence supports the contribution of Artificial Intelligence to skills acquisition. According to Chassignol et al. (2018), AI supported educational systems significantly improve learners' technical competence, independent learning, and problem solving abilities. Likewise, OECD (2023) reported that AI enhances learners' acquisition of digital competencies that are increasingly required within modern workplaces.

Artificial Intelligence, Employment, and Future Skills

The rapid advancement of Artificial Intelligence has generated significant changes in global labour markets. Automation increasingly replaces repetitive manual and cognitive tasks while simultaneously creating demand for occupations requiring analytical thinking, creativity, technological competence, communication, emotional intelligence, and innovation (ILO, 2024). Consequently, educational institutions must prepare learners with competencies that enable them to adapt successfully to changing employment conditions. The World Economic

Forum (2025) identifies analytical thinking, resilience, flexibility, leadership, technological literacy, Artificial Intelligence, big data, cybersecurity, creativity, and lifelong learning as among the most important skills required for future employment. Similarly, the International Labour Organization (2024) argues that workforce readiness increasingly depends upon continuous skills development and the ability to integrate emerging technologies into professional practice. Technical and Vocational Education institutions therefore have a responsibility to redesign curricula that integrate Artificial Intelligence while strengthening learners' employability through practical training, digital competence, innovation, and entrepreneurship.

Artificial Intelligence in the Cameroonian Educational Context

Cameroon continues to implement educational reforms aimed at improving the quality and relevance of Technical and Vocational Education through digital transformation, entrepreneurship education, and curriculum modernization. Government initiatives promoting Information and Communication Technologies have created opportunities for integrating emerging digital technologies into classroom instruction. Nevertheless, Artificial Intelligence adoption within Government Technical Schools remains relatively limited due to inadequate infrastructure, insufficient teacher training, financial constraints, and limited policy implementation. In Mfoundi Division, which hosts several Government Technical Schools, opportunities exist for integrating Artificial Intelligence into teaching and learning because of increasing internet accessibility, expanding digital infrastructure, and proximity to universities, research institutions, and technology organizations. However, disparities in technological resources and teacher preparedness continue to influence the effective utilization of Artificial Intelligence within classroom practice.

THEORETICAL FRAMEWORK

This study is anchored on the Technology Acceptance Model (TAM) developed by Davis (1989) and the Constructivist Learning Theory proposed by Vygotsky (1978). The Technology Acceptance Model explains that technology adoption is influenced primarily by perceived usefulness and perceived ease of use (Davis, 1989). Teachers and learners are therefore more likely to adopt Artificial Intelligence if they believe that it improves teaching effectiveness, facilitates learning, and enhances academic performance. Constructivist Learning Theory emphasizes that learners actively construct knowledge through interaction, collaboration, practical experiences, and problem solving (Vygotsky, 1978). Artificial Intelligence complements this theory by providing adaptive learning environments, intelligent feedback, virtual simulations, and collaborative learning opportunities that encourage active learner participation and meaningful knowledge construction. The integration of these theoretical perspectives provides an appropriate framework for understanding how Artificial Intelligence influences teaching effectiveness, skills acquisition, and workforce readiness in Government Technical Schools in Mfoundi Division.

Research Gap

The reviewed literature demonstrates that Artificial Intelligence has considerable potential to improve teaching effectiveness, skills acquisition, and workforce readiness. However, empirical studies focusing on Government Technical Schools in Mfoundi Division remain limited. Existing studies have largely concentrated on higher education, online learning, or general educational technology without adequately examining the relationship between Artificial Intelligence, teaching effectiveness, skills acquisition, and workforce readiness within Technical and Vocational Education. This study therefore addresses this gap by providing empirical evidence from Government Technical Schools in Mfoundi Division, Yaoundé, Cameroon, thereby contributing to educational policy, curriculum reform, and the advancement of Artificial Intelligence integration within Technical and Vocational Education.

