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E-Learning During the Civil War in Sudan: Perceptions, Barriers, and Acceptance

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Abstract: On 15 April 2023, the civil war in Sudan began, pitting the Sudanese Armed Forces (SAF), led by General Abdel Fattah al-Burhan, against the Rapid Support Forces (RSF), led by General Mohamed Hamedan Dagalo. The conflict has had significant humanitarian, economic, and political consequences for the population, prompting universities to transition to e-learning. This study explores students' perceptions of the advantages and disadvantages of e-learning, as well as the challenges they faced during this Civil War-era e-learning experience. It also investigates learners' acceptance of e-learning. The participants were enrolled in the Department of English Language at the Faculty of Arts, University of Khartoum. Data were collected via a Google Forms questionnaire and analysed statistically. While participants appreciated the flexibility of e-learning, this benefit was overshadowed by substantial barriers, including internet connectivity issues, low motivation, limited access to learning materials, and difficulties supporting instructor and peer interactions. Perceptions of disadvantages were strongly negative (M = 4.08, SD = 0.92, RW = 82%), compared with neutral perceptions of its benefits (M = 3.00, SD = 1.14, RW = 60%). The study concludes that the subjects preferred face-to-face learning over e-learning, with an average score of 4.08 (SD = 0.92) and a relative weight of 82%. Larger-scale studies are needed to substantiate the findings; however, the outcomes are essential for informing policymakers in developing e-learning policies and practices as an alternative pedagogical approach to traditional teaching methods.

Key words: Civil War, E-learning, Learners' perceptions, Barriers, Acceptance, Technology Acceptance

1. Introduction

On 15 April 2023, the civil war broke out in Khartoum, the capital. The conflict pits the Sudanese Armed Forces (SAF), led by Sudan's President General Abdel Fattah Al-Burhan, against the paramilitary Rapid Support Forces (RSF), led by former Sovereign Council Leader General Mohamed Hamadan Dagalo. Some small armed groups have also participated in the war. It is unclear who fired the first shot, but both sides blame each other. By the end of May 2023, the RSF controlled most of Khartoum, forcing the SAF to move eastward. The SAF government relocated to Port Sudan on the Red Sea coast. The fighting then spread to other states in Sudan, including all the central states and most of the Darfur and Kordofan regions (Gunawan et al., 2024; Gabriel, 2025; Ahmed et al., 2025). The war has caused social, economic, and human disruption. The prolonged conflict has severely affected the economy and the lives of civilians. Moreover, the health system has crumbled, educational institutions have been destroyed, and food shortages have spread across the country (Gabriel, 2025). The conflict has led many civilians to be internally displaced to other states in the country, while millions have become refugees (Ahmed et al., 2025). According to Gibreel (2024), the war has destroyed civilians' lives, particularly through the breakdown of the healthcare system,

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education, and security. The breakdown of educational institutions has put the Sudanese at risk, as over 19 million children are affected by the closure of schools, which are either destroyed or used as camps for displaced people. This situation has forced teachers and students at all levels to adjust to e-learning.

Although some Sudanese universities offer distance learning, notably the Open University of Sudan, established in 2002, and the Sudan University of Science and Technology, which offers postgraduate distance programmes (Salah & Yousef, 2010), the COVID-19 pandemic accelerated the adoption of e-learning in Sudan while also exposing significant structural and logistical challenges, including inadequate network infrastructure, limited internet capacity, and power shortages in many remote areas. These challenges have been exacerbated by ongoing conflict, which has intensified power failures and disrupted network services due to an unstable electricity supply and insufficient generator maintenance. Such conditions substantially hinder the effectiveness, accessibility, and inclusivity of online education (Gismalla et al., 2021; Ibrahim et al., 2021; Hassan & Nasr, 2025). E-learning is being used for the second time in Sudanese universities amid the ongoing civil war, which is affecting institutions across multiple conflict-affected states. This study examines the situation in Khartoum, where universities and other public institutions have been destroyed during the conflict.

Research on e-learning in Sudan remains constrained by several significant limitations. While e-learning holds considerable promise for enhancing educational access and quality, its implementation poses notable challenges. Accordingly, there is a pressing need for comprehensive, methodologically robust investigations to inform the development of an implementation model aligned with Sudan's specific socio-educational context. Therefore, it is essential to understand learners' perceptions of and satisfaction with e-learning. Such research is also necessary to guide the development of context-relevant policy frameworks. This is particularly important because e-learning offers a pedagogical approach that diverges substantially from conventional teaching and learning practices.

