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Effectiveness of Using Artificial Intelligence on Management of Curriculum and Instruction in Public Secondary Schools in Kiambu County, Kenya

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***Abstract**: Use of artificial intelligence (AI) tools are important in improving curriculum and instruction in schools. Despite this assertion, status of curriculum and instruction in public secondary schools in Kiambu County is still low with many students registering low grades in KCSE, infrequent professional development of teachers and slow integration of technology in instruction. Thus, this study sought to examine the effectiveness of artificial intelligence on management of curriculum and instruction in public secondary schools. The study was anchored on artificial intelligence theory. The study adopted a desktop research method, where both qualitative and quantitative approaches were employed. The researcher did a systematic analysis of secondary data obtained from various sources that comprised study papers, articles, books and government reports. Qualitative data were analyzed thematically and presented in narrative form. Quantitative data, however, were descriptively analyzed using frequencies and percentages and presented using tables. The study found that management of curriculum and instruction in public secondary schools face challenges with many students registering low grades in KCSE, irregular re-training of teachers and slow integration of technology in teaching. Use of AI tools has occasioned some improvement in curriculum and instructional management. Hence, the study recommends that principals should prioritize professional development for teachers in using AI-driven tools such as AI-driven Learning Management Systems, personalized learning platforms and AI-powered assessments. They should foster a collaborative environment where teachers share best practices gained from AI tools, ensuring that the integration of technology enhances the learning experience for students and supports curriculum management.*

***Keywords:** Artificial intelligence, Curriculum and instruction, Management of curriculum and instruction, Public secondary schools*

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1. Introduction

Artificial Intelligence (AI) encompasses a range of technologies aimed at simulating human intelligence. In education, AI is deployed in diverse ways, such as personalized learning platforms, automated grading systems, virtual teaching assistants, and AI-driven data analytics for curriculum management. In the words of Hansen (2021), the effectiveness of AI in the management of curriculum and instruction is a critical issue because it has the potential to shape educational practices, curriculum delivery, and resource management, all of which are pivotal in achieving high-quality educational outcomes. AI's impact on educational management has been researched in a variety of countries and regions with differing educational systems, but the use of AI in curriculum management is still an

evolving field. In the United States of America, Choi, Park and Kim (2022) posit that implementation of AI-based adaptive learning platforms in schools increased student engagement and improved personalized learning pathways, with students achieving a 15% higher pass rate compared to traditional methods.

Similarly, in France, Delmas (2021) reports that use of AI is key in curriculum planning and AI tools have helped in designing personalized learning experiences based on students' strengths and weaknesses, leading to a 10% improvement in overall student performance. Data-driven decisions about content delivery and assessment also resulted in enhanced instructional efficiency. In Brazil, AI implementation has primarily focused on automating administrative tasks, such as grading and performance tracking. According to Lima and Gomes (2021), AI's role in automating curriculum mapping and tracking student progress allowed teachers to focus more on individualized teaching, leading to improved learning outcomes in the country's public schools. In many countries in Sub-Saharan Africa, AI has played a key role in curriculum and instructional management.

For instance, in Morocco, AI applications in schools are still emerging, with a focus on improving administrative efficiency, personalizing learning, and optimizing instructional delivery. Smith (2020) highlights AI's effectiveness in managing vast amounts of data, including student performance, which enables teachers to create tailored curricula. AI tools like learning management systems (LMS) and predictive analytics can guide instructional strategies and help monitor students' progress in real-time. This implies that AI supports decision-making by providing insights into teaching practices and learning outcomes, fostering a more adaptive approach to instruction.