RESEARCH METHODOLOGY

Research Design

This study adopted a mixed methods research design, integrating quantitative and qualitative approaches to examine the influence of Artificial Intelligence on teaching effectiveness, skills acquisition, and workforce

readiness in Government Technical Schools in Mfoundi Division, Yaoundé. The mixed methods approach was considered appropriate because it enabled the researcher to obtain both numerical evidence and in depth explanations of participants' experiences regarding the integration of Artificial Intelligence into teaching and learning. According to Creswell and Creswell (2023), mixed methods research enhances the validity of findings by combining the strengths of quantitative and qualitative research approaches.

Area of the Study

The study was conducted in Mfoundi Division in the Centre Region of Cameroon. Mfoundi Division hosts several Government Technical Schools that provide Technical and Vocational Education and Training to learners in diverse technical disciplines. As the administrative and political capital of Cameroon, Yaoundé has experienced increasing access to digital technologies and educational innovations, making it an appropriate setting for investigating the educational implications of Artificial Intelligence within Government Technical Schools.

Population of the Study

The target population consisted of students enrolled in Government Technical Schools in Mfoundi Division. These students were considered appropriate because they are the direct beneficiaries of classroom instruction and practical training and are therefore capable of evaluating the influence of Artificial Intelligence on teaching effectiveness, skills acquisition, and workforce readiness.

Sample Size

The study involved 327 respondents selected from Government Technical Schools in Mfoundi Division. The sample size was considered adequate for achieving the objectives of the study and ensuring reliable statistical analysis (Cohen et al., 2018).

Sampling Techniques

The study employed both probability and non-probability sampling techniques. Government Technical Schools were selected purposively because of their relevance to the objectives of the study. Thereafter, respondents were selected using simple random sampling to provide each eligible participant with an equal opportunity of being included in the study. The combination of these sampling techniques enhanced representativeness while minimizing sampling bias (Fraenkel et al., 2019).

Sources of Data

Both primary and secondary sources of data were used in the study. Primary data were obtained directly from respondents through structured questionnaires, semi structured interviews, and focus group discussions. Secondary data were obtained from books, peer reviewed journal articles, conference proceedings, government publications, policy documents, reports from international organizations, and other scholarly publications relating to Artificial Intelligence, Technical and Vocational Education, teaching effectiveness, and workforce readiness.

Instruments for Data Collection

The principal instrument for quantitative data collection was a structured questionnaire designed using a five point Likert scale ranging from Strongly Agree to Strongly Disagree. The questionnaire contained items measuring Artificial Intelligence integration, teaching effectiveness, skills acquisition, and workforce readiness. Qualitative data were collected through semi structured interview guides and focus group discussion guides. These instruments enabled participants to provide detailed explanations regarding the opportunities and challenges associated with the use of Artificial Intelligence within Government Technical Schools.

Validity of the Instruments

The validity of the research instruments was established through expert judgment. Specialists in Curriculum Studies, Educational Technology, Measurement and Evaluation, and Research Methodology examined the questionnaire and interview guides to determine their clarity, relevance, and adequacy in addressing the objectives of the study. Their recommendations were incorporated before the instruments were administered. This process enhanced the content validity of the instruments (Fraenkel et al., 2019).

Reliability of the Instruments

A pilot study was conducted in a Government Technical School that did not participate in the main study. Responses obtained from the pilot study were analysed using Cronbach's Alpha coefficient to determine the internal consistency of the questionnaire. According to Tavakol and Dennick (2011), a reliability coefficient of 0.70 or above is considered acceptable for educational research. The reliability analysis confirmed that the instrument was suitable for data collection.

Procedure for Data Collection

An introductory letter was obtained from the University of Yaoundé I and presented to the relevant educational authorities before data collection commenced. Permission was subsequently obtained from the principals of the selected Government Technical Schools. Respondents were informed about the purpose of the study, and their voluntary participation was emphasized. The researcher administered questionnaires personally, while interviews and focus group discussions were conducted in conducive environments within the schools. Completed questionnaires were collected immediately after completion to maximize the response rate.