This study adopts the Unified Theory of Acceptance and Use of Technology (UTAUT) as its guiding theoretical framework. The model was developed by Viswanath Venkatesh and colleagues (Venkatesh et al., 2003). It identifies four core determinants of behavioural intention and actual use: performance expectancy, effort expectancy, social influence, and facilitating conditions. Performance expectancy is the extent to which an individual believes that using a system will improve job or learning performance. Effort expectancy is the perceived ease of use of the system. Social influence is the extent to which individuals perceive that important others, such as peers, instructors, or institutional authorities, believe they should use the technology. Facilitating conditions are the extent to which individuals believe that organisational and technical infrastructure exists to support the use of the system.

UTAUT is particularly appropriate for this study because it integrates individual perceptions and contextual factors that influence technology adoption, making it well-suited to examining e-learning in complex, resource-constrained environments. In Sudan, where e-learning is implemented amid infrastructural instability and ongoing conflict, these constructs offer a valuable lens for understanding how learners perceive, experience, and evaluate online education. Specifically, factors such as flexibility, technical challenges, internet access, and interaction can be examined through these theoretical dimensions. Accordingly, this framework informs the formulation of the research questions and guides the analysis and interpretation of the study's findings.

This study investigates learners' perceptions and experiences of e-learning and addresses the following questions:

1- What are learners' perceptions of the usefulness of e-learning in the context of the ongoing civil war in Sudan?
2- Which aspects of e-learning do students perceive as barriers to learning?
3- What aspects of e-learning do students feel satisfied with?
4- To what extent are learners satisfied with e-learning, and does this satisfaction relate to their acceptance and continued use?

1.1. Electronic learning

The concept of electronic learning (e-learning) emerged in the late 1990s as digital technologies were increasingly integrated into education (Garrison, 2011). The term describes technology-assisted instruction, often framed as web- or internet-based learning (Wang, 2003; Rakic et al., 2020; Wang et al., 2010). E-learning also encompasses the delivery of course content through electronic platforms, including the Internet, Intranets, Extranets, satellite broadcasts, audio/video tapes, interactive TV, CD-ROMs, and phone (Duderstadt et al., 2002). Research has emphasised its potential to extend educational opportunities beyond conventional classroom settings and to improve access to knowledge through online platforms. Zhang et al. (2004) argued that e-learning represents not only a technological innovation but also a structural shift in the delivery of education, enabling instruction through networked technologies that transcend geographical and institutional boundaries.

A central theme in the literature is the accessibility e-learning affords. It was noted that digital platforms remove conventional barriers of time and place, providing learners with unrestricted opportunities for asynchronous, ubiquitous learning (Sun et al., 2008; Miguel et al., 2023). In addition to accessibility, scholars emphasise the pedagogical benefits of e-learning environments, which offer a range of online resources and interactive tools that support a learner-centred approach. These environments enable the customisation of instructional content, promote active engagement, and support learning autonomy (Rodrigues et al., 2019).

Four common types of e-learning systems have been developed, namely the Learning Content Management System (LCMS), Learning Support System (LSS), Learning Design System (LDS), and Learning Management System (LMS) (Adzharuddin & Ling, 2013). Although these systems share similar names, their functions differ. In e-learning, LMSs are widely adopted by educational institutions. They are generally regarded as platforms for managing users' experiences with e-learning content. The LMS typically performs three main functions: presenting and organising training content, creating assignments to assess and reinforce knowledge, and evaluating progress (Maytha & Rietsema, 2016). E-learning is classified into a) e-learning with physical presence and without e-communication (face-to-face); b) e-learning without presence and without e-communication (self-learning); c) asynchronous e-learning without presence and with e-communication, allowing learners to participate on their own schedule; d) synchronous e-learning with virtual presence and with e-communication; e) blended/hybrid asynchronous, which is e-learning with occasional presence and communication; and f) blended/hybrid synchronous, which is e-learning with presence and with e-communication (Negash et al., 2008).

These studies offer essential insights into how e-learning has evolved from a technological innovation into a significant educational paradigm, transforming both the delivery and the experience of learning in the digital age. The development of e-learning reflects the broader digitisation of society, while its accessibility and pedagogical innovations underscore the role of autonomous learning.

1.2. Students' perceptions and acceptance of electronic learning

Researchers have examined students' perceptions of e-learning and identified several challenges associated with the shift to e-learning. Key issues include reduced motivation, poor time management, limited access to learning resources, limited interaction with teachers and peers, and difficulty understanding complex topics. In particular, technology-related problems were the most prominent obstacle, with students often reporting internet connectivity issues, a lack of suitable devices, and recurring software problems that impeded their learning (Bączek et al., 2021; Basar et al., 2021; Martin, 2020; Khan et al., 2021; Catherine et al., 2024; Hassan & Nasr, 2025).