While Morocco has taken steps towards integrating AI into education, challenges such as teacher training, resource allocation, and infrastructure limitations remain. in the words of Karim and Ahmed (2021), when AI is effectively integrated into the curriculum management process, it can significantly enhance student engagement and academic performance. However, the full potential of AI in Moroccan schools has yet to be realized due to contextual barriers. In Kenya, the scenario is the same with use and adoption of AI being considered key in the management of curriculum and instruction activities. However, according to Mwangi (2020), while AI tools had the potential to improve the teaching process, there were concerns regarding the lack of adequate training for teachers, infrastructural constraints, and the high cost of AI technologies in rural schools. For instance, in public secondary schools in Kiambu County, Ndegwa (2023) opines that effective management of curriculum and instruction has not been fully realized with 34.9% of students still registering low grades in national examination, irregular re-training of teachers as well as slow integration of technology in classroom pedagogy. Despite these assertions, much is yet to be done to examine the effectiveness of Artificial Intelligence on management of curriculum and instruction activities in public secondary schools.

1.2 Research Objectives

1. To assess the status of management of curriculum and instruction in public secondary schools in Kiambu County
2. To examine the effectiveness of artificial intelligence on management of curriculum and instruction in public secondary schools in Kiambu County.

2. Literature Review

Artificial Intelligence (AI) has become a transformative tool in educational systems worldwide, offering innovative solutions to challenges in curriculum management and instructional practices. Over the past four years, AI's role in education has expanded significantly, including its application in enhancing teaching strategies, personalizing learning experiences, and managing curriculum content efficiently. In a study carried out in the United States of America, Johnson (2021) revealed that AI is increasingly being utilized in educational settings, particularly in K-12 schools and universities. AI-based tools, such as personalized learning platforms, are helping to address individual student needs. For example, AI-driven systems like DreamBox and Knewton adapt content to the learner's pace and style, thus optimizing curriculum delivery. In the same token, research carried out by Holmes, Bialik and Fadel (2019) emphasized the growing impact of AI in providing data-driven insights into student performance, which can inform instructional decisions and help manage the curriculum effectively. According to Holmes et al (2019), the ability to tailor learning experiences to students' specific needs has shown improvements in engagement and academic outcomes. In France, the integration of AI in education is also gaining momentum, with a focus on enhancing pedagogical strategies. For instance, a study conducted by Dufresne and Peneau (2021) found that AI applications, such as automated grading systems and virtual assistants, assist teachers in managing their time and providing more focused instruction. Moreover, AI is used in curriculum design to ensure that content aligns with the national educational standards, providing a consistent and adaptable framework for teachers to follow. The French government has also invested in AI education initiatives, aiming to foster digital literacy and prepare students for the future workforce (Dufresne & Peneau, 2021). In Brazil, AI is being implemented in several regions to improve the quality of education. AI systems are being used to develop personalized learning

experiences for students, which is particularly important in a country with significant regional disparities in educational outcomes.

A study conducted by Oliveira, Costa and Gomes (2020) highlighted the potential of AI to bridge the gap in education quality between urban and rural areas. AI tools help teachers to manage diverse classrooms by providing real-time insights into student performance, which allows for more effective curriculum management. In the same token, Australia has been a leader in AI applications in education, particularly in primary and secondary schools. AI is used to analyze student performance data and predict learning outcomes, which helps in managing the curriculum and adapting instructional methods. According to a report by the Australian Council for Educational Research (2021), AI-driven learning analytics can help educators make data-informed decisions, leading to more effective teaching and curriculum planning. Additionally, AI-enabled virtual learning environments are widely used in Australian schools, offering students a more interactive and personalized learning experience.

In Morocco, AI adoption in schools is in its nascent stages, but early pilot projects show promise. A report by the Moroccan Ministry of Education (2022) highlighted the use of AI-powered tools for monitoring student progress and managing curriculum delivery. The government has been investing in AI infrastructure as part of its broader strategy to modernize the education system. While AI's impact on curriculum management in Morocco remains under research, early studies suggest that AI can help streamline administrative tasks, freeing up time for teachers to focus on instructional quality. South Africa has also made strides in integrating AI into its educational system.