Methods of Data Analysis

Quantitative data were coded and entered into the Statistical Package for the Social Sciences (SPSS) for analysis. Descriptive statistics including frequencies, percentages, means, and standard deviations were used to summarize respondents' characteristics and responses. Inferential statistics, including Pearson Product Moment Correlation and multiple regression analysis, were used to test the research hypotheses at the 0.05 level of significance. Qualitative data obtained from interviews and focus group discussions were transcribed, coded, organized into themes, and analysed using thematic analysis. The qualitative findings were integrated with the quantitative results to provide a comprehensive understanding of the influence of Artificial Intelligence on teaching effectiveness, skills acquisition, and workforce readiness (Creswell & Creswell, 2023).

Ethical Considerations

Ethical principles were observed throughout the study. Participation was voluntary, and informed consent was obtained from all respondents before data collection. Participants were assured that their responses would remain confidential and anonymous and would be used strictly for academic purposes. Respondents were also informed of their right to withdraw from the study at any stage without any consequences. These ethical procedures were implemented in accordance with the ethical standards recommended by the British Educational Research Association (BERA, 2024).

RESULTS

Demographic Characteristics of Respondents

327 respondents participated in the study, representing students from selected Government Technical Schools in Mfoundi Division, Yaoundé. The respondents were analysed according to gender, age, level of study, and area of specialization to establish the representativeness of the sample. The findings indicated that the respondents were drawn from diverse technical disciplines, thereby providing comprehensive information regarding the influence of Artificial Intelligence on teaching effectiveness, skills acquisition, and workforce readiness.

Artificial Intelligence and Teaching Effectiveness

The first objective of the study sought to examine the influence of Artificial Intelligence on teaching effectiveness in Government Technical Schools in Mfoundi Division. The descriptive analysis revealed that most respondents agreed that Artificial Intelligence enhances lesson preparation by enabling teachers to access quality instructional materials, generate teaching resources, and organize classroom activities more efficiently. Respondents also agreed that AI promotes learner-centered instruction through personalized learning experiences that accommodate learners' different abilities and learning needs. Furthermore, Artificial Intelligence improves classroom interaction by encouraging active learner participation through intelligent learning platforms, virtual demonstrations, educational simulations, and instant feedback. The findings equally showed that Artificial Intelligence facilitates continuous assessment by supporting automated grading, monitoring learner progress, identifying learning difficulties, and providing timely academic feedback. These findings suggest that AI contributes significantly to improving teaching effectiveness by enabling teachers to concentrate more on instructional delivery and learner support than on routine administrative activities. The inferential analysis further revealed a statistically significant positive relationship between Artificial Intelligence and teaching effectiveness. This finding implies that increased integration of Artificial Intelligence within Government Technical Schools is associated with improved instructional quality and enhanced classroom effectiveness. The finding is consistent with Holmes et al. (2022), who concluded that Artificial Intelligence improves teaching effectiveness through adaptive learning systems, intelligent assessment, and personalized instructional support. Similarly, Luckin (2018) reported that Artificial Intelligence enables teachers to make evidence based instructional decisions that improve learner achievement and classroom engagement.

Artificial Intelligence and Skills Acquisition

The second objective examined the influence of Artificial Intelligence on learners' acquisition of technical and employability skills. The findings indicated that respondents strongly agreed that Artificial Intelligence enhances practical learning by providing virtual laboratories, intelligent simulations, project based learning opportunities, and access to current technical information. Respondents further indicated that AI strengthens learners' digital literacy by increasing exposure to emerging technologies widely used within modern workplaces. The study also established that Artificial Intelligence promotes creativity, innovation, critical thinking, communication, teamwork, and problem solving through interactive learning activities requiring learners to analyze information, solve technical problems, and develop practical solutions. These competencies are increasingly recognized as essential employability skills within contemporary industries. Inferential analysis revealed a significant positive relationship between Artificial Intelligence and skills acquisition, indicating that increased utilization of AI contributes to improved acquisition of occupational competencies and employability skills. This finding supports UNESCO UNEVOC (2022), which emphasizes that Artificial Intelligence strengthens competency-based education by improving practical learning experiences and aligning Technical and Vocational Education with industrial needs. Similarly, OECD (2023) observed that Artificial Intelligence contributes significantly to learners' acquisition of digital competencies and workplace readiness.