In contrast to these problems, the literature also emphasises the significant advantages of e-learning, notably its flexibility, convenience, and broad accessibility. Research consistently shows that students generally hold positive attitudes towards online education, emphasising the autonomy it provides. This autonomy enables learners to control their study pace, manage their studies more efficiently, and engage in self-directed learning (Hassan & Nasr, 2025; Bączek et al., 2021; Basar et al., 2021; Martin, 2020; Khan et al., 2021; Aguilera, 2020; Chowdhury et al., 2024).

Research into learners' acceptance of e-learning has produced mixed findings. Overall satisfaction with online learning is generally moderately positive. The most frequently cited benefits are flexibility, which allows learners to study at their own pace, and convenient timing (Janet et al., 2025; Al Rawashdeh et al., 2012).

However, several studies indicate that many learners still prefer classroom-based learning to e-learning (Ibrahim et al., 2021; Aguilera, 2020). Gismalla (2021) argues that the absence of face-to-face interaction is the main obstacle for medical students and a key factor limiting acceptance of e-learning. Similarly, Khan et al. (2021) report that online learning is perceived as less effective for practical or laboratory-based courses than for theory-oriented subjects.

In the same vein, Hassan and Nasir (2025) highlight concerns among medical students, noting that online learning reduces motivation, hampers self-regulated learning, and fails to develop essential disciplinary knowledge, clinical skills, and social competencies. Taken together, these findings suggest that although e-learning offers appealing flexibility, many students still prefer traditional face-to-face learning.

According to Catherine et al. (2024), e-learning has the potential to enhance academic achievement; however, its effectiveness and acceptance depend largely on successfully mitigating obstacles to student engagement. Prospective e-learners must recognise the distinctions between e-learning and traditional classroom settings, as both models have advantages and limitations that could influence academic performance (Al Rawashdeh et al., 2021).

2. Materials and Methods

2.1. methods

This study examines learners' perceptions and barriers to e-learning during the transition to e-learning, which began in April 2023 following the outbreak of the civil war. It also seeks to understand learners' satisfaction with their e-learning experience.

The data were collected via an online questionnaire designed to examine participants' perspectives, challenges, and acceptance of e-learning during the civil war in Sudan. The questionnaire was developed in line with the study's objectives, drawing on elements of an instrument previously used by Hassan and Nasr (2025). It was reviewed by experts and pilot-tested with a small group of students. The questionnaire link was sent to participants via WhatsApp groups at the end of the second semester in April 2024. The questionnaire comprises four sections. The first section collects demographic information about the participants. The second section investigates learners' views on the advantages and disadvantages of e-learning. The third section examines the challenges participants faced during their learning experience. The fourth section explores participants' opinions of e-learning. For each item, participants were asked to respond on a five-point scale ranging from strongly disagree to strongly agree.

2.2. Participants

The participants in this study were third-year undergraduate students enrolled in the Department of English Language at the Faculty of Arts, University of Khartoum, Sudan. The study was conducted in May 2025, following the second semester of e-learning. Course materials were delivered to learners via the Learning Management System (LMS). Learner interactions, including tasks and quizzes, took place within the same system, while students sat the examination at various centres in safe regions of Sudan and abroad. Participants were informed that their participation in the study was voluntary. A total of 80 students participated in the study. All participants were between 19 and 21 years old.

3. Results

A descriptive analysis was used to analyse the data. The findings highlight four key aspects.

1- Participants' demographic information, previous internet experience, and IT skills.
2- Participants' general views of e-learning.
3- Barriers to e-learning during participants' experience.
4- Participants' satisfaction with e-learning compared with face-to-face classrooms.

3.1. Demographic Characteristics and IT Skills

As shown in Table 1, the majority of participants were female (n=56, 70%), with males accounting for 30% (n=24). Participants were third-year students aged 19–21. Most reported prior e-learning experience during the COVID-19 pandemic. The data (Table 2) showed that 66.3% of participants had prior e-learning experience, while 33.8% had none. Regarding IT skills, most learners reported moderate proficiency (n = 49, 61.3%), followed by low (n = 18, 22.5%) and high (n = 13, 16.3%) proficiency (Table 2).

Table 1: Demographic characteristics of the Subjects

Characteristic	Frequency	Percentage (%)
Female	56	70
Male	24	30
Age Group	19–21	—
Level of Study	3rd Year	—

Table 2: Previous internet-based learning experience and IT skills

Item	Frequency	Percentage (%)
Prior e-learning experience: Yes	53	66.3
Prior e-learning experience: No	27	33.8
High IT skills	13	16.3
Moderate IT skills	49	61.3
Low IT skills	18	22.5

