



INTERNET TECHNOLOGIES INTEGRATION AND ITS PERCEPTIONS IN LEARNING OF ENGLISH IN PUBLIC SENIOR SCHOOLS IN KAKAMEGA COUNTY, KENYA

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Abstract

Internet technologies (such as Artificial Intelligence (AI) tools, Wi-Fi, Local Area Network (LAN) and social media) have revolutionized education sector. They allow sharing of resources and prompt interaction of learners. Literature review showed successful use of internet technologies; nevertheless, there is little empirical evidence of internet technologies transforming learning outcomes in Kakamega County, Kenya. Further, English performance in Kenya Certificate of Secondary Education (KCSE) examinations slumped from 2021 - 2025. It was from this background that formed the study. Specific objective of the study was to: examine internet technologies integration and its perceptions in learning of English in public senior schools in the county. The study revealed that students often use internet technologies (such as AI tools, Wi-Fi, LAN and social media) that transform learning by providing vast information access, offer interactive content, foster collaboration and develop critical literacy and writing skills. Besides, Internet technologies enhance student-teacher connectedness, student-centred learning and teacher-learner centred method. Teachers and students also have positive attitudes to adopting internet technologies for searching, reading and writing purposes however, they reported limitations in their proficient use. Lastly, the internet technologies were inadequate in schools due to senior schools' little budget allocation for: provision of internet technologies, maintenance of soft ware and hard ware and professional development programmes regarding use of internet. Based on the findings, the study recommended that for effective integration of internet technologies in learning, senior schools should provide ICT resources and offer training on effective use of internet technologies for learning purposes.

Key words: Internet technologies, integration

1.0 Introduction

Internet technologies include access methods (Fiber, Wi-Fi), applications (Web browsers, email, social media, streaming), infrastructure (Routers, servers), and Artificial Intelligence (AI) tools forming the foundation for online communication and data exchange. The study findings indicated that there is a significant relationship between academic performance of the respondents and playing online games during weekends. Therefore, this strengthened home and school partnership to supervise students' activities. Even though students played online games; they socialized and performed very well in schools. The research assessed impact of online gaming on academic performance and social behaviour of students in Polytechnic University of the Philippines – Laboratory High School. They used descriptive – correlation method which utilized questionnaire to collect data (Dumrique & Castillo, 2017). Further, the study of Sophia

(2016) observed that most parents (81%) agreed that using the internet for homework, research or educational games helped children to prepare for the future. Therefore, it allowed children to learn at their own pace, and were less likely to be left behind in class. Sophia's research focused on students' use of internet for homework. She used a qualitative approach.

The research of Oberiri and Iyendo (2018) investigated place of internet in academic research and learning of students. They used 250 undergraduate students in three selected universities within North – Eastern Nigeria. To gain an in – depth understanding of the perception of the students' views, a focus group was conducted with 18 students. In their research, students perceived that lack of digital readiness among staff and inefficient internet facility discouraged utilization of the internet in the institutions. In another research of Muvango, Kowino, Ajuoga, and Okono (2020) indicated that schools lacked funds to pay internet service providers that hindered frequent use of internet facilities in the classrooms. They examined availability of e-resources for use in teaching and learning of English language in public secondary schools in Kakamega County, Kenya. Therefore, it was from this background that the present study examined internet technologies integration and its perceptions in learning of English in public senior schools in Kakamega County, Kenya. The key question this study aimed to answer was: What is the perception of internet technologies integration in learning of English in public secondary schools in Kakamega County, Kenya?