Artificial Intelligence and Workforce Readiness

The third objective examined the influence of Artificial Intelligence on workforce readiness among learners in Government Technical Schools. The findings revealed that Artificial Intelligence prepares learners for future employment by improving technological competence, encouraging innovation, strengthening entrepreneurial abilities, and developing adaptability to changing workplace technologies. Respondents indicated that AI enables learners to acquire competencies required in modern industries where automation, digital technologies, and intelligent systems continue to reshape occupational requirements. The study also revealed that learners exposed to AI supported instructional environments demonstrate greater confidence in applying digital technologies, solving workplace challenges, and adapting to technological innovation. These findings suggest that Artificial Intelligence contributes positively to workforce readiness by equipping learners with competencies required for employment within the digital economy. The results are consistent with the findings of the International Labour Organization (2024), which emphasized that future employment depends increasingly on workers' ability to integrate technological competence with creativity, innovation, and continuous learning. Likewise, the World

Economic Forum (2025) identified technological literacy, analytical thinking, resilience, creativity, and lifelong learning as among the most important competencies required for future employment.

Challenges Affecting the Integration of Artificial Intelligence

The study further investigated the challenges limiting effective implementation of Artificial Intelligence within Government Technical Schools in Mfoundi Division. The findings revealed that inadequate digital infrastructure remains the most significant challenge affecting Artificial Intelligence integration. Respondents also identified insufficient internet connectivity, inadequate computer laboratories, and limited availability of Artificial Intelligence applications, inadequate teacher competence, insufficient financial resources, unreliable electricity supply, and weak institutional support as major constraints affecting effective implementation. Respondents additionally reported inadequate policy implementation, limited professional development opportunities for teachers, and unequal access to technological resources among Government Technical Schools. These challenges reduce opportunities for effective utilization of Artificial Intelligence during classroom instruction and practical training. These findings support UNESCO (2023), which identified inadequate infrastructure, financial limitations, insufficient teacher preparedness, and policy challenges as major barriers to Artificial Intelligence integration within educational institutions across developing countries.

DISCUSSION OF FINDINGS

The findings of this study demonstrate that Artificial Intelligence has become an important technological innovation capable of transforming teaching and learning within Government Technical Schools in Mfoundi Division, Yaoundé. The study established that Artificial Intelligence significantly enhances teaching effectiveness, facilitates learners' acquisition of technical and employability skills, and improves workforce readiness. However, the findings also reveal that several institutional and infrastructural challenges continue to hinder its effective implementation. These findings are discussed in relation to the objectives of the study and existing empirical literature.

The first objective sought to examine the influence of Artificial Intelligence on teaching effectiveness in Government Technical Schools. The findings indicate that Artificial Intelligence significantly improves lesson preparation, instructional delivery, learner participation, classroom interaction, and assessment practices. Respondents acknowledged that AI enables teachers to prepare lessons that are more organized, access updated instructional materials, provide immediate feedback, and personalize learning according to students' individual learning needs. These findings suggest that Artificial Intelligence reduces teachers' workload by automating repetitive administrative tasks while allowing teachers to devote more time to mentoring learners, facilitating classroom interaction, and improving instructional quality.

These findings are consistent with Holmes, Bialik and Fadel (2022), who argued that Artificial Intelligence enhances teaching effectiveness through intelligent tutoring systems, adaptive learning platforms, automated assessment, and personalized instructional support. Similarly, Luckin (2018) observed that AI enables teachers to make evidence based instructional decisions by analysing learners' academic performance and identifying areas requiring additional support. The findings further agree with UNESCO (2021), which reported that Artificial Intelligence contributes significantly to improving educational quality by supporting learner centred pedagogical practices and strengthening instructional effectiveness. The implication is that successful integration of Artificial Intelligence within Government Technical Schools can improve the quality of technical education and produce graduates with stronger academic and practical competencies.

The second objective examined the influence of Artificial Intelligence on learners' skills acquisition. The findings revealed that Artificial Intelligence significantly contributes to the acquisition of practical skills, digital literacy, creativity, communication, collaboration, critical thinking, innovation, and problem solving abilities. Respondents agreed that AI supported learning environments expose learners to intelligent simulations, virtual laboratories, project based learning activities, and real world problem solving experiences that strengthen technical competence and encourage independent learning. These findings demonstrate that Artificial

Intelligence extends learning beyond traditional classroom instruction by creating interactive educational environments that allow learners to apply theoretical knowledge to practical situations.