3.2. Perceptions of E-Learning Advantages

Participants' views on the strengths of e-learning are summarised in Table 3. The most positive feedback was for the statement about the ability to study at one's own pace. A large proportion of participants agreed that e-learning could help learners study at their own pace, with an average score of 3.71 (SD 1.034) and a relative weight of 74.20%. This result is labelled 'Agree,' emphasising that students view pacing flexibility as a significant benefit of e-learning. Respondents also agreed that online materials are easy to access. The mean score of 3.36 (SD 1.150) and a relative weight of 67.20% indicate positive perceptions. Despite this, the overall results are classified as "Undecided," suggesting that although access to materials is generally positive, a significant portion of learners still face challenges. However, participants' responses regarding comfort with electronic communication were mixed. The mean score of 2.95 (SD .066) and a relative weight of 59.00% indicate a neutral stance. Likewise, the suitability of their home learning environments was rated as neutral. The mean score of 2.92 (SD 1.271) and a relative weight of 58.40% indicate a neutral perception. The result is inconclusive, suggesting that while some learners benefit from comfortable environments, others believe that home conditions may be unsuitable. Notably, the majority of respondents disagreed that e-learning is more motivating than face-to-face learning. The mean score

was 2.06 (SD 1.173), with a relative weight of 41.20%, placing this item last and suggesting that learners do not perceive e-learning as more motivating.

The overall mean score of 3.00 (SD 14) and a relative weight of 60% indicate a generally undecided attitude towards the benefits of e-learning. While flexibility in pacing and easy access to online materials are clearly valued, other factors, such as comfort with communication and the environment, are perceived as neutral.

Table 3: Learners' perceptions of the Advantages of e-learning

Statements	M	SD	Relative Weight (%)	Result	Rank
It is easy to access online materials	3.36	1.15	67.20	Undecided	2
I am comfortable communicating electronically.	2.95	1.07	59.00	Undecided	3
E-learning helps learners study at their own pace.	3.71	1.03	74.20	Agree	1
Learners have comfortable surroundings during e-learning.	2.92	1.27	58.40	Undecided	4
Learning on the Internet is more motivating than regular courses.	2.06	1.17	41.20	Disagree	5
Overall	3.00	1.14	60.00	Undecided	—

M = Mean; SD = Standard Deviation.

3.3. Barriers and Disadvantages of E-Learning

The study identified several barriers (Table 4) that negatively affect learners' engagement and performance in e-learning across technical, environmental, pedagogical, personal, and learning-outcome dimensions. Among these, technical barriers were the most prominent. Participants strongly agreed that e-learning could have technical problems, with a mean score of 4.40 (SD = 0.704) and a relative weight of 88.0%. Limited internet access at home affected 46.3% of learners. Among those with restricted access, the most common reason was a combination of signal availability and cost, accounting for 36.3% of responses. Signal strength or availability alone was the second most common issue (31.3%), followed by price (20.0%). A smaller group (12.5%) attributed their limited access to a lack of knowledge about how to use the internet.

Most participants encountered environmental challenges while studying remotely. Learners reported that unsuitable learning conditions at home are a significant challenge, with a mean score of 4.17 (SD = 0.854) and a relative weight of 83.4%.

Regarding pedagogical barriers, participants reported several factors that negatively affected their e-learning experiences. E-learning was perceived to reduce teacher-peer interaction. The average score was 3.91 (SD = 1.058), with a relative weight of 78.2%, indicating that most respondents agreed that e-learning could result in a lack of interest. Incomplete learning materials or resources were also identified as a limitation, with an average score of 3.52 (SD = 1.253) and a relative weight of 70.4%. Opportunities for collaborative learning were likewise identified as a drawback of e-learning. Learners reported limited group work, with collaboration during e-learning rated at an average of 2.60 (SD = 1.109) and a relative weight of 52.0%. These results highlight that students often struggle to collaborate effectively in group activities during online sessions.

Personal barriers also shaped learners' experiences of e-learning. Participants agreed that e-learning could contribute to a lack of self-discipline (Mean = 3.82, SD = 1.065, RW = 76.4%). Participants also noted that the online platform was perceived to reduce motivation, with a mean score of 3.61 (SD 1.248) and a relative weight of 72.20%, indicating that most respondents agreed that e-learning could lead to a lack of interest and decreased motivation. Notably, students reported being inactive during e-learning. This item had a mean score of 3.30 (SD 1.316) and a relative weight of 66%.

Regarding learning outcomes, respondents were uncertain about the impact of e-learning on their disciplinary knowledge, as reflected in a moderate mean score of 3.20 (SD = 0.974) and a relative weight of 64.0%, indicating a neutral perception of its effectiveness in enhancing subject-specific understanding.

Similarly, participants remained undecided about the influence of e-learning on their social competence. With an average score of 2.78 (SD = 1.091) and a relative weight of 55.6%, the results suggest that e-learning environments may offer limited opportunities to develop interpersonal and social skills.