2.0 Methodology

The research was guided by Generic Model that was proposed by Wang (2008). The model consisted of three key components: pedagogy, social interaction and technology. The study population was 150 principals, 250 teachers of English and 10,000 Grade Ten students. Simple random sampling method was used to select 108 principals, 152 teachers and 370 students. Research instruments included: questionnaires for principals, teachers and students, interview schedule and observation checklist for teachers. The study selected public senior schools by virtue of their uniformity in acquisition, selection and use of internet technologies. Principals were chosen as a result of their role of implementing and supervising integration of ICT in senior schools. They also enforced government policy on ICT Training amongst teachers. The study purposively sampled out Grade Ten cohorts by reason of it was at this level where intensive learning is done. Finally, based on the nature of the problem under the study; teachers of English were selected as a unit of study due to the fact were point of focus and influential in learning process in schools, therefore believed to cause positive change easily in learning. Face validity of research instruments was established by judgement of three experts in the Department of Educational Communication, Technology and Curriculum Studies. Reliability of instruments was established through pilot study on 10 principals, 20 teachers and 30 students. The study used test – retest method to estimate degree of reliability of the instruments. The computed coefficients of reliability were 0.85, 0.85 and 0.8 for questionnaires of principals, teachers and students respectively. The small scale preliminary study evaluated feasibility, cost, duration, adverse events and improved upon the study design prior to performance of full – scale research. Data was analysed through descriptive statistics included frequencies, means and percentages. Statistical Package for Social Sciences (SPSS) was used to analyse data.

3.0 Results and Discussions

Learners Questionnaire (LQ) established available internet technologies for use in learning English. The results are shown in Table 1.

Table 1: Internet Technologies for Learning

n=370 Students

Examples of Internet Technologies	Number of Learners (f)	%
Local Area Network (LAN)	50	13.5
Social media (WhatsApps, Facebook, YouTube, Instagram)	239	64.6
Artificial Intelligence (AI) tools (ChatGPT, Quillbot, Gemini Grammarly, google translate, duolingo)	91	24
Wi-Fi	143	38.6
Satellite internet	109	29.5
Modem	223	60.3

Table 1 revealed that students adequately use social media (64.6%) and modem to access internet (60.3%) in learning. This was because of their convenience of use and inexpensive nature (Muvango, 2021). On the contrary, Local Area Network (LAN) (13.5%), Artificial Intelligence (AI) tools (24%), Wi-Fi (38.6%), and Satellite internet (29.5%) were insufficiently utilized in learning due to students' unawareness and limitation in proficient use of the technologies in education.

Moreover, the results insinuated little use of AI tools (such as ChatGPT, Quillbot and Gemini Grammarly) in senior schools. They reported limited access to AI tools which negatively affect engagement and AI literacy development; still, with numerous challenges for current technology, students have positive perceptions of using AI tools in writing activities. Notably, AI prompted interactive discussions in the classrooms, allow students to link reading comprehensions, oral narratives and story books to contemporary issues easily. Many students (Pikhart, Klimova, & Al-Obaydi, 2024) regarded AI tools as vital resources for acquiring vocabulary, phrases and language skills. Accordingly, Lugendo (2025) research emphasized that integrating AI technology promotes efficiency in knowledge production. Her study recommended that training in use of AI tools for effective learning in higher education institutions.

During the interview, 59% teachers indicated familiarity with AI tools but limited ability to apply them in learning. Notwithstanding, (Jiack & Mohamod, 2025) without structured guidance, students may become dependent on AI tools for factual recall rather than developing deeper analytical skills. Contrarily, (Wiyaka, Silitonga, Sunardi, & Pramudi, 2024) AI Chatbots promote an increase in students' participation and it also triggers their self – assurance in language usage by offering prompt feedback and creating an engaging atmosphere for them.

The Interview Schedule suggested that AI learning tools offer automated note summaries, practice quizzes, language practice, content creation (text, video) and transforms how students study and create educational materials. Further, teachers who were interviewed disclosed that AI – prompts encourage students to revise writing and become independent in revising writing (53%), AI – generated suggestions help to learn new vocabulary (57%) and students enjoy using AI tools during English writing activities (63%). AI is only a learning tool that supports them to create ideas; it does not replace their own thinking. Significant, when students use vocabulary instantly in their writing; enhances students' communication and writing. AI has potential to (Lee, 2024; Jiack & Mohamod, 2025) enhance high order thinking skills but only when integrated thoughtfully within pedagogical framework that encourage inquiry, verification and discussion. Without structured support, AI may primarily reinforce surface – level learning rather than prompting critical historical reasoning.