The findings corroborate those of UNESCO UNEVOC (2022), which emphasized that Artificial Intelligence strengthens competency based education by improving practical learning and aligning Technical and Vocational Education with industry requirements. Likewise, OECD (2023) reported that Artificial Intelligence enhances learners' acquisition of digital competencies and emerging workplace skills required within modern industries. Chassignol et al. (2018) also concluded that AI supported learning environments improve learners' technical competence, creativity, and analytical thinking through intelligent educational technologies. The findings therefore suggest that integrating Artificial Intelligence into Technical and Vocational Education curricula can significantly improve learners' employability by equipping them with competencies required for the Fourth Industrial Revolution.

The third objective investigated the influence of Artificial Intelligence on workforce readiness. The findings established that Artificial Intelligence prepares learners for future employment by improving technological competence, encouraging innovation, promoting entrepreneurship, and strengthening adaptability to rapidly changing workplace environments. Respondents indicated that learners exposed to Artificial Intelligence during their training are better prepared to use digital technologies, solve workplace challenges, and adapt to technological innovations occurring across different industries. These findings imply that Artificial Intelligence contributes not only to educational improvement but also to national economic development through the production of a technologically competent workforce.

The findings support the position of the International Labour Organization (2024), which argued that future labour markets increasingly require workers possessing digital competence, creativity, resilience, technological literacy, and lifelong learning abilities. Similarly, the World Economic Forum (2025) identified Artificial Intelligence, technological literacy, analytical thinking, problem solving, innovation, and adaptability among the most critical competencies required for future employment. Consequently, Government Technical Schools should integrate Artificial Intelligence into teaching and learning processes to ensure that graduates possess competencies consistent with emerging labour market demands.

Despite the positive contributions of Artificial Intelligence, the study identified several challenges affecting its effective implementation within Government Technical Schools in Mfoundi Division. Respondents identified inadequate digital infrastructure, insufficient internet connectivity, limited computer laboratories, inadequate Artificial Intelligence facilities, unreliable electricity supply, insufficient financial resources, and inadequate teacher competence as major barriers. The findings also revealed limited institutional support and inadequate policy implementation regarding Artificial Intelligence integration. These constraints reduce opportunities for teachers and learners to fully utilize Artificial Intelligence technologies during classroom instruction and practical training.

These findings are consistent with UNESCO (2023), which identified inadequate infrastructure, financial limitations, insufficient teacher preparedness, and weak policy implementation as major barriers to Artificial Intelligence integration within educational institutions in developing countries. Similarly, Celik et al. (2022) reported that many teachers remain insufficiently prepared to integrate Artificial Intelligence effectively because of inadequate professional development opportunities and limited technological support. These findings therefore suggest that successful implementation of Artificial Intelligence requires coordinated investment in digital infrastructure, teacher capacity building, educational policies, and institutional leadership.

Overall, the findings demonstrate that Artificial Intelligence has enormous potential to transform Technical and Vocational Education in Government Technical Schools in Mfoundi Division by improving teaching effectiveness, strengthening learners' acquisition of technical and employability skills, and enhancing workforce readiness. However, realizing these benefits requires sustained government commitment, increased investment in educational technology, continuous teacher professional development, curriculum reforms, and stronger partnerships between schools, universities, industries, and technology organizations. Addressing these

challenges will enable Government Technical Schools to prepare graduates capable of meeting the demands of an increasingly digital and technology driven global economy.

CONCLUSION

This study examined the influence of Artificial Intelligence on teaching effectiveness, skills acquisition, and workforce readiness in Government Technical Schools in Mfoundi Division, Yaoundé, Cameroon. The findings revealed that Artificial Intelligence has the potential to transform Technical and Vocational Education and Training by improving instructional delivery, enhancing learner engagement, strengthening practical skills acquisition, and preparing learners for the changing demands of the twenty first century labour market. The study established that AI supported teaching enhances lesson preparation, personalized learning, classroom interaction, learner assessment, and access to quality instructional resources, thereby improving overall teaching effectiveness. The study further demonstrated that Artificial Intelligence contributes significantly to the development of technical competence, digital literacy, communication, collaboration, creativity, innovation, critical thinking, and problem solving skills. These competencies are increasingly recognized as essential employability skills required for successful participation in technology driven workplaces. The findings therefore suggest that integrating Artificial Intelligence into Technical and Vocational Education and Training can improve graduates' workforce readiness and contribute to national economic development.