Overall, the results indicate that participants held a neutral attitude towards the benefits of e-learning while strongly agreeing on its drawbacks, emphasising significant technical challenges, particularly internet access and reliability, which were the most notable obstacles. Learners also reported inadequate study environments, reduced interaction, limited collaboration, and decreased motivation and self-discipline. Additionally, participants expressed uncertainty about the effectiveness of e-learning in improving disciplinary knowledge and social competence.

Table 4: Learners' perceptions of disadvantages and barriers of e-learning

Category	Statements	M	SD	Relative Weight (%)	Frequency (F)	Percentage (%)	Results
Technical	E-learning could have technical problems.	4.40	0.704	88.00%	—	—	Strongly Agree
	Limited internet access at home (Limited + No)	—	—	—	37	46.3%	Significant Barrier
	Signal availability/strength problems	—	—	—	25	31.3%	Major Barrier
	Combined signal availability and cost issues	—	—	—	29	36.3%	Major Barrier
	Cost/too expensive	—	—	—	16	20.0%	Moderate Barrier
	Low IT skills	—	—	—	10	12.5%	Minor Barrier
Environmental	Inappropriate learning conditions at home.	4.17	0.854	83.40%	—	—	Agree
Pedagogical	E-learning reduces teacher and peer interaction.	3.91	1.058	78.20%	—	—	Agree
	Problems with incomplete learning resources/materials.	3.52	1.253	70.40%	—	—	Agree
	I worked in groups during e-learning	2.60	1.109	52.00%	—	—	Disagree
Personal	I believe e-learning could lead to a lack of self-discipline.	3.82	1.065	76.40%	—	—	Agree
	E-learning decreased my motivation.	3.61	1.248	72.20%	—	—	Agree
	During e-learning, I was completely inactive	3.30	1.316	66.00%	—	—	Undecided
Learning Outcome	E-learning increased my discipline knowledge.	3.20	0.974	64.00%	—	—	Undecided
	E-learning increased my social competence.	2.78	1.091	55.60%	—	—	Undecided

M= Mean ; SD= Standard Deviation

3.4. Learners' Acceptance of E-Learning vs Traditional Learning

The findings in Table 5 indicate that learners had a clear preference for traditional face-to-face learning over e-learning. The statement "Traditional face-to-face learning is more effective than online learning" received the highest mean score of 4.30 (SD 1.08) and a relative weight of 86.00%, reflecting strong agreement and suggesting that learners perceive in-person instruction as more engaging and effective. In contrast, the e-learning experience was generally less favourable, with learners disagreeing that it was satisfying and enjoyable, yielding an average score of 2.23 (SD = 1.10) and a relative weight of 44.60%. The statement regarding the ability to complete online courses without difficulty yielded a more neutral response. The mean score was 2.77 (SD = 1.1) with a relative weight of 55.40%, indicating moderate acceptance of online learning but highlighting potential challenges in its implementation.

Overall, the average score of 4.08 (SD 0.92) and a relative weight of 82% indicate that participants strongly valued the effectiveness and engagement of traditional classrooms.

Table 5: Learners' acceptance of e-learning and traditional classroom learning

Statements	M	SD	Relative Weight (%)	Result	Rank
I found the e-learning experience satisfying and enjoyable	2.23	1.10	44.60	Disagree	3
I completed an online course without difficulty.	2.77	1.10	55.40	Undecided	2
Traditional face-to-face learning is more effective than online learning	4.30	1.08	86.00	Strongly Agree	1
Overall	4.08	0.92	82.00	Agree	—

M=Mean; SD=Standard Deviation

3.5. Summary

Overall, the data analysis shows that participants hold neutral views on the benefits of e-learning, although they acknowledge its flexibility in pacing and access to online learning materials. However, respondents agreed on the drawbacks of e-learning. They highlighted several challenges that negatively affected learners' experience, including technical issues such as unstable internet connections and inadequate home learning environments, as well as decreased motivation, incomplete learning materials, and limited opportunities for interaction. Participants also expressed uncertainty about the effectiveness of e-learning in enhancing disciplinary knowledge and social competence.

Although most participants had prior e-learning experience, the data reveal a strong preference for traditional face-to-face learning. Traditional classroom learning was rated as more effective, engaging, and satisfying, whereas e-learning was perceived as less enjoyable and less motivating. Respondents remained sceptical about its ability to replace traditional classroom learning.

4. Discussion

During the civil war in Sudan, universities moved many courses online and adopted e-learning as an alternative mode of instruction. This study investigated the advantages and disadvantages of e-learning from students' perspectives, explored their experiences and challenges, assessed their satisfaction with e-learning, and interpreted the findings using the Unified Theory of Acceptance and Use of Technology (UTAUT).

Overall, participants' views on the advantages of e-learning were neutral, reflecting its role as a necessary rather than preferred alternative during periods of disruption, such as war. The findings indicated that flexibility, self-paced learning, and easy access to materials were appreciated. These results can be interpreted through the lens of performance expectancy, as learners recognised that e-

learning offers academic benefits, including continuity of learning and flexibility. Other aspects, such as comfortable e-learning communication and suitable learning environments, varied more, which may reflect differences in learners' effort expectancy, particularly regarding the ease or difficulty of engaging with online learning platforms and environments. These findings are supported by previous studies (Bączek et al., 2021; Basar et al., 2021; Martin, 2020; Khan et al., 2021; Aguilera, 2020; Chowdhury et al., 2024; Hassan & Nasr, 2025).

The research also found that participants valued the freedom and flexibility of e-learning, as well as the availability of online materials. These findings further indicate that the value of e-learning in conflict settings lies less in its pedagogical strengths and more in its capacity to deliver accessible, flexible education during periods of disruption. This, in turn, reflects performance expectancy within UTAUT.

An investigation into learners' perceptions of e-learning's disadvantages identified several significant drawbacks. Respondents identified technical issues as the primary concern. These findings strongly reflect facilitating conditions, as unstable internet connections and recurring technical problems directly affect actual system use. In the Sudanese context, weak infrastructure and unreliable electricity further limit effective engagement with e-learning, making facilitating conditions the most critical factor in adoption.

These findings align with previous research, which has likewise highlighted technology-related barriers as major drawbacks of e-learning. Students frequently report unreliable internet connections, limited access to devices, and software malfunctions that impede learning (Arkorful & Abaidoo, 2015; Eltahir, 2019; Bączek et al., 2021; Basar et al., 2021; Martin, 2020; Khan et al., 2021; Catherine et al., 2024; Hassan & Nasr, 2025). Other drawbacks identified in the literature include reduced motivation, poor time management, restricted access to learning resources, and limited communication between students and teachers.

Notable weaknesses of e-learning included unsuitable learning conditions, a lack of self-discipline, and limited interaction with peers and instructors. Likewise, many researchers have highlighted similar challenges (Arkorful & Abaidoo, 2015; Eltahir, 2019; Bączek et al., 2021; Basar et al., 2021; Martin, 2020; Khan et al., 2021; Catherine et al., 2024; Hassan & Nasr, 2025). In particular, reduced interaction with teachers and peers can be understood through the lens of social influence, as limited communication and academic engagement weaken motivation and learners' sense of support within the learning environment.

The data indicate that learners' perceptions of their e-learning experience were neutral, leaning towards the negative. Several difficulties that influenced their e-learning experience were identified. The most common issues included limited internet access, reduced motivation, and challenges with interaction, self-discipline, knowledge acquisition, and social competence. These factors were identified as barriers that reduced the efficiency of their e-learning experience. In UTAUT terms, these findings highlight the combined influence of facilitating conditions (internet access and infrastructure), effort expectancy (difficulty in managing learning independently), and social influence (lack of interaction and support). These findings align with the current literature, which highlights challenges including limited interaction with teachers and peers, technical issues, and poor internet connectivity. These were the most frequently reported obstacles, followed by inadequate time management, restricted access to learning materials, and difficulty understanding complex topics (Hassan & Nasr, 2025; Catherine et al., 2024; Basar et al., 2021; Bączek et al., 2021; Martin, 2020; Khan et al., 2021).

While the findings align with the current literature, their implications are significantly amplified by the ongoing conflict in Sudan. The study found that participants favour face-to-face learning and consider it more effective than e-learning. However, they did not enjoy their e-learning experience and remain highly sceptical about its ability to replace traditional education. This preference may be explained by low effort expectancy, as students perceive e-learning systems as more demanding in terms of self-regulation, technical handling, and independent learning than traditional classrooms.

Traditional classroom learning was rated as more effective, engaging, and satisfying, whereas e-learning was perceived as less enjoyable and less motivating. This aligns with previous studies (Ibrahim et al., 2021; Aguilera, 2020), which likewise reported a preference for face-to-face learning.

However, in the Sudanese context, the impact of war intensifies this preference, as displacement, insecurity, and loss heighten the need for structured, socially supportive learning environments. This further weakens social influence and reinforces the importance of physical interaction in learning.

Gismalla (2021) and Hassan & Nasr (2025) further noted that the lack of face-to-face interaction is a key reason students do not appreciate e-learning, a finding consistent with the current study. However, these results contrast with other studies (Al Rawashdeh et al., 2021; Janet et al., 2025; Pandey et al., 2021; Sharma, 2023; Eltahir, 2019), which reported positive perceptions of e-learning and student satisfaction. This discrepancy may be explained by severe infrastructural limitations and conflict-related disruptions in Sudan, which significantly weaken facilitating conditions and reduce overall acceptance of e-learning, despite its perceived usefulness.