Senior schools use Wi-Fi to connect buildings, auditoriums and outside areas in order to allow computers, smartphones, and tablets to connect to the internet or communicate with one another wirelessly within school compound (Muvango, Kowino, Ajuoga, & Okono, 2020). Majorly, 65%

teachers who were interviewed demonstrated that Wi-Fi services improve access to and usage of internet search, computer games, internet assignments and e-mails which are catalyst to improve academic results. Nevertheless, 54% senior schools are unconnected to internet due to high fees charged by internet service providers such as Safaricom and Airtel. As a consequence, school management and stakeholders must provide LAN and WiFi to schools for internet connection in order to accelerate access of information in schools (Muvango, 2021; Muvango, Kowino, Ajuoga, & Okono, 2020).

Learners' Questionnaire identified pedagogical benefit of AI in learning of English language. Each statement had five possible answers: Strongly Agreed (SA), Agreed (A), Undecided (U), Disagreed (D) and Strongly Disagreed (SD). The results are in Table 2.

Table 2: AI-Based Digital Writing Systems (AI-DWS) Pedagogical Benefit

n= 370 Students

	Statement	SA	A	N	D	SD
a.	AI-DWS make English writing less stressful for them	86	127	86	50	21
		% 23	34	23	14	6
b.	AI-DWS enhance confidence when writing in English	101	116	79	63	11
		% 27	31	21	17	3
c.	AI-DWS improve grammar and sentence structure	94	126	95	41	14
		% 25	34	26	11	4
d.	AI-DWS identify weaknesses in writing	114	116	100	29	11
		% 30.8	31.3	27	8	3
e.	AI-DWS is suitable for use in English writing lessons	106	124	94	35	11
		% 29	34	25	9	3
f.	AI make them comfortable in school writing tasks when guided by the teacher	100	126	95	28	21
		% 27	34	26	8	6
g.	AI-DWS should be integrated into English writing lesson.	97	124	92	42	15
		% 26	34	25	11	4
h.	AI-DWS help to express ideas clearly in writing	100	126	96	27	21
		% 27	34	26	7	6
i.	AI-DWS assist to understand how to organize ideas well when writing	97	120	92	55	6
		% 26	32	25	15	2
j.	AI – DWS encourage students to think critically about writing choices	92	126	95	36	21
		% 25	34	26	10	6

In Table 2, students strongly agreed and agreed that using AI-Based Digital Writing Systems (AI-DWS): make English writing less stressful for them (57%), enhance confidence when writing in English (58%) and make them comfortable for school writing tasks when guided by the teacher (61%). Therefore, majority of students (60%) strongly agreed (26%) agreed (34%) that AI – DWS should be integrated into English writing lessons. The incorporation of AI- DWS in learning along with teacher facilitation boosts writing abilities and mastery of vocabularies in

English. Students (Othman, 2025) value guidance and support alongside technological tools. It is a clear indicator that schools are blending AI tools with teacher led discussions and also providing tutorials for using AI effectively.

Most students also strongly agreed and agreed that AI-DWS: improve grammar and sentence structure (59%), identify weaknesses in writing (62.1%), help to express ideas clearly in writing (61%), encourage students to think critically about writing choices (59%) and assist to understand how to organize ideas well when writing (58%). Thus, 63% students feel that AI-DWS is suitable for use in English writing lessons. According to Dhillon, Molaei, Li, Golub, Zheng and Robert (2024) study showed a positive correlation that AI improves writing quality from sentence – level to paragraph – level. More so (Lee & Shin, 2025) AI applications support language specific learning, by offering adaptive feedback and multimedia content that reinforce comprehension and retention. Thereupon, (Hassan, Laili, Ismail & Abu, 2025) the rapid advancement of AI tools have transformed education creating opportunities to enhance learning outcomes and digital competences amongst learners

AI-DWS driven tools are sophisticated form of learning that provide tailored feedback and adjust to the unique needs of each learner. Nonetheless, students should not depend entirely on them as they sometimes provide inaccurate information. Their replies are generated based on patterns rather than true understanding or experience.

GOK prioritized procurement of undersea optical fibre links so that to provide fast and reliable global internet to schools. These innovations are meant to transform learning from teacher talk and learner listen traditional approach to interactive, explorative and collaborative learning process (Muvango, 2021). Thereupon, Principal’s Questionnaire (PQ) required principals to indicate utilization of internet facilities used in schools. The results are summed up in Table 3.