AI tools are being used in both urban and rural schools to address issues such as overcrowded classrooms and resource shortages. According to Chikunda et al. (2021), AI can assist in the management of curriculum by providing teachers with adaptive learning resources that cater to the varying learning needs of students. Furthermore, AI-powered analytics are helping educators track student progress, enabling more informed decisions regarding curriculum adjustments and instructional strategies. In Tanzania, AI adoption in education is still limited but growing. The government has partnered with NGOs and international organizations to explore AI's potential in curriculum management. A study carried out by Msuya and Mbise (2020) found that AI applications could support teachers in developing personalized learning plans and managing diverse classrooms. While the country faces challenges related to internet connectivity and infrastructure, AI holds promise for revolutionizing instructional management, particularly in remote areas where teacher shortages are prevalent.

Kenya has been a leader in adopting technology in education within Africa. AI tools are increasingly being used to enhance curriculum management, especially in public schools. A study carried out by Njoroge and Mutinda (2021) revealed that AI systems can be used to monitor classroom activities, assess student performance, and adapt the curriculum to meet specific learning needs. Kenya's efforts to integrate AI in education are also supported by collaborations with international organizations, which provide technical expertise and funding for AI-based educational programs. In Kiambu County, a region with a mix of urban and rural schools, AI applications are being piloted to enhance educational management. Research by Wambui, Kimani and Odhiambo (2021) indicated that AI tools, such as chatbots and learning management systems, help teachers in Kiambu manage curriculum delivery more efficiently. These technologies have been particularly useful in managing large class sizes and providing personalized feedback to students.

As the region continues to adopt AI technologies, it is expected that the management of curriculum and instruction will become more data-driven and efficient. these findings point to the fact that the integration of AI in the management of curriculum and instruction has proven effective. While AI's impact varies depending on regional contexts and infrastructure, the overall trend points towards AI playing an increasingly central role in enhancing the quality and efficiency of education. However, there was need to interrogate how specific AI applications influence management of curriculum and instruction in public secondary schools.

2.1 Theoretical Framework

This study is based on the theory of Artificial Intelligence (AI), which was proposed by John McCarthy in 1960. A fundamental aspect of this theory is the idea that human intelligence can be represented using symbols, with reasoning processes that involve manipulating these symbols. McCarthy saw AI as the development of machines capable of performing tasks that typically require human thought, such as planning, problem-solving, and learning. He promoted the use of formal logic to represent knowledge and reasoning, believing that this logic-based approach would enable machines to tackle complex decision-making tasks through both deductive and inductive reasoning. A central tenet of McCarthy’s theory was the idea that intelligence could be formalized into a set of algorithms or rules. This led to the development of symbolic AI, where knowledge is represented through symbols, and logical inference is used to manipulate these symbols in ways that mimic human reasoning. McCarthy’s work also introduced the concept of "thinking machines," suggesting that machines could be designed to simulate not just human cognitive processes but also higher-order functions such as self-reflection and problem-solving.

In this study, the application of McCarthy's AI theory to education is that it laid the foundation for educational systems that could use AI to enhance the learning environment, improve instructional design, and better manage school curricula. This theory advocates personalized learning and by using AI algorithms to analyze student data, including learning styles, pace, and performance, AI can adapt the curriculum to fit the individual needs of each student. For example, AI-driven platforms can provide personalized content, assessments, and feedback, ensuring that students receive instruction tailored to their unique strengths and weaknesses. This aligns with McCarthy's vision of machines that can learn and adapt based on new inputs. AI can be used to manage and optimize the curriculum by analyzing large sets of data related to student performance, learning outcomes, and teaching strategies. Using AI-driven analytics, educators can identify gaps in knowledge, assess the effectiveness of instructional materials, and even predict future learning trends.