5. Conclusion

E-learning has recently been recognised as an effective means of delivering knowledge and has the potential to surpass traditional teaching approaches. The present study examines participants' perceptions of e-learning, the challenges they encountered during their e-learning experiences, and their level of acceptance. The results indicated that participants held a generally neutral view of e-learning's benefits. However, they appreciated its flexibility and the ability to access learning materials at any time and place. These aspects reflect elements of performance expectancy, as learners recognise the usefulness of e-learning in supporting continuity of education.

However, participants also identified several drawbacks that detracted from their experiences. Overall, their perceptions ranged from neutral to slightly negative, with key challenges including poor internet connectivity, limited access to learning resources, and reduced interaction with instructors and peers. These issues can be understood in terms of facilitating conditions and social influence, which appear to constrain effective engagement with e-learning in this context.

The study further found that participants preferred face-to-face learning to e-learning, viewing it as more effective, engaging, and satisfying. Despite prior experience with e-learning, learners did not report positive experiences and remained sceptical about its ability to fully replace traditional classroom-based education. This suggests that although the perceived usefulness of e-learning exists, it is outweighed by limitations in effort expectancy, facilitating conditions, and social interaction, which collectively reduce overall acceptance.

Although this marks the second implementation of e-learning in Sudan, the findings highlight the urgent need for context-specific improvements, particularly in conflict-affected settings. To enhance the effectiveness and accessibility of e-learning, interventions should prioritise low-bandwidth, mobile-friendly platforms and provide downloadable, offline learning materials for students with unreliable internet access. Additionally, incorporating structured peer-support networks may strengthen social influence, enhance engagement, and reduce feelings of isolation, while flexible, asynchronous teaching approaches can accommodate disruptions to connectivity and electricity.

To address financial and infrastructural barriers, partnerships with telecommunications providers are needed to enable subsidised or zero-rated access to educational platforms. Furthermore, developing centralised repositories of learning materials can improve accessibility and ensure continuity of learning in unstable conditions.

Finally, further large-scale, methodologically robust research is needed to better understand the effectiveness and limitations of e-learning in conflict-affected contexts and to inform the development of more resilient, inclusive, and context-sensitive implementation strategies.

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7. References

[1] Adzharuddin,N.A and Ling, L.H. (2013). Learning Management System (LMS) among University Students: Does It Work? International Journal of e-Education, e-Business, e-Management and e-Learning 3(3) 248-252

[2] Aguilera-Hermida. AP. (2020). College students' use and acceptance of emergency online learning due to COVID-19. International Journal of Educational Research Open. 1 100011

[3] Ahmed. O.S, M., Eltahirb. E A., Abdelkareem, N.Y al-rawashdeh.A., and Ahmed, A.S (2025). Is calling the SAF-RSF conflict a 'dirty war' an objective description or a moral judgment? A critical analysis of the ongoing war in Sudan (2023–present) Journal Cogent Social Sciences 11(1) 1-14

[4] Al Rawashdeh A.Z., Enaam Y. M., Asma R.A., Mahmoud A., and Butheyna Al.R.(2021). The Electronic Journal of e-Learning 19 (3) 107-117

[5] Arkorful, V., and Abaidoo, N. (2015). The role of e-learning, its advantages, and the disadvantages of its adoption in higher education. International Journal of Instructional Technology and Distance Learning 12(1) 29-42

[6] Bączek, M., Zagańczyk-Bączek, M., Szpringer, M., Jaroszyński, A., and Wożakowska-Kapłon, B. (2021). Students' perception of online learning during the COVID-19 pandemic: A survey study of Polish medical students. Medicine, 100(7) 1-6

[7] Basar ZM, Mansor AN, Jamaludin KA, Alias B.S. (2021). The effectiveness and challenges of online learning for secondary school students—a case study, Asian Journal of University Education. 17(3) 119–29

[8] Catherine N.A· Stephen A· Sunday A · Hilary O· Sidney S. (2024). Impact of online learning on students' performance and engagement: a systematic review. Discover Education 3 (305) 1-15

[9] Chowdhury, S. Md. Sarker. F.H., Niaz A.K., Md K., Maruf A. T., Md. Hasan I. B. (2024). Students' Satisfaction in Online Class during COVID-19: An Empirical Study in the Bangladesh Context. Education Research International 2024, Article ID 1333227 1-11

[10] Duderstadt. J. Atkins, D. Houweling, V.D. (2002). Higher Education in the Digital Age: Technology Issues and Strategies for American Colleges and Universities. USA Rowman & Littlefield

[11] Eltahir, M.E. (2019) E-Learning in Developing Countries: Is it a Panacea? A Case Study of Sudan. IEEE Access 7, 97784-97792

[12] Gabriel. (2025) The Conflict in Sudan: An overview Journal of Social Encounters 9 (2) 259-267

[13] Garrison DR (2011). E-Learning in the 21st Century: A Framework for Research and Practice. New York: Routledge.