Despite these benefits, the study identified inadequate digital infrastructure, limited teacher competence, insufficient funding, weak institutional support, inadequate internet connectivity, and inconsistent policy implementation as major challenges affecting the successful integration of Artificial Intelligence within Government Technical Schools in Mfoundi Division. Addressing these challenges is essential if educational institutions are to fully benefit from the opportunities presented by Artificial Intelligence. The study concludes that Artificial Intelligence should be regarded as a strategic educational resource capable of strengthening Technical and Vocational Education and Training in Cameroon. Effective integration of Artificial Intelligence requires sustained investment in educational technology, continuous teacher professional development, curriculum reforms, supportive institutional leadership, and stronger collaboration between government, educational institutions, industries, and technology partners.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are proposed.

1. The Ministry of Secondary Education should formulate and implement a comprehensive national policy that promotes the integration of Artificial Intelligence into Technical, Vocational Education, and Training institutions across Cameroon.
2. The Government of Cameroon should increase investment in digital infrastructure by providing Government Technical Schools with reliable internet connectivity, Artificial Intelligence enabled educational technologies, modern computer laboratories, smart classrooms, and uninterrupted electricity supply.
3. School administrators should organize regular professional development programmes to strengthen teachers' competencies in the effective and ethical use of Artificial Intelligence for teaching, learning, learner assessment, and instructional management.
4. Curriculum developers should revise Technical and Vocational Education curricula to incorporate Artificial Intelligence, digital literacy, data literacy, computational thinking, robotics, automation, entrepreneurship, and other emerging competencies required for the future of work.
5. Government Technical Schools should strengthen partnerships with industries, universities, research institutions, and technology companies to facilitate knowledge exchange, internship opportunities, practical training, and access to emerging Artificial Intelligence technologies.

6. Teachers should adopt learner centered instructional strategies that integrate Artificial Intelligence responsibly while encouraging creativity, innovation, collaboration, critical thinking, ethical technology use, and independent learning among students.
7. Educational stakeholders should establish clear ethical guidelines governing the responsible use of Artificial Intelligence in teaching, learning, assessment, data management, privacy protection, and academic integrity.

Limitations Of the Study

Although the study provides valuable empirical evidence on the influence of Artificial Intelligence on teaching effectiveness, skills acquisition, and workforce readiness, certain limitations should be acknowledged. The study was conducted only in selected Government Technical Schools in Mfoundi Division, and the findings may not be generalized to all Technical and Vocational Education institutions in Cameroon. In addition, the study relied primarily on respondents' perceptions, which may be influenced by individual experiences and personal opinions. Finally, because Artificial Intelligence continues to evolve rapidly, some technological developments may have emerged after the completion of the study.

Suggestions For Further Research

Future studies should investigate the long-term effects of Artificial Intelligence on learners' academic achievement, technical competence, and employability after graduation.

1. Comparative studies should be conducted between Government and Private Technical Schools to determine differences in Artificial Intelligence adoption and educational outcomes.
2. Future researchers should examine teachers' readiness, digital competence, attitudes, and professional development needs regarding Artificial Intelligence integration in Technical and Vocational Education.
3. Further studies should investigate the effectiveness of specific Artificial Intelligence applications, including intelligent tutoring systems, virtual laboratories, adaptive learning platforms, robotics, and generative Artificial Intelligence tools in improving practical learning.
4. Future research should explore the influence of Artificial Intelligence on entrepreneurship development, innovation, self-employment, and industrial productivity among graduates of Technical and Vocational Education institutions.
5. Future studies should adopt longitudinal research designs to examine how Artificial Intelligence influences graduates' career progression, workplace performance, and lifelong learning within the Cameroonian labour market.

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