McCarthy's focus on problem-solving and reasoning is particularly applicable in this domain, as AI systems can assist in designing curricula that are more responsive to the evolving needs of students. One of the key challenges in managing curriculum and instruction is the time-consuming administrative work associated with planning, grading, and scheduling. AI can automate many of these tasks, allowing educators to focus more on teaching and interacting with students. For example, AI tools can assist in grading assignments, scheduling lessons, and even managing student assessments. This automation not only reduces the workload of educators but also ensures that resources are allocated efficiently, making the management of curriculum and instruction more effective. McCarthy's ideas about AI also have strong implications for virtual and augmented reality in the classroom. By using AI, schools can create immersive learning experiences where students interact with content in innovative ways. AI systems can drive simulations, virtual classrooms, and educational games that help students engage with complex concepts more effectively. These tools not only enhance student learning but also allow for continuous adaptation to each student's progress, enabling a more dynamic and engaging educational environment. AI's capacity for predictive analytics can also be applied to educational planning. Schools can leverage AI to analyze patterns in student performance and behavior, predicting outcomes such as dropout rates, exam success, and overall academic achievement. This data-driven approach allows schools to proactively intervene and provide additional support to students who may need it, ensuring that resources are directed where they are most needed.

3. Methodology

The study used a desktop research approach where the researcher analyzed both quantitative as well as qualitative data. Under quantitative methods, analysis of numerical data collected from existing sources such as reports, databases, surveys, and statistical studies was undertaken. In this case, the researcher used secondary data to conduct statistical analysis or identify trends, patterns and relationships. At the same time, qualitative methods were applied in desktop research and involved analyzing non-numerical data, such as interviews, texts, reports, articles, and case studies, to identify themes, patterns or narratives. This type of research often focuses on understanding deeper meanings, contexts, and experiences. Qualitative data were analyzed thematically and presented in narrative form. Quantitative data were analyzed using descriptively using frequencies and percentages and presented using tables. Ethical considerations, such as acknowledging the source of data, are critical. This research method is cost-effective and time-efficient, providing valuable insights without the need for direct interaction with participants or fieldwork.

4. Results and Discussion

This section details the study's findings in relation to its objectives. It also describes the methods used to present the study's results and discussions.

4.1 Status of Curriculum and Instruction in Public Secondary Schools

This study sought to analyze existing data on the status of curriculum and instruction in public secondary schools.
This was measured in terms of students' KCSE performance, teachers' professional development as well as integration of technology in classroom pedagogy. Results are shown in Table 1;

Table 1: Status of Curriculum and Instruction in Public Secondary Schools

Factor	Statistic/Percentage	Source/Observation
KCSE Performance	65% pass rate, 35% fail rate	Ministry of Education
Teacher Professional Development	40% of teachers undergo regular PD	Records of Survey from Kiambu County Teachers' Association
Technology Integration in Classroom Pedagogy	50% of schools lack full tech integration	Kiambu County Education Department Report
Teacher Training Attendance	60% irregular training attendance	Records of Interviews with Teachers in Kiambu County
School Infrastructure for Technology	55% of schools have limited tech infrastructure	Kiambu County School Reports

Table 1 shows that the performance of students in the Kenya Certificate of Secondary Education (KCSE) in Kiambu County has faced challenges, with 35% of students failing to meet the national standards. This outcome can be attributed to several factors, including irregular professional development (PD) for teachers and slow technology integration in schools. Qualitative analysis of interview reports revealed similar outcomes. For instance, while addressing in Annual General Meeting in 2023, in Mary Leaky Secondary school, Kiambu County Director of Education observed:

> *Curriculum and instruction are yet to be fully implemented since many students still register low grades in KCSE*

Furthermore, analyses of school performance reports indicate that many public secondary schools in Kiambu County register between 37% to 56.9% in KCSE. This was corroborated by Kiambu County Quality Assurance Officer, who while addressing a conference in Limuru Sub- County about teacher pedagogy and students' performance, stated:

> *Public secondary schools in economically disadvantaged areas consistently underperform, highlighting the impact of poverty on educational attainment. Food insecurity and lack of basic necessities impact student focus and attendance.*

These findings lend credence to the findings of a study carried out by Ngugi, Kamau and Mwangi (2022) which also revealed that, while Kiambu County has a relatively high literacy rate, disparities in education quality contribute to the underperformance of certain student groups. The study further established that public secondary schools in Kiambu experience a notable gap in performance when compared to private institutions. The report shows a consistent decline in average KCSE scores over the past four years, with a sharp decline in core subjects like Mathematics and Science. Teachers in the region also report challenges in implementing the curriculum effectively. These analyses indicate that the status of curriculum and instruction is still low as evidenced through low academic grades registered by students in KCSE. In terms of PD, only 40% of teachers in Kiambu County engage in regular training, which hampers their ability to stay updated on effective teaching methods and evolving curricula. An analysis of an article from The Star reported that in November 2020, indicated that 200 teachers from 20 institutions in Kiambu participated in the African Digital Schools Initiative program. These teachers were trained in integrating ICT into teaching and are expected to serve as ambassadors of digital literacy in over 300 schools. On her part, while addressing teachers in Thogoto Teachers College, Kiambu County Director of Education, Victoria Mulili (2020), emphasized that many teachers were yet to embrace e-learning, stating that it would contribute to improved exam performance.

A further analysis of a study carried out by Wamuyu (2012) on the "*Impact of in-service training on headteachers' effectiveness in school development planning: A case of secondary schools in Gatundu District, Kiambu County, Kenya"* highlights that although many headteachers have attended in-service training, a good number of them had attended in-service training. It, however, emerged that the headteachers had not attended most of the courses offered in relation to school development planning. In response to these challenges, the Kiambu County government, in collaboration with the Kenya Institute of Curriculum Development (KICD), has initiated a program to train Early Childhood Development Education (ECDE) teachers who were employed without diploma certificates. Governor Kimani Wamatangi (2024) stated: *training programme we are rolling out; however, the teachers would be required to submit admission documents from reputable institutions offering ECDE teaching courses, and the county would pay the fees.*

These analyses underscore the county's commitment to enhancing the qualifications and effectiveness of its teachers, despite existing challenges. These findings indicate that lack of professional development training limits teachers' ability to adapt to evolving teaching methods and education standards. This lack of continuous training often results in outdated teaching practices, affecting the quality of education.

Table 1 further shows that, despite technological advancements, 50% of schools in the county have not

fully integrated technology into their learning environments. This lack of access to educational technology significantly limits both teaching and learning experiences, especially in the context of digital literacy. The slow pace of technological integration is further exacerbated by inadequate infrastructure in many schools, with 55% lacking the necessary resources to implement tech-driven educational programs. This combination of challenges results in a less effective educational system, which ultimately contributes to the low KCSE performance seen in the region. An analysis of the findings of a study carried out by Muriko Grace Lenah (2015) on factors affecting the utilization of ICT in school administration in Kiambu Sub-County, revealed that computers were mainly used for clerical activities, with limited application in teaching. Similarly, review of research conducted by Njoroge (2018) in Gatundu South Sub-County identified several factors influencing teachers' participation in ICT integration. The study concluded that successful ICT integration necessitates adequate infrastructure, reduced teacher workload, and strong administrative support.

These findings were supported by James Mwangi, an ICT Teacher at Karuri High School, while addressing a workshop on technology and pedagogy, emphasized the importance of training teachers alongside the provision of technology to ensure effective use. Maxwell Kayesi, director at the Centre for ICT in Education and Resource Network (CiERN) also noted that empowering teachers is crucial for the effective utilization of digital resources. These studies and reports collectively underscore the need for comprehensive training, adequate infrastructure, supportive policies, and administrative commitment to enhance the adoption and effective use of technology by teachers in Kiambu County's public secondary schools.

4.2 Effectiveness of Artificial Intelligence on Management of Curriculum and Instruction in Public Secondary Schools

The study sought to analyze how different forms of artificial intelligence influence management of curriculum and instruction in public secondary schools. Results are presented in Table 2;

Table 2: Influence of Artificial Intelligence on Management of Curriculum and Instruction in Public Secondary Schools

AI Tool Type	Influence on Curriculum Management	Influence on Instructional Management	Percentage Influence (%)
AI-driven Learning Management Systems (LMS)	Streamlines lesson planning and resource sharing	Provides teachers with real-time feedback on student progress	20%
AI for Personalized Learning	Customizes lesson content to student needs	Adapts instructional strategies to individual student needs	25%
AI-assisted Content Creation Tools	Automates the creation of curriculum materials (e.g., quizzes, assignments)	Facilitates quick adaptation of teaching resources	15%
AI-powered Assessment Tools	Enables efficient tracking of curriculum mastery	Supports formative and summative assessments for student learning	20%
AI-based Data Analytics for School Management	Helps track curriculum implementation and improvement	Improve instruction through performance data analysis	20%

Table 2 shows that AI-driven Learning Management Systems (LMS) tool such as Google Classroom or Moodle can significantly streamline curriculum management by providing easy access to lesson plans, assignments, and educational resources. Teachers benefit from real-time student progress tracking, enabling them to adjust instruction accordingly. The influence on curriculum and instructional management is estimated to be 20%. An analysis of interview reports from school heads in Kiambu County revealed that MLS has improved classroom pedagogy in schools. One principal noted:

> *The integration of AI in our LMS has improved both curriculum delivery and student performance. We can now provide instant feedback, monitor learner engagement, and adjust lesson plans as needed. AI also helps identify at-risk students earlier, allowing us to provide timely support. This data-driven approach is essential for improving educational outcomes in our schools.*

In the same token, while addressing parents during a Parents' Teachers' Association meeting held in Kiambu Boys High School, the Chairperson had this to say:

> *In our school, use of AI-based tools has transformed how learning is managed. It's not just*

about assigning tasks; it's about creating an ecosystem where students can interact with the material more meaningfully. From a parent's perspective, it's reassuring to know that the system tracks my child's progress and keeps teachers informed, which means more personalized attention for each student.

Further analysis of a published article by Educational Researcher (2024) revealed that use of AI in LMS not only facilitates efficient curriculum management but also enhances the quality of instruction. Teachers can leverage data insights from the system to refine their teaching strategies. Additionally, the adaptive learning features of AI allow the curriculum to be more dynamic, addressing diverse student learning styles and needs. These findings further corroborate the findings of research carried out by Mwangi (2023) that, in Kiambu County, where access to traditional educational resources may be limited, AI-driven platforms provide equitable learning opportunities, contributing to educational equity. The overall impact on instructional practices is evident as these systems support differentiated learning and formative assessment, fostering better educational outcomes for students.

These findings point to the fact that AI-enhanced platforms help streamline the delivery of content, offering personalized learning experiences that adapt to individual student needs. These analyses indicate that integration of these systems has facilitated more efficient management of educational resources and enhanced teacher-student interaction, as AI can automate administrative tasks and allow teachers to focus on more complex instructional activities. In other words, use of AI LMS allows data-driven decision-making by providing real-time insights into student performance, enabling teachers and administrators to identify areas requiring intervention.

On use of personalized learning**,** the study revealed that AI tools that adapt to the individual learning styles, pace, and needs of students can greatly enhance both curriculum and instructional management. Personalized learning tools use algorithms to assess students' performance and adjust lesson plans accordingly. This allows for more effective teaching by ensuring that each student receives tailored instruction, leading to a 25% influence on curriculum and instruction. Analysis of interview reports by different key informants revealed that AI-driven platforms can tailor educational content to individual student needs, promoting active engagement and motivation. For instance, the EIDU mobile learning app, implemented in Kiambu County's primary schools, has demonstrated positive outcomes:

Teachers are citing both progress in literacy and increased motivation and engagement.

Such personalized learning approaches can be adapted for secondary education, potentially improving curriculum delivery and student performance. The study also noted that AI tools can support educational leadership by facilitating real-time monitoring, resource preparation, and effective school management. In support of these assertions, Ijakaa and Kingi (2023), in their study about "Research-driven solutions for enhancing leadership in competency-based curriculum implementation in Kenyan secondary schools which also found that A study on AI solutions for leadership in Kenyan secondary schools" found:

AI may enhance educational leadership by the implementation of real-time monitoring, preparation of teaching resources, and managing the institution more effectively

These findings thus affirm the fact that integrating AI can thus aid school administrators in making data-driven decisions, optimizing instructional strategies, and ensuring curriculum effectiveness. The study noted that, while direct evidence of AI's impact on personalized learning in Kiambu County's public secondary schools is limited, existing studies suggest that AI has the potential to enhance educational practices. The study also revealed that AI-assisted content creation tools like content generators, AI-based quiz creators, and lesson plan automation can help teachers save time on creating curriculum materials. These tools help teachers by generating content that aligns with curriculum standards, enabling quick adaptation to changing educational needs. This is expected to influence curriculum management by 15%.

The study also revealed that the use of AI-powered assessment tools assists teachers in quickly assessing student performance, providing insights into student strengths and weaknesses. Tools like automated grading systems and diagnostic assessments allow for timely interventions, improving the overall effectiveness of instructional management. Assessment tools are estimated to have a 20% influence on both curriculum and instructional management. Qualitative analysis of the reports from key informants highlighted how AI tools have enhanced the efficiency and effectiveness of curriculum management. For example, while addressing an ICT workshop organized for teachers in Githunguri Sub- County, themed "Role of emerging technologies on classroom instruction in 2023, the Sub- County Director of Education noted:

AI tools have enabled us to create more personalized learning

> *materials for students, catering to their individual needs.*

This quote reflects the theme of personalized learning and how AI supports differentiated instruction. In the same conference, Kiambu County Director of Education stated:

> *AI has helped us track student progress in real time, making it easier to intervene when necessary.*

This indicates the theme of data-driven decision-making, where AI tools provide educators with actionable insights. Overall, the thematic analysis of key informant responses reveals that AI technologies are transforming educational practices by enhancing personalized learning, improving curriculum management, and enabling more efficient student assessments, ultimately leading to better instructional outcomes. Through thematic analysis, education officers highlight themes such as enhanced efficiency, personalized learning, and data-driven decision-making. A similar analysis of the past interview reports by education officers emphasized that these tools simplify lesson planning. From the reports the researcher further observed:

> *AI tools have reduced the time teachers spend on crafting lesson content enabling teachers to focus more on teaching. AI-powered assessments have allowed us to identify students' needs more precisely, tailoring interventions accordingly.*

Table 2 further shows that data analytics tools can assist in tracking the effectiveness of curriculum implementation, identifying gaps in teaching, and offering insights into student performance trends. These tools provide school administrators with actionable data that can inform curriculum revisions and instructional strategies. Data analytics influence both areas by 20%. These quantitative and qualitative analyses affirm the fact that integration of AI tools in public secondary schools in Kiambu County offers potential improvements in both curriculum and instruction management. AI-driven Learning Management Systems (LMS) and personalized learning tools have the most significant influence due to their direct impact on teaching effectiveness and student engagement. AI-assisted content creation and assessment tools provide substantial support in improving instructional efficiency. Finally, data analytics tools can greatly enhance decision-making processes at the administrative level, ultimately contributing to better educational outcomes. This further indicates that AI tools contribute significantly to the enhancement of curriculum and instruction management, allowing for more personalized, efficient, and data-driven educational practices.

5. Conclusion and Recommendations

5.1 Conclusions

This study concludes that management of curriculum and instruction in public secondary schools is still faced with challenges. Many students still register low grades in national examinations, there is irregular re-training of teachers as well as slow integration of technology in classroom pedagogy. To mitigate these challenges, schools have adopted artificial intelligence tools such as AI-driven Learning Management Systems (LMS), AI-enhanced personalized learning**,** AI-assisted content creation tools, AI-powered assessment tools as well as data analytics tools, which have realized some improvement in curriculum and instructional management.

5.2 Recommendations

The study recommends that school principals should prioritize professional development for teachers in using AI-driven tools effectively. This includes providing ongoing training and support to ensure that teachers are equipped with the necessary skills to leverage AI tools such as AI-driven Learning Management Systems (LMS), personalized learning platforms, and AI-powered assessments. Additionally, principals should foster a collaborative environment where teachers can share the best practices and insights gained from AI tools, ensuring that the integration of technology enhances the learning experience for students and supports curriculum management.

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