[14] Gibreel, W. (2024). Humanitarian crises in Sudan: the impact of the civil war on health and education. Sudanese Medical Journal, 28(3), 55–70

[15] Gismalla MDA, Mohamed MS, Ibrahim O.S.O, Elhassan M.M.A, Mohamed M.N.E. (2021). Medical students' perception towards E-learning during the COVID-19 pandemic In a high-burden developing country. BMC Medical Education 21(1) 1-7

[16] Gunawan, Y., Putra. M.R.P., Al Khairi, M.F., Arumbinang. M.H. (2024). International Law in the Sudanese War 2023: An Overview of the Conflict and Law Enforcement. Jurnal Suara Hukum 6(1) 38-53

[17] Hassan,G.M& Nasr,A.(2025). An investigation of Students' Perceptions and Challenges of Online Education During the Covid-19 Pandemic: A Case Study of Undergraduate Students at Medical Faculty, University of Khartoum. Journal of Northern Europe Academic for Studies and Research 27 (4) 42-51

[18] Ibrahim AH. (2021). E-services in Sudan during the COVID-19 pandemic as a model: A case study of the University of Bahri-Sudan. Journal of Governance and Public Policy 8(2) 165-183

[19] Janet W.H. Sit, Joanne W.Y. Chung, Meyrick C.M. Chow, Thomas K.S. Wong. (2025). Experiences of online learning: students' perspective Nurse Education Today 25, 140–147

[20] Khan, D. M. Y., Raza, S. A., & Sibtain, D. M. (2021). Online learning and motivational strategies in the backdrop of COVID-19: An EFL perspective on teachers' and students' perceptions at the tertiary level in Pakistan Sjesr 4(1) 135–147

[21] Martin, F., Wang, C., & Sadaf, A. (2018). Student perception of helpfulness of facilitation strategies that enhance instructor presence, connectedness, engagement, and learning in online courses. The Internet and Higher Education 37, 52–65.

[22] Maytha,A.M& Rietsema,A.K.(2016). Learning Management Systems: A Shift Toward Learning and Academic Analytics. International Journal of Engineering and Technology 11(4) 77-82.
[23] Negash, S.Whitman, M. Woszczynski. A, Mattord, H.(2008). Handbook of Distance Learning for Real-Time and Asynchronous Information Technology Education. IGI Global: United States
[24] Pandey. D, Ogunmola, G.A., Enbeyle, E., Abdullahi, M., Pandey, B.K., Pramanik, S. (2021). COVID-19: A Framework for Effective Delivery of Online Classes During Lockdown. Human Arenas 5, 322–336
[25] Pérez MA, Tiemann P, Urrejola-Contreras GP. (2023). The impact of sudden shifts in the learning environment on students' performance during the COVID-19 pandemic. Education Média 24(3) 1-9
[26] Rakic, S., Tasic, N., Marjanovic, U., Softic, S., Lüftenegger, E., Turcin, I. (2020). Student Performance on an E-learning Platform: A Mixed-Method Approach. International Journal of Emerging Technologies in Learning. 15(2) 187-203,
[27] Rodrigues, H., Almeida, F., Figueiredo, V., & Lopes, S. L. (2019). Tracking E-Learning through Published Papers: A Systematic Review. Computers & Education, 136(C) 87-98.
[28] Romero, C., Ventura, S. (2010). Educational data mining: a review of the state of the art. IEEE Transactions. System, Man, Cybern., Part C. (Application. Review) 40 (6), 601–618.
[29] Salah, A., Elsammani, & Yousif, A. (2010). The current status of e-learning in Sudan. Retrieved from The current status of e-learning in Sudan.
[30] Sharma, B.(2023). Perception of Students towards Online Learning: A Review of Literature Journal of Research in Humanities and Social Science 11(4) 189-191
[31] Sun, P.C., Tsai, R.J., Finger, G., Chen, Y.Y., Yeh, D. (2008). What drives successful eLearning? An empirical investigation of the critical factors influencing learner satisfaction. Computers and Education. 50(4), 1183–1202.
[32] Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27(3), 425–478.
[33] Wang, M., Ran, W., Liao, J., et al. (2010). A performance-oriented approach to e-learning in the workplace. Journal of Educational Technology & Society 13(4) 167–179
[34] Wang, Y.S. (2003). Assessment of learner satisfaction with asynchronous electronic Learning Systems Information and Management 41 (1) 75–86
[35] Zhang. D., Zhao. J.L., Zhou, L., Nunamaker Jr, J.F. (2004). Can e-learning replace classroom learning? Communication of the ACM 47 (5) 75–79