Table 3: Internet Facilities Usage in Schools

n=108 Principals

Internet Facilities	Number of Principals (<i>f</i>)	Percentage (%)
Internet search/use	40	37
Computer games	29	27
Internet assignments	44	41
E-mail writing	51	47

In Table 3, principals suggested that internet search/use (37%), computer games (27%), internet assignments (41%) and e-mail writing (47%) were under-utilized in education. Schools also have limited access to up-to-date computer and internet infrastructure. Interviewed teachers suggested that inconsistent internet access impede incorporation of digital tools into classroom setting. By incorporating interactive games, questions and e-mail writing keep students engaged and entertained minimizing boredom and enhancing classroom participation. Learner’s Questionnaire (PQ) identified best things about computerization in learning process, results are shown in Table 4.

Table 4: Computerization in Schools

n=370 Students

Computerization	Number of Learners (<i>f</i>)	%
Online games	196	53
Information search	233	63
Applications	211	57
No response	7	2

In Table 4, online games (53%), information search (63%) and applications (57%) were features that attracted students when using computer. The internet/WWW enhances extensive and fast information search in education; as a result improves learning outcomes. Computerization in school lies in its role as a contributor towards learner-centred form of education. More so, computer – based applications for language learning include: word processors, e-mail links, spelling and grammar checkers, translation packages and speech recognition and text to speech packages (Malakar, Chakravorty & Debasish, 2019).

English Teacher’s Questionnaire (ETQ) identified number of internet tools and resources available for learning of English language. Teachers suggested whether they were available or not for use as summed up in Table 5.

Table 5: E-tools and E-Resources Available for use

n=152 Teachers of English

E-tools and E-Resources	Number of Teachers (<i>f</i>)	%
Computers mediated communication	152	100
Computers		
Cell phones	83	55
Videos	8	5
E-newspapers	152	100
E-content	71	47

Table 5 showed that 100% teachers suggested that computers and e-newspapers were adequately available for use in senior schools. This was because the programme sponsored by Intel equipped schools with computers to facilitate education. Computers mediated communication involves e-mails and websites containing e-materials that lead to learning process. Teachers who were interviewed insinuated that computerization, internet connection and World Wide Web (WWW) enhance easy access of videos, e-newspapers and e-content for learning practice.

Cell phones (55%) were sufficiently used in learning process. 8 (5%) and 71 (47%) teachers of English implied that videos and e-content were available but insufficiently used in learning respectively. This indicated inadequate availability of video and e-content in schools. Lack of internet connectivity and high fees charge by internet service providers impeded access of e-materials. Though, the research of Muvango, Indoshi and Okwara (2019) considered video recording and its use in learning as effective instructional resource. Their study focused on factors influencing the use of media in teaching and learning of English in secondary schools in Kakamega East Sub-County, Kenya.

Further, teachers who were interviewed expressed that: cell phones were distribution platform for internet, audio application, e-newspapers, e-magazines and e-material (67%), cell phones connected to wireless network are web surfer, word processor and a dictionary (73%) and they were also known for creation, storage, access and presentation of information in learning practices (61%). This revealed that teachers were using cell phones appropriately in learning of English language. Even so, availability of videos and e-content for use was unsatisfactory due to lack of e-pedagogical skills and ICT resources.

Interview Schedule disclosed that Internet tools and resources such as e-mail and chats are used for communication sending homework/assignments to learners easily. So, ETQ identified extent of teachers’ use of e-mails for learning of English. This research rated use of e-mails in terms of very good, good, poorly and not at all. Table 6 showed results.

Table 6: Use of E-mail

n=152 Teachers of English

Extent Teachers used E-mails	Number of Teachers used E-mails (f)	%
Very good	30	20
Good	62	41
Poorly	46	30
Not at all	14	9
Total	152	100.0

In Table 6, teachers use e-mails very good (20%), good (41%), poorly (30%) and not at all 14 (9%) in learning of English. Therefore, 61% teachers very good (20%) good (41%) used e-mails adequately in schools. However, 29% teachers cited lack of up-to-date computers and low e-confidence as the main causes of insufficient use of e-mails in learning practices. Teachers emphasized that e-content and assignments are sent via e-mails to students. They also accessed and sent feedback to learner's or parent's e-mail accounts. E-mails use improve teacher - learner connectedness in the curriculum (Muvango *et al.*, 2020).

Therefore, school management must: provide up-to-date computers for fast access of e-content, improve internet infrastructure and enhance teacher's ICT skills, knowledge and attitudes by attending ICT related in-service training programmes. Professional development programmes imparted 21st Century skills to learners and delivered positive learning outcomes in education.

ETQ established ways teachers accessed e-content in the curriculum. Results summed up in Table 7.

Table 7: Accessibility of E-content

n=152 Teachers of English

E-content Access	Number of Teachers (f)	%
On computer screen	147	97
On cell phones screen	152	100
Download content in storage devices	137	90

In Table 7, 147 (97%), 152 (100%) and 137 (90%) teachers of English accessed sufficiently e-content from computer screen, cell phone screens and download content in storage devices. This study indicates that teachers were aware of various ways of accessing e-content for learning in schools. However, teachers pointed out that internet connectivity was a challenge of accessing e-content. Inadequate internet infrastructure and exorbitant costs by internet service providers hindered them from accessing e-material easily. Most schools had inadequate budget allocation for ICT use in education. Internet service providers must subsidize the cost of accessing internet especially for schools.

LQ found out that learner's opinion on use of internet in learning of English language. Results are shown in Table 8.

Table 8: Learners' opinion on Internet Use

n=370 Students

Influence of Internet	Number of Learners (f)	%
Increase retention in learning	270	73
Help in learning	248	67
Ensure understanding of concepts	274	74
Make learning lively	244	66
Increase desire to learn	248	67
Concepts became lively during learning	281	76

In Table 8, students agreed that internet: increase retention in learning (73%), help in learning (67%), ensure understanding of concepts (74%), make learning lively (66%), increase desire to learn (67%) and make concepts lively during learning (76%) in education. Media use (including

internet use) influenced learners’ learning of English language positively (Muvango, Indoshi, Okwara & Okoti, 2020). Their research established perceptions of teachers on media use in teaching and learning of English in public secondary schools in Kakamega East Sub-County, Kenya.

Therefore, internet technologies influence learner’s learning outcomes positively through active interaction. They enable students to access quality information from the internet as results improve knowledge, skills and attitudes regarding internet use in learning practices. Accordingly, interaction is a stimulus for positive academic performance in schools (Muvango, 2021).

Generally, Interview Schedule identified that adequate use of internet improves academic self – confidence, academic self-reliance and learner – teacher connectedness in schools. It also pointed out that internet allows students to learn at their own pace and are less likely to be left behind in learning process. Thus, internet made it easy to get their homework done however, initial results in Table 2 depicted inadequate use of internet in schools. These results confirmed that learners are aware of benefits accrued from use of internet in learning process.

The internet essentially includes e-mail and the World Wide Web (WWW); a website is a group of web pages. Therefore, ETQ expected teachers to indicate internet influence on learning of English language in terms of strongly agreed, agreed, undecided, disagreed and strongly disagreed. Findings are in Table 9.

Table 9: Teachers’ Perception on Internet Use

n=152 Teachers of English

Statements	Number of Teachers (<i>f</i>)	%
Strongly agreed	35	23
Agreed	86	57
Undecided	23	15
Strongly disagreed	3	2
Disagreed	5	3
Total	152	100.0

Table 9 confirmed that 80% of teachers strongly agreed (23%) agreed (57%) that internet influence positively learning of English language. It was notes that internet attract attention of learners as an easy source of accessing information and e-resources. Thus, internet improves educational performance in schools. Interview Schedule expressed internet increases attainment levels of learners; schools with improved internet infrastructure achieved better results than those that were poorly equipped. Its access in schools resulted in significant improvements in learner’s learning outcomes (Balanskat, Blamire & Kefalla, 2006). However, this was a review of studies of ICT impact on schools in Europe.

More so, interviewed teachers suggested that: internet change the way teachers and learners work through cooperation and interaction amongst themselves, within the same sub-county/county (63%), parents were kept informed via websites of learner’s academic performance through virtual Parent Associations (PAs) (57%), institutionally, so much on the web is available for free for learners, teachers (75%) and professional organizations made their work available freely for anyone to use (80%). Therefore, the internet is the greatest venue for exchange of educational material ever constructed in the world.

Moreover, interrogation was done to find out why the internet was preferred in learning practices, one of the teachers asserted that:

Internet is increasingly interactive. Learning programs are tailored to each learner; it introduces challenging tasks slowly as learning proceeds. Large computerization, internet and

influx of WWW create extensive and fast dissemination of information and turn the world into a global village. Libraries nowadays are surrounded by networked data connected to vast internet – based service to make desired information sources accessible to teachers and learners.

LQ noted whom learners learnt from about computers and internet generally. Results were summed up in Table 10.

Table 10: Whom Learners learnt about Computers and Internet

n=370 Learners

Sources	Number of Learners (<i>f</i>)	%
Parents/Adults/Guardians	181	49
Teachers	211	57
Older sibling	233	63
Classmates	189	51
Self	63	17
Collaborations	248	67

Table 10 expressed that 181 (49%), 211 (57%), 233 (63%), 189 (51%), 63 (17%) and 248 (67%) learners obtained information about computers and internet from parents/adults/guardians, teachers, older sibling, classmates, self and collaborations respectively.

Most learners obtained knowledge about computers and internet through collaboration (67%). Learners used collaboration greatly because it increases availability of working knowledge which improves use of computers and internet. During collaboration; knowledge, skills and experiences are made available to support peers in their academic work consequently, provide value at a little or no cost. Learners indicated that limited access to computers and internet were major problem hindering access to e-material. They also showed willingness to be trained extensively on computers and internet use accordingly.

ETQ revealed how teachers obtained e-materials for learning of English language. The findings were summed up in Table 11.

Table 11: Mode of Obtaining E-materials

n=152 Teachers of English

Statements	Number of Teachers (<i>f</i>)	%
Parents Association (PA)/Board of Management (BOM)	92	61
Ministry of Education (MOE) supplied them	20	13
Teachers of English borrowed	80	53
Supplied by donors/sponsors	89	59

In Table 11, 92 (61%), 20 (13%), 80 (53%) and 89 (59%) teachers confirmed that they obtained e-material from PA/BOM, MOE, teacher borrowing and donors/sponsors for learning process. Borrowing e-materials from other schools improved collaboration amongst teachers and learners. E-material in schools was sourced greatly by PA/BOM (61%) and donors/sponsors (59%). Respondents noted that they were expensive thus schools relied on borrowing e-material (53%). Their use requires adequate organizational precondition (vision, policy and culture), personal initiative (knowledge, skills and attitudes) and interest amongst teachers for successful implementation. Through collaboration, knowledge, skills, experiences and products of in-service training were made available to support peers/colleagues in learning with value at a little or no cost. Thus collaboration increased use of internet technology in learning practices.

The ministry concerned insufficiently supplied e-material to schools. Thus, MOE commitment to provide e-material was not forthcoming in many schools. Through the social pillar of Vision

2030, (ROK, 2018) MOE obligates to provide quality education that provided learners to competitively function within a highly technologically – oriented and information – based global economy.

Alternatively, schools must work closely with stakeholders such as PA, BOM, donors, sponsors and Non Governmental Organizations (NGOs) for provision of sufficient e-materials. Additionally, (Muvango, *et al.*, 2019) it was right for teachers to give resourceful learners a chance to make e-materials to enhance their availability in schools.

4.0 Conclusions and Recommendations

4.1 Conclusions

Students often use internet technologies that transform learning by providing vast information access, offer interactive content, foster collaboration and personalized learning, enhance reading and writing skills and develop critical literacy and teamwork, such internet technologies include AI tools, Wi-Fi, social media and LAN. Besides, Internet technologies enhanced student-teacher connectedness, student-centred learning and teacher-learner centred method. Teachers and students also have positive attitudes to adopting internet technologies for internet search, reading and writing purposes however, they reported limitations in proficient use of internet technologies. Lastly, the internet technologies were inadequate in schools due to schools had little budget allocation for: provision of internet technologies, maintenance of soft ware and hard ware and professional development programmes regarding use of internet.

4.2 Recommendations

The study recommended that for effective integration of internet technologies in learning, senior schools should provide ICT resources. BOM and PA should provide: adequate internet infrastructure, sufficient budget allocation for use of internet technologies in learning and implement continuous training on effective use of internet technologies. The school management should provide up-to-date learning hardware and software in schools in order to open files faster and motivate/reward teachers who use internet technologies.

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