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Stakeholders' Perceptions on Adoption of Blended Learning Approach in Tanzanian Secondary Schools

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Abstract

Integrating information communication technologies in education goes with many digital learning applications. Blended learning Approach (BLA) has been an important strategy that facilitates students' learning. This study investigated stakeholders' perceptions on the adoption of a blended learning approach (BLA) in Tanzanian secondary schools. Specifically, the study identifies stakeholders' perception on the adoption of BLA in secondary schools, examines the learning environments that support the adoption of BLA in Tanzanian secondary schools and assesses the extent to which the BLA is used in secondary schools. Data were collected via self-administered questionnaire and interviews; the response of 620 participants were analysed. The results showed that participants adequately had confident perception towards the adoption of BLA on students' learning; further, in the studied schools, learning environments were perceived to be supportive in the adoptions of BLA based on available devices and services; this will, later, positively facilitate the adoption and influence the increase of level of BLA usage among teachers and students. However, poor infrastructure, lack of institutional support and insufficient hardware and software facilities impinged the use of BLA. In conclusion, BLA is well perceived; thus, the resolution to the challenges would promote its application in the classroom.

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Introduction

Learning technologies are the whole shebang in modernised education systems, which are claimed to provide students with the most labour needed in 21st-century job skills. Schools and companies struggle to adopt user-friendly, supportive, communicative, individual-owned, accessible and flexible learning approaches (Topping et al., 2021; Rao, 2018; Siew-Eng & Muuk, 2015). As such, in both the teaching and working worlds, the blended learning approach (BLA) is a promising strategy, and it seems that society is expecting it as it looks at digital learning and working capacities. Typically, BLA encompasses collaborative platforms, webinars, interactive audio-visual, and online learning coupled with face-to-face interaction to support student learning (Tan et al., 2021; Ustun, 2019). According to van Laer and Elen (2018), blended learning is distinguished by the intention to use online and classroom-based interventions to initiate and support teaching and learning; foster socio-constructivism, reflective thinking, and inquiry practices (Villanueva et al., 2023). However, it is also the case that one definition is yet to be achieved (Graham, 2013); application of blended learning in developing countries like Tanzania is influenced by increased comprehensive adoption of innovative learning technologies, internet use, computer and digital skills (Malima et al., 2023). Therefore, blended learning is widely accepted and adopted approach delivery of education (ElSayad, 2023; Tang et al., 2024).

As it stands, blended learning refers to the use of computer-assisted learning combined with contact moments whereby interaction between students, teachers, internet-based devices, and learning management systems influence active teaching and learning (Machumu et al., 2022). As claimed by Siew-Eng and Muuk's (2015) study, blended learning exposes students and teachers to the outer and higher horizons, which are far beyond the traditional hook of the book-teacher model where learning should be necessarily limited to the classroom. This entails that BLA is much more flexible in representing content by using different methodological approaches, strategies and styles which can enhance learning. Empirical evidence unveils that due to its effectiveness, and flexibility; schools in different countries have adopted and integrated BLA in their curricula as one of influential and innovative pedagogies in teaching and learning process (Bhatt et al., 2021; Lapitan et al., 2021; Tan et al., 2022; ElSayad, 2023; Egara & Mosimege, 2024). As such, countries like the USA, China, Chile and Malaysia have adopted the model and integrated it into the education curriculum for lower schools (UNICEF, 2020; Bhatt et al., 2021; Liu et al., 2024; Hayati et al., 2021; Yu et al., 2023).

In Malaysia, for instance, teachers are provided with many new technologies that are believed to be able to help them perform their jobs better (Yarborough, 2012; Villanueva et al., 2023. Over the past two decades, the government has invested millions of dollars in equipping all 10,000 schools with not only computer labs but also the Frog Virtual Learning Environment (Frog VLE) (Bushko, 2017). The Frog VLE is a web-based learning system that replicates real life learning by incorporating virtual equivalents of traditional concepts of

education (Kamalludeen et al., 2016; Majid & Hasim, 2019). Malaysia puts attention on e-learning in schools as a segment of the government's vision for 2020 (Yarborough, 2021; Siew-Eng & Muuk, 2015). The analysis of Malaysian teachers was able to integrate e-learning into their teaching practices (Tan et al., 2022). The Frog VLE also caters searchable lecture materials, forums, streamed video and assessment as learning and teaching resource (Majid &Hasim, 2019).

In Tanzania, SEDP (2004-2009) emphasised ICT-based information management in primary, secondary and teacher training colleges (URT, 2007). The development of the Information Communication Technology (ICT) policy for basic education facilitated the integration of curriculum and content in the modern pedagogy of teaching and learning. The general role of these policy frameworks acknowledged the use of ICT devices in education in order to improve the quality of education and helped to raise awareness of the benefits and the potential gains in adopting ICT in the education sector, which, in turn, raised ICT to priority area in education planning (Liu et al., 2024). Despite the impressive policy statement, its implementation is far behind the reach of the policy target. It was expected that the application of blended learning would have spread all over the country but that is not the case.

Empirical evidence shows that the level of teachers applying ICTs in secondary school was too minimal to facilitate the integration of traditional methods and ICTs in classroom teaching (Almerich et al., 2014). The ability of teachers to practice pedagogical ICTs such as BLA, online learning and e-learning is highly influenced by the knowledge, competences and skills possessed. As such, the deployment of ICTs and BLA knowledge in secondary schools in Tanzania was not fully realised (Kihoza et al., 2016). There are no sufficient reasons that are brought forth to explain about observed findings. Significantly, the study observed that if the BLA is the current ideal delivery mode of teaching and learning that secondary schools should adopt, then, the need to uncover the unknown reasons for poor utilisation of BLA in secondary schools is highly demanded. Consequently, this study investigates stakeholders' perceptions on the adoption of BLA in Tanzanian secondary schools. Studies have shown that integration of BLA, in the education system, is an effective approach to dispensing knowledge and learning innovation to students and teachers (Eggers et al., 2021; Iringan, 2020).

However, cognisant of the importance of adopting ICT in the education system, the government of the United Republic of Tanzania deliberately integrated the content of the curriculum in primary and secondary schools with that of ICTs (Ministry of Education, Science and Technology (MoEST), 2023). The need was to ensure that students are taught about the application of ICT facilities and make ICT an instrumental component of the teaching and learning process in a blended form (MoEST, 2023; URT, 2007; Almerich et al., 2014). Furthermore, the policy decisions that the government undertook did not seem to actualize since many secondary school teachers are still attached to the use of traditional methods of teaching (Machumu & Zhu,

2019). Blended learning is still regarded as a new approach by most teachers and students in schools, meaning that the policy statement is in contradiction to the observed practices. It is high time for the studies to find out the reasons causing the observed mismatch between the policy and practices.

Literature Review

Blended Learning and Blended Learning Environments

History has it that BLA was first introduced in the field of corporate human resources training, aiming to overcome the limitations of time and space in face-to-face teaching, including small class size, poor timeliness, and high training cost (Liu et al, 2024). Garrison and Kanuka (2004) view blended learning as an integration of old face-to-face classroom experience and online learning experience. Blended learning takes several contexts of learning approaches that provide a learner and a teacher with the potential possibility to learn and teach effectively via innovative learning technologies. In this study, blended learning refers to a combination of conventional face-to-face methods and ICT to form an integrated instructional approach. This combination inspires students to engage themselves in active and collaborative learning. In BLA, online teaching and learning encourage the sharing of experiences among students; thus, improving learning and digital skills. Also, the application of BLA is designed to attain several learning goals: student-centred education; students' experience using innovative learning technologies, tools and devices; blended learning helps students to practice life skills (Dangwal & Lalima, 2017; Shivam & Singh, 2015). In fact, BLA in Tanzanian context refers to an approach to education that combines online educational resources and opportunities for online interaction with traditional face-to-face teaching and learning.

In connection to BLA, as described above, blended learning environments have been referred to as the pedagogical combination of both the effectiveness of face-to-face teaching environments and ICT-mediated teaching and learning environments (Iringan, 2021; Hayati et al., 2021; Graham & Allen, 2009). Graham (2013) suggested the following essential features of blended learning environments: increased student engagement in learning, students feeling safe with personalised learning, collaboration tools like social media communication, enhanced teacher and student interaction, social learning support, responsibility for learning and time management. In addition, other crucial features include improved students' learning outcomes, time flexibility, enhanced institutional reputation and 24/7 access to training resources, tracking employee performance and skill development, reduction in training costs and provision of personalized training experiences. In Tanzanian context, blended learning environment refers to learning situations integrating the advantages of the online learning delivery and face-to-face delivery modes. In other words, blended learning environments use both traditional approach and modern learning technologies to collect, store and organize learning resources in

digital forms of all kinds—data, text, images, motion video, sound, and integrated media—and made it available and sharable for teaching and learning (Machumu et al., 2022).

Conditions for the Adoption of BLA in the Context of Tanzanian Secondary Schools

The adoption of BL in secondary schools is a challenging activity since it demands some basic preparations in the aspect of the teaching and learning process, students, content design and the infrastructures (Yu et al., 2023; Villanueva et al., 2023; Eggers et al., 2021; Dangwal & Lalima, 2017). The following are necessary conditions in the adoption of BLA: Blended learning demands well-trained teachers who could emphasise the student-centred approach of teaching and learning perspective (Iringan, 2021). The teachers need to be familiar with the BLA and have the skills to blend both traditional face-to-face and online teaching and learning delivery. Moreover, teachers need to be trained to develop content in digital form so that it can be available to students. Teachers should know how to use learning technologies including websites, blogs, YouTube facilities, and software like Skype, Google Talk and social networking sites for educational purposes (Malima et al., 2023).

Teachers engaging in BLA should have a scientific attitude to adopt diverse learning technologies relevant to BL implementation in secondary schools (Apandi & Raman, 2020; Farrely & Shand, 2017). Thus, to adopt a BLA, there is a need for flexibility in other aspects of learning such as learning timetable, delivery methods, assessments, and examination system. These aspects are crucial for the adoption of BLA not only in secondary education but also in higher education (Warioba et al., 2022). Scholars revealed that possible conditions for adoption of BLA in schools include ICTs infrastructures, good classrooms, well-furnished computer laboratories with enough computers to satisfy all the students of one class and lastly the internet facility and its accessibility (Caporarello & Iñesta, 2016; Warioba et al., 2022). As discussed in Dangwal and Lalima's (2017) study, continuous internal assessment and other tools for formative evaluation should be able to provide the need required for the adoption of the BLA in terms of facilities and infrastructures. Parents and guardians based on their roles as essential education stakeholders; need to be aware of a BLA. They need to support their children so that they can be ready to adopt BLA for the benefit of their children's academic progress (Tan et al., 2021).

Uses of BLA in Teaching and Learning in Tanzanian Secondary Schools

Teachers in secondary schools use BL to maximise the benefits of traditional face-to-face learning and online learning (Tang et al., 2024; Tan et al., 2022; Wang et al., 2009). Studies show that secondary school teachers use BLA to create the best learning environment for their students and that they blend different methodologies, and approaches to develop the most efficient learning environment (Topping et al., 2022). Secondly, BLA has

been used to support a student-centred learning environment that motivates active and deep learning in students (Vernadikis et al., 2011; Rao, 2018). When student-centred learning is practised in a blended learning environment, instructions have to be provided through the online learning environment (Iringan, 2021). The role of the teacher in a BLA changed to a facilitator as opposed to a sage on stage (Apandi & Raman, 2020).

Thus, instructions to be provided through online, learning activities and other resources should be carefully selected and designed to support both face-to-face as well as online learning (Weerasinghe, 2018). Thirdly, BLA supports the accessibility of materials such as textbooks, and students' notes. Also, through BLA, learning materials are made available in electronic handheld devices such as mobile phones, laptops, tablets, and e-readers (Liu et al., 2024). Fourthly, BLA is used to support the traditional face-to-face teaching approach (Eggers et al., 2021; Fernando, 2020). As claimed by Garrison and Kanuka (2004), the real test of BLA is the effective integration of two main components: face-to-face and computer-mediated learning instruction such that it is not just adding on to the existing dominant method. However, BLA integrates several resources, methods, activities, devices, and approaches related to teaching and learning to enhance accomplishment of learning outcomes. Fifthly, BLA creates motivating learning environments (Egara & Mosimege, 2024; Eggers et al., 2021). BLA can provide students with the option to select the type of learning environment that best meets their learning and scheduling needs.

BLA Experience during and after the COVID-19 in Tanzania Secondary Schools

According to the World Health Organisation (WHO), the Wuhan Municipal Health Commission in China reported several cases of pneumonia illness on December 31, 2019, which erupted and caused health respiratory complications. Owing to similarities with the coronaviruses that cause the Middle East respiratory syndrome (MERS) and severe acute respiratory syndrome (SARS), it was later dubbed coronavirus disease (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (WHO, 2020b). Outside of China, COVID-19 started spreading too quickly, and as of 13th January 2020, Thailand reported a similar case of COVID-19 (WHO, 2020a).

Apart from the health sector, other sectors like education experienced the COVID-19 tremble, as schools, colleges and universities were closed (Msigwa, 2020; UNESCO, 2020a). In line with the COVID-19 challenge, mechanisms were devised to allow the provision of education in distance mode (UNICEF, 2020; UNESCO, 2020b). As such, online and blended learning becomes a central focus in some countries with state-of-the-art technologies like the availability of home internet systems, learning management systems, and teaching and learning devices like laptops, tablets, iPads, and Kindle (Lapitan et al., 2021; Namulondo et al., 2023). Other countries opted to go back to traditional distance learning mode through radio programmes and television

sessions for lesson delivery (UNESCO, 2020a). Like other countries, in Tanzania, the closure of schools, colleges and universities forced fundamental changes in the teaching and learning process. Msigwa (2020) unveil that during COVID-19, the government of Tanzania devised different mechanisms including mode of delivery, assessment methods, teaching and learning activities as well as school governance. On the one hand, with curfews, physical distancing guidelines, routine screening, contact tracing, self-isolate, mask-wearing, open door policy, furlough, and quarantine policies, the government sought to keep providing education to learners in their homes and protecting teachers and workers gradually (WHO & ILO, 2021).

On the other hand, post-COVID-19 events demonstrate that BLA has continued, with the following happening since COVID-19: (i) The use of e-learning platforms, blogs, and websites in teaching and learning have increased (Msigwa, 2020; Malima et al., 2023). Examples of these platforms are: https://www.msomeni.co.tz/; https://somaconect.or.tz/; https://www.onlineschoolbase.com/; https://www.darasahuru.co.tz/; https://www.shuledirect.co.tz/; https://somakwanza.tz/); (ii) online libraries such as google classroom and Tie Library (use of mobile apps) to disseminate teaching and learning resources including video and e-books (https://ol.tie.go.tz/); (iii) tutoring through direct phone-based text and SMS has increased since COVID-19 (Msigwa, 2020); (iv) use of social media like Facebook in the classroom and What Apps groups which brings together teachers and students for sharing. Teachers use these social media platforms to distribute homework packages and require parents to urge their children to participate in assignments (v) radio programmes and television episodes; however, it is rarely used after COVID-19, still, some schools recommend their students to follow subjects' specific radio and television programmes in various TV channel and radios (Malima et al., 2023). With confidence, we refer to these experiences as "inclusive excellence" since they provide real, concrete, and observable insights into the effectiveness of BLA adoption and implementation in both normal and tragic life situations. Given the BLA experiences during and after COVID-19, the current study explores stakeholders' perceptions on the adoption of BLA in Tanzania secondary schools.

Theory Bases

The current study adopted the Concerns-Based Adoption Model (C-BAM) since changing teaching methods, pedagogical tools, concerns and learning approaches by integrating learning technology is a way to enhance the 21st-century lives of both students and teachers (Machumu et al., 2022; Almerich et al., 2016). The C-BAM denotes a developmental process for accepting innovations in education, concentrating on individuals' enhanced use and experiences like the use of ICT to improve students' and teachers' learning (Garrison, 2021). As such, improved use of learning technologies in secondary schools is enhanced by teachers' strategies, learning environments, facilities, ICT services and school actions to adopt change.

In the 1970s, the Research and Development Center for Teacher Education created the C-BAM (McREL.org, 2021; Hall & Hord, 2020). According to Khoboli and O'Toole (2012), the work of Frances Fuller served as the foundation for the first iteration of the C-BAM model. Additionally, the model takes advantage of teachers' worries about improving their teaching talents and capacity to improve student learning. The literature claims that twelve assumptions (principles of change) form the basis of C-BAM (Donovan et al., 2007; Khoboli & O'Toole, 2012; Hosman & Cvetanoska, 2013):

(1) change is learning; it's as simple and complex as that; (2) change is a process, not an event; (3) implementing change is a whole system effort; (4) organizations adopt change while individuals implement change; (5) The school is the primary organizational unit for change; (6) school-based leadership is essential to long-term change success; (7) facilitating change is a team effort; (8) interventions are key to the success of the change process; (9) appropriate interventions can reduce resistance to change; (10) all-way communication is needed all the time; (11) mandates can work; and (12) sustaining change requires additional time, interventions and leadership."

The C-BAM model has increasingly been used in recent years to examine the use of computers in schools (McREL.org, 2021), specifically to address concerns like the efficiency of directed technological interventions and adoption. As claimed by de Vocht & Laherto (2017), the initial spreading in a successful adoption process is quick among early adopters or forerunners and slows down once a majority has adopted the innovation. The C-BAM consists of three distinct components: levels of use, innovative configurations, and stages of worry (Fuller, 1969, as in Hall & Hord, 2020). The stages of the concern process are designed to support and understand the range of excitement, perceptions, and emotions that teachers experience regarding a specific change (e.g., ICT integration, and teaching methods) (Hosman & Cvetanoska, 2013). It should be noted that teachers are often confronted with new curricula and other modifications to the execution of school programmes and routines daily. Moreover, the C-BAM, as a theory to promote change, is therefore appropriate to analyse the process of teachers' adapting to and adopting technology vis-à-vis their teaching and learning skills, experiences and demands for professional development.

Besides, the C-BAM is adopted in this study since it specifically focusses on stakeholders' perceptions of the adoption of a blended learning approach in secondary schools because stakeholders like teachers are at the core of the change process. As a result, it also provides a useful framework not only for examining learning environments for the adoption of blended learning but also for studying experiences and skills in the use of the blended learning approach. Although C-BAM has been used in a wide variety of educational settings, it was developed and researched primarily within pre-primary, primary and secondary education settings. Its applicability to secondary schools may be limited by two core assumptions: First, C-BAM assumes that the

innovation will be adopted. Second, its emphasis on implementing new teaching and learning approaches (cf., blended learning) with fidelity, may not adequately address the complexity of change in secondary schools (Kihoza et al., 2016; Villanueva, et al., 2023).

However, each of these factors may not apply during COVID-19, because the switch to ICT and related innovation like BLA, e-learning, microlearning and online instruction is not something teachers and students decide about; they rather implement them since they require guidance, funds and technical support from experts and institutions (de Vocht & Laherto, 2017). In addition, ICT use, BLA, e-learning adoption and online instruction require a countless level of commitment in ICT use. In this study, the C-BAM explains how stakeholders in secondary schools and teachers adopt and facilitate change that helps students understand, adopt, lead, learn and monitor the complex process of change in education by using ICT as a complex innovation that requires multifaceted design and training to implement. Furthermore, the model should consider the specific concerns of teachers and secondary school administrators who are being directed and required to make the necessary changes in order to use innovative learning technologies such as e-learning, BLA and online learning.

The interest of the study was to probe the stakeholders' perceptions on the adoption of a blended learning approach in Tanzanian secondary schools. To achieve this objective, the study was guided by the following research questions:

1. What are stakeholders' perceptions about the adoption of a blended learning approach in secondary schools in Tanzania?
2. How do school learning environments support the adoption of a blended learning approach in secondary schools in Tanzania?
3. To what extent is the blended learning approach used in secondary schools in Tanzania?

Methods

The study employed exploratory sequential design. It is a two-phase mixed methods research design which often requires the qualitative phase to have a bigger priority than quantitative strand due to the research problem and purpose of the study. The study employed two-phase mixed methods research with a constructivist ontological premise. The premise concerns the social construction of reality. The choice of design was based on two aspects: research objectives and the fact that researchers wanted to familiarize themselves with the topic as it is used in the study context. The results of the qualitative component aided the research in developing a questionnaire to collect quantitative data. The findings were merged at the interpretation stage of the study.

Population and Sampling

Twelve secondary schools and districts education departments from four regions (cf., Morogoro, Dar Es Salaam, Dodoma, and Iringa) in Tanzania were selected to inform the study. The selection of regions and schools were based on the following attributes: availability of power at the school, conditions for adoption of BLA approach, the internet, computer labs, ICT help desk, familiarity, and proximity of study areas to researchers' workspaces. At the time of study, the population of the study was based on 12 secondary schools with estimated 1214 population. The sample includes heads of schools, deputy heads of schools, teachers, and students. The study also involved education quality assurers and secondary educational officers. A sample of 620 respondents was used to inform the study. The study used a stratified random sampling technique to obtain 60 teachers and 480 students. In addition, a purposive sampling technique was employed to select 12 heads of schools and 12 deputy head of schools, 12 ICT teachers, 12 school academic officers, 16 school quality assurers and 16 secondary school educational officers.

Table 1. Categories of participants, study locations and number of secondary schools

Categories of respondents	**Regions**												**Total**
	Morogoro			**Dar Es Salaam**			**Iringa**			**Dodoma**			
Schools	SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8	SS9	SS10	SSS11	SS12	
HoSs	1	1	1	1	1	1	1	1	1	1	1	1	12
DoHs	1	1	1	1	1	1	1	1	1	1	1	1	12
SAOs	1	1	1	1	1	1	1	1	1	1	1	1	12
ICT-T	1	1	1	1	1	1	1	1	1	1	1	1	12
QAO	2	1	1	2	1	1	1	2	1	1	2	1	16
SEO	2	1	1	2	1	1	1	2	1	1	2	1	16
Teachers	5	5	5	5	5	5	5	5	5	5	5	5	60
Students	40	40	40	40	40	40	40	40	40	40	40	40	480
Total	53	51	51	53	51	51	51	53	51	51	53	51	620

Key: SS = Secondary school; DH = Deputy head; SEO = Secondary Education Officers; QAOs = Quality Assurance officers; SAOs = school academic officers; ICT-T = ICT teacher

Instruments

This study used several data collection techniques including questionnaires and interview guides to obtain essential data. The questionnaire was divided into two sections: the first section involved demographic questions such as gender, age, educational level, work experience, and subject. The second section addressed variables items related to stakeholders' perceptions about the adoption of BLA, supportive learning environments for adoption of BLA and the magnitude of BLA usage. To achieve validity, the study employed triangulation and back translation. Triangulation by using questionnaire and interview methods was employed on heads of schools, educational officers and education quality assurers, teachers, and students. Triangulation was used to ensure the complementarity of data gathered for the study. Further, participants used the Kiswahili

and English language interchangeably; therefore, some questionnaires and interview guides in the English language were translated into Kiswahili language for some participants to help participants understand. Then, the responses were back translated into the English language. The study performed a pilot study in 12 secondary schools with the same characteristics as that of the expected actual study areas. Moreover, before data collection, the study considered ethical issues for effective research conduct. The researchers sought for permission letters from several authorities at school level. In this study, informed consent was obtained from the study participants who were informed in advance about the significance of the study, data and analysis procedures, risks, benefits and their right to withdraw at any time. They were assured that their privacy and confidentiality are protected.

Data Analysis

Analysis of qualitative data was done by using content analysis. In the course of facilitating the analysis, the collected data were prepared through coding and editing. The interview method provided massive information that was necessary to be subjected to procedures of data management, reduction and construction of themes related to the research questions. The coding process started after the text had been transcribed, translated, and put into the Word documents. The matrix technique was used to create categories of concepts, and meanings and find the similarity between respondents' opinions. The processes involved iterative and intensive reading of the narrative text from every respondent. Collected quantitative data were cleaned up, summarized and then coded before they were taken into the IBM SPSS Statistics 26 for descriptive analysis. Descriptive analysed data were presented in tables, frequency and percentages.

Results

Stakeholders' Perception on the adoption of BLA

Researchers sought to establish secondary school stakeholders' perceptions on the adoption of BLA. Perceptions of respondents were measured through two aspects including the understanding of the concept "BLA" and perception towards the practice of the BLA in the studied secondary schools. Researchers used interviews and questionnaires to generate relevant information. The first interviewees were the school quality assurance officers who were asked to provide the understanding meaning of the BLA, their responses are provided in extracts hereunder:

"*BLA is the opportunity for a student to learn in different environments be in class or out of the classroom whereby he/she may utilise different technologies such as ICT to access learning content (SQA, 14/05/2022 13:00 hrs*."

In congruence, when asked about his perceptions towards the adoption and practice of BLA in secondary schools, taking into consideration of resources (i.e., internet, devices and electricity) constraints, some of school quality assurance officers had the following to offer:

"*In our context [Tanzania], teaching and learning depend on physical classroom attendance, of which teachers are responsible to be in class on daily basis, I thought BLA can be positively endorsed, recognised and guarantee since using offline digital content is a milestone to both students and teachers … meanwhile it makes the process of learning more accessible and convenient (SS1_SQA, 12/09/2021 09:30 hrs.)*".

On the other hand, teachers were not very far from school quality assurance officers' understanding about BLA. Teachers appeared to be knowledgeable about BLA as they were able to offer several conceptual meanings. For example, one of the teachers from SS5 argued that:

"*To my understanding BLA is an approach used in teaching and learning by the use of computers… it encourages the use of both personal and group learning through assistive technologies…the technology things, the internet, gamification, learning platform, social media, and mobile learning combined together (SS5_teacher, 15/05/2021 09:30 hrs.)*".

Another teacher had the following to add:

"*I have attended several training and workshop on the use of digital learning content and online learning platform… as a result, I can say that BLA is good to me and when used appropriately can provide better-quality integrated learning environment to both teachers and students (SS7_teacher, 16/05/2020 12:00 hrs.)*"

Similarly, interviewees from SS1 conceived BLA as an embedment of traditional and modern technology. They argued that during the peak of COVID-19 in the country, schools were in a cessation situation, and were encouraged to use several measures in preparation for normality of teaching and learning. It was during that time some of the teachers in studied secondary schools heard about BLA. In support of that, one of the interviewed teachers emphasised that:

"*The BLA is a technique of combining the traditional method and the new technologies using the internet and computer-connected devices that help students to gain more materials as they prefer (SS11_teacher, 08/05/2021 12:00 hrs.)*"

In the other interview, a deputy head of the school showed interest in the adoption of BLA by arguing that BLA is a good approach for both students and teachers, however, in the context of poor resources lamented that:

"*BLA is a good approach to enhance students personalised learning …however, we still have as many as possible challenges including lack of internet connectivity and learning devices among our students (SS8_teacher, 17/05/2022 12:00 hrs.)*"

On their side, students described blended learning as:

"*To me, BLA is the means used in teaching using electronic devices such as computers, projectors and the like but also other old methods are applied in mixed ways (SS4_Student, 10/05/2022 14: 15 hrs.)*"

Data from the interviews show that respondents had a basic understanding of the BLA. The concept of BLA was understood as the method of using ICT in combination with traditional methods for the teaching and learning process and it can take place inside or outside the classroom. Also, a questionnaire was used to obtain information from respondents regarding their awareness of BLA. Two questions were posed to measure the understanding and awareness of respondents about the BLA. The responses are indicated in Table 2.

Table 2. Respondents Awareness with BLA

Respondents	**Variable**		
	Are you aware with BLA at this school(s)		
	Response		
	YES (F/%)	**NO (F/%)**	**F/%**
Teachers	45 (75)	15 (25)	60 (100)
Students	349 (72.7)	131 (27.3)	480 (100)
ICT-T	10 (83.3)	2 (16.7)	12 (100)
QAQs	9 (75)	3 (25)	16 (100)
HoSs	10 (83.3)	2 (16.7)	12 (100)
SAOs	9 (75)	3 (25)	16 (100)
DoSs	10 (83.3)	2 (16.7)	12 (100)

The findings in Table 2 revealed that 72.7% of the students were aware of the concept of BLA as opposed to 75% of the teachers. While ICT-T got 83.3%, QAO 75%, HoSs and DoSs 83.3 % were the same. These findings, perhaps, report that almost all students are cognizant with BLA uses in their respective secondary schools. In doing so, respondents were asked to indicate their understanding of BLA. The descriptive responses are provided in Table 3.

Table 3 shows that respondents have good theoretical knowledge of BLA. While about 90.9% of respondents (students) understood BLA as the learning system by use of ICT sources like computers, TV, the Internet, learning systems, laptops and tablets; other respondents who composed 89% (of teachers) indicated that BLA as an approach used in teaching and learning through a combination of various technology and traditional methods such as the use of computer, slides and other ICT facilities. However, the data presented imply that teachers were more knowledgeable about BLA than students. Categorically, the findings indicate that participants had a high theoretical understanding of the concept of BLA. This was an impressive observation since it provides ground to dig further into the nexus of theory and practice.

Table 3. Teachers and Students Understanding of BLA

Defining BLA	Students	Teachers	QAQs	HoSs	SAOs
	F (%)	F (%)	F (%)	F (%)	F (%)
Learning by using other sources like computers, social media, TV, learning systems, laptops, and tablets not only from book sources	350(72.9%)	11 (18.3%)	3 (25%)	2(16.7%)	2(16.7%)
Use of cutting-edge learning technology alongside conventional delivery methods.	10(2.0%)	20(33.3%)	2(16.7%)	3 (25%)	2(16.7%)
Integration of online learning and several traditional teaching methods	50(10.4%)	13(21.7%)	3(25%)	1(8.3%)	2(16.7%)
Access to a broad range of learning modes and methods.	50(10.4%)	10(16.7%)	2(16.7%)	2(16.7%)	2(16.7%)
The approach of teaching students that combines face-to-face instruction with online learning.	13(2.7%)	5(8.3%)	1(8.3%)	3 (25%)	4(33.3%)
I have no idea about BLA	10(4.8%)	1(6.7%)	1(8.3%)	1(8.3%)	0 (0%)
Total	480(100%)	60(100%)	12 (100)	12 (100)	12 (100)

School Learning Environments and the Adoption of BLA in Secondary Schools

The study explored secondary school environment learning factors possibly available to support the adoption of BLA. The presence of computer experts who could collaborate with teachers while implementing BLA was one of the factors under examination. Interviews were conducted to students, heads of schools, and teachers to establish if school learning environments in studied schools could support the adoption of BLA. The following extracts generated from students and teachers during the interviews are presented in Table 4:

Table 4. Students' Responses about School Learning Environment in Support of BLA Adoption

Extracts	Sub-themes	Themes
We refer to one of our teachers as "mtaalam wa komputa" meaning that a computer expert since he/she has been teaching us computer studies since 2021 (SS1_student_10/05/2020, 12:00hrs_Morogoro)	Computer expert, ICT teacher,	ICT teacher
We have good computers in our computer room…the room is furnished with carpet, air-condition, electrical energy, 50 desktops (SS2_student 15/05/2020, 14:15hrs_Morogoro)	Computer lab, electrical energy Compute class	Computer lab, electricity energy
In this schools, we enjoy computer class with our ICT teachers who has been a blessing to us. We learn typing skills, searching, and googling (SS4_student_06/09/2021, 08:20hrs_Iringa)	ICT teachers, Computer class, ICT basic skills	ICT teacher, computer class
I have seen another computer expert from nearby Catholic-owned schools who visit the school premises to lecture us about computer and related skills (SS9_student 20/09/2021, 09:30hrs_Iringa)	Computer experts, using computer, searching	Computer experts, computer class
I have noticed that there is a man out of the school who comes to handle the situation technical issues in the computer room, maybe he is a computer expert of our school (SS11_student, 22/09/2022,12:00hrs_Dar)	Hired experts, ICT teachers,	Hired computer experts, ICT teacher

However, I once observed a person visiting our school to fix the internet connections and explaining some issues to our teachers while in class (SS12_student_20/09/2022, 10:06hrs_Dar)	Computer labs, Hired computer experts	Computer labs
Sometimes desktops are connected to the internet for internet surfing skills during class hours (SS3_student 16/05/2020, 14:15hrs_Dodoma)	Internet, desktops	Internet
Almost all our teachers possess smartphones while our ICT teachers have laptop, smartphones, and desktops at his office (SS10_student 16/05/2020, 14:15hrs_Dodoma)	ICT devices smartphones	ICT devices

It seems that computer class, computer experts, ICT teachers, computer devices, and electricity energy are possible perceived parts of school environments for adoption of BLA in studied secondary schools. Aso, it was revealed that some studied secondary schools do not have computer experts who can assist with maintenance and technical issues regarding computer system breakdown and software update. Moreover, the descriptive statistical results in Table 3 and 4 were congruent with the explanations provided by the heads of schools concerning the application of the BLA. Extracts are presented in Table 4 hereunder.

Table 5. Head of Schools' Responses about School Learning Environment in Support of BLA Adoption

Extracts	**Sub-themes**	**Themes**
In this school, some informed teachers use LCD projector for teaching and learning. LCD projector has been digitally used in connection to the online recorded lecture from the internet as a teaching to showcase advanced learning experiences SS1_HoS, 19/05/2020,14:45hrs.)	LCD project, online recorded lecture, digital tools	Digital learning tools
The school received internet facilities from the Mobile Internet Service Provider (ISP) for free to augment teaching and learning process (SS4_HoS, 14/07/2021,14:45hrs.)	Internet facilities, Internet services	Internet
In fact, teachers try to adopt current technological teaching devices and e-resources which support adoption BLA in their lessons. (SS6_HoS, 19/09/2022,14:45hrs.)	Technological teaching devices, e-resources	Digital tools
At this school, we have computer lab that accommodate 50 students at per learning session. (SS8_HoS, 15/10/2023,14:45hrs.)	Computer lab	Digital tools
With some digital tools like video, websites, e-resources at our schools, BLA adoption is possible pedagogical approach. (SS3_HoS, 09/09/2022,14:45hrs.)	Websites, video, e-resources	Digital tools
Video is one of digital tools for classroom that are used by both teachers and students for educational purposes in school (SS5_HoS, 22/10/2022,14:45hrs.)	Digital tools, video	Digital tools
I thought that the use of digital tools boost students' engagement and enhance learning experiences in an overcrowded classes (SS12_HoS, 12/10/2022,14:45hrs.)	Digital tools, engagement, learning experiences	Digital tools
Some teachers create multimedia posters by combining text information, photos, and videos and they use it on various subjects and topics for teaching (SS9_HoS, 23/08/2023,14:45hrs.)	Multimedia, photos, video and poster	Digital tools

The results presented in Table 4 and 5 reveal three outstanding findings. First, for interviewed students admitted that schools used to hire external ICT experts in case of need of computer class. Second, it was revealed that some teachers acted as IT experts but were not fully employed for that purpose. Third, interviewed heads of schools appeared to be conversant with the school learning environments they lead since the majority praised their teachers who used several digital tools for educational purposes. This study assessed the school learning environments that are supportive to the adoption of BLA. Furthermore, students and teachers were assessed on

the school learning environments focused on nine instrumental aspects. A summary of the results is presented in Table 6.

Table 6. School Learning Environments Supporting BLA Adoption

Item (school learning environments)	Rating Scale (1-2)			
	Students		Teachers	
	Agree	Disagree	Agree	Disagree
	F (%)	F (%)	F (%)	F (%)
ICT infrastructures computer lab	400(83.3)	80 (16.7)	47 (78.3)	13(21.7)
Availability of electricity i.e., lighting	411(85.6)	69(14.4)	41(68.3)	19(31.7)
Availability of ICT teacher at school	430(89.6)	50(10.4)	55(91.7)	5(8.3)
School ICT facilities & services	301(62.7)	179(37.3)	35(33.3)	25(41.7)
Recommended academic websites i.e., ShuleDirect, TIE, Khan Academy database	303(63.1)	177(36.9)	49(81.7)	11(18.3)
FQAs leaflet about BLA	114(23.7)	366(76.3)	23(38.3)	37(61.7)
School IT technicians for technical support	130(27.1)	350(72.9)	15(23.3)	46(76.7)
The school ICT team with the Help Desk	125(26.1)	355(73.9)	19(31.7)	41(68.3)
Wireless equipment - wireless access points (WAPs) i.e., Tigo, Airtel	85(17.7)	395(82.3)	11(18.3)	49 (81.7)
Approachability of ICT teacher for assistance	353(73.5)	127(26.5)	32(53.3)	28 (46.7)

Table 6 shows that respondents perceived the existence of all ICT facilities and services that could support the adoption of BLA in the studied schools. It was revealed that respondents agreed that schools have learning environments that support the adoption of a BLA. The study further explored students' views as to whether the school environment supports the implementation of a blended learning approach. Students were asked to identify their agreement or disagreement with the school environment in supporting their learning via BLA. The results are presented in Table 7.

Table 7. Perceived Supportive School Environments for BLA Adoption

Perceived Supportive Learning Environments	Response	
	YES (F/%)	NO (F/%)
Do you think the school environment is supportive for you to learn via BLA	423 (88.1%)	12(11.9%)
At this school, do students have a way to access class resources and ask questions?	417 (86.9%)	63 (13.1%)
Do teachers at this school design lessons using a range of questions, materials, and links to other websites?	382 (79.6%)	98 (20.4%)
Do teachers make use of digital tools available that support student choice, voice and enhance student learning?	412 (87.5%)	68 (12.5%)
Do you feel that teachers at this school provide an environment for learning where you can succeed?	460 (95.8%)	20(4.2%)

Based on the results in Table 7, most respondents conceived that the school learning environments support the adoption of BLA. As such, item 1 to 5 exhibits that respondents remarked favourably on the available learning

environments in support of BLA adoption. Although some students showed disagreement, the number and percentages of students favour the premise that learning environments in studied secondary schools support the adoption of BLA.

BLA Usage in Secondary Schools

The study assessed the usage level of BLA in the studied secondary schools. Building from qualitative data, two indicators were established to determine the level of BLA usage: the rate of teachers trained to facilitate BLA usage, and the extent to which BLA is used by students and the possible challenges encountered in the application of BLA. The study presupposed that the level of adoption of BLA was indicated by the number of trained teachers, awareness of users about BLA, the level of BLA application, and the limited number of challenges in its application. Teachers were asked to provide their responses as to whether they were trained about the use of BLA. The descriptive results are provided in Table 8.

Table 8: Rate of Teachers Trained for Using BLA Adoption in studied Secondary Schools

Rate of teachers trained on BLA usage	**Teachers' response**	
	YES (F/%)	**NO (F/%)**
Did you attend any in-service training on BLA usage	44 (73.3)	16 (26.7)
Do you apply BLA in teaching your subject	39(65)	21 (35)
Did you attend training on the use of digital tools for teaching and learning in your school?	50(83.3)	10(16.7%)

Results in Table 8 indicate that 44 (73.3) teachers received training while 16(26.7) did not receive any training related to the application of BLA for teaching and learning. Furthermore, it was claimed that 39(65) teachers attested to apply a BLA in their subjects while 21(35) had nothing to do with the BLA approach in their subjects. Based on the findings, it can be reported that the level of BLA usage in the studied secondary schools was ranked high by both students and teachers. Figure 1 provides the results generated from both teachers and students' response.

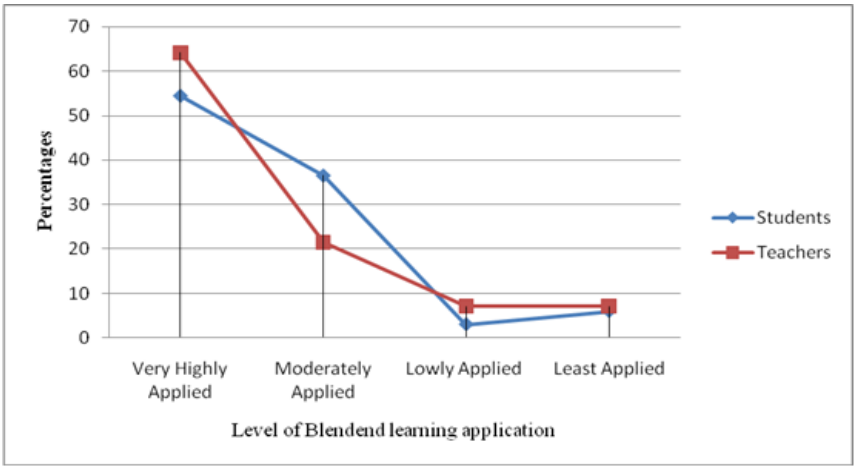

Figure 1. The extent of BLA Usage in studied Secondary Schools

It is verified from the figure 1 that BLA was very highly used in the studied secondary schools as perceived by 64% of teachers and 54% of students. However, 35% of students and 21% of teachers conceived that BLA was moderately applied in the schools. The study contends that the extent of BLA usage in the studied school was relatively high by 60% by accounting the mean of the two responses.

Discussion

Stakeholders' Perception on the Adoption of BLA

Stakeholders' perceptions were measured through two aspects including the understanding of the concept "BLA" and perception towards the practice of the BLA in the studied secondary schools. Data from the interviews show that the respondents had a basic understanding of the BLA. In specific, BLA was understood as the method of integrating several resources, learning materials, methods of learning, digital content and traditional methods for improving teaching and learning process. Interestingly, the results indicate that the adoption of BLA is imperative in enhancing teaching and learning in secondary schools. Though it is a preferred approach. The findings of the present study avowed prior results by Topping et al. (2022) who conceived that BLA is a useful approach to accessing teaching and learning materials. Moreover, our findings are also corroborated by Tan et al. (2022), who indicated that BLA was considerably better than online learning for possible enhancing task flexibility and opening door for collaborative learning. These findings perhaps report that almost all respondents are cognizant of BLA.

The discrepancies in awareness among respondents might be because some respondents are implementing BLA but are not fully aware of the program at their respective secondary schools. This is in support by Fernando (2020) who found that awareness of BLA is somehow shallow in some countries like Philippine since the learning style is not properly implemented. By awareness, it means that the knowledge gained through one's own perception or by means of information. According to a study by Hsu et al. (2018), teachers and school leaders and educational officers who were aware of the BLA had the potential to enhance children's long-term learning and memory. Similarly, a study conducted in India by Maruthavanan & Devi (2020)., concluded that there was no significant difference in the awareness of the blended learning approach among students and teachers in the Madurai district. As a result, the study proceeded with measuring the theoretical understanding of the concept of blended learning. In doing so, respondents were asked to indicate their understanding of BLA. Categorically, findings indicate that participants had a high theoretical understanding of the concept of BLA. This was an impressive observation since it provides ground to dig further into the nexus of theory and practice of BLA.

Learning Environments in Support of the Adoption of BLA

As it stands from the findings, several services and facilities were available in some studied secondary schools like wireless access points donated by mobile carriers like Tigo (cf., telecommunication company in Tanzania). The study further explored students' views as to whether the school environment supports the implementation

of BLA. Students were asked to identify their agreement or disagreement with the school environment in supporting their learning via BLA. It seems that school learning environments in studied secondary schools support students to learn via BLA. Some studies suggest that the primary focus for the adoption of BLA in secondary schools should be teaching and learning environments which support its adoption like pedagogical tools, ICTs facilities and devices (Antwi-Boampong & Bokolo, 2022; Maruthavanan & Devi, 2020). In context of learning environment, the study further inquired about the existence of some electronic devices and ICT facilities and services that were present in each studied secondary school have been engaging and using BLA. Students provided an inventory of ICT facilities that were present in the school. Our findings revealed that some studied secondary schools had the following facilities: well-furnished computer labs, the internet and electricity which allow both teachers and students to engage in enjoyable learning via BLA. Similarly, studies found that students who lack devices or the teachers themselves lack the equipment to teach via BLA (Hayati et al., 2021). Equally, a study conducted in Indonesia by Tamah et al. (2020) found that the availability and accessibility of ICT facilities and services have an impact towards the adoption of BLA among teachers and students.

In the case of this study, the existence of electronic and accessible ICT facilities and services could serve very little if schools lacked ICT experts, ICT teachers and the ICT help desk. The findings of the study helped to clarify that schools were perceived to support BLA since they possessed ICT facilities and infrastructures. The presence of these elements confirmed that the BLA could be carried out in secondary schools (Cheok et al., 2014). Following this situation, the study explored the presence of computer experts who could collaborate with teachers while implementing BLA. It appears that some secondary schools used to hire ICT experts from outside in case of need while some teachers acted as IT experts though were not fully employed for that purpose. This study contends that secondary schools demand further investments in ICT facilities, solutions and services in support of BLA (Apandi & Raman, 2020). The findings suggest that the implementation of BLA in secondary schools will necessitate a collaborative effort from multiple educational partners to enhance secondary schools' learning settings. Furthermore, the appropriate ministry should set aside funds for teachers' capacity building, the establishment of computer labs in schools, and the training of ICT teachers.

The Extent of BLA Usage in Secondary Schools

Researchers developed two indicators to determine the level of BLA usage: the rate of teachers trained to facilitate BLA usage, the extent to which BLA is used by students and the possible challenges encountered in the application of BLA. The study presupposed that the level of adoption of BLA was indicated by the number of trained teachers, awareness of users about BLA, the level of BLA application, and the limited number of challenges in its application. These results suggest that the application of the BLA in studied secondary schools is at a high level. The number of trained teachers was high equivalent to two-thirds of the respondents. As such, the importance of teacher training on the application of BLA was appropriate for the adoption of BLA because skilled teachers applied the knowledge, they had acquired to assist student learning. A study by Lalima and Dangwal (2017) supports this claim with the contention that among other preconditions for the use of a BLA

is to have well-trained teachers. Perhaps this might have been caused by challenges related to the lack of stable internet connectivity and ICT devices among teachers and students.

Based on the findings, it can be reported that the extent of usage of BLA in studied secondary schools was relatively high by both students and teachers. The findings provide a more nuanced understanding of conditions relevant to the adoption of BLA in secondary schools in developing countries like Tanzania as well as stakeholders' perceptions of BLA. The study concurs with that of Hayati et al. (2021) and Villanueva et al. (2023) conducted among secondary school teachers in Malaysia and Indonesia. The study establishes that teachers, especially senior teachers, who are not trained with proper training and knowledge will have a hard time adapting to learning technology. Furthermore, the findings suggest that achieving BLA requirements for implementation in secondary schools will improve teaching and learning and, as a result, students' learning outcomes. That is, in the end, instructors can incorporate a blended learning approach into their teaching methods, and governing bodies can dedicate more resources to encourage BLA adoption in schools.

Conclusion

The findings of the study offer the following crucial conclusions: first, stakeholders perceived BLA as an essential and useful methodology for teaching and learning Tanzanian secondary schools. And that, if appropriately used, BLA increases the quality of education offered in secondary schools. Second, many facilities and services were uncovered to be present in secondary schools under study, and these features appear to be some of the deciding criteria for supporting BLA adoption and implementation in secondary schools. That is, computer laboratories, electricity, a few skilled professionals, ICT infrastructures, and ICT teachers are considered as necessary characteristics for BLA acceptance in secondary schools. Further, school learning environments with such services, facilities and infrastructures are perceived to be potentially promoting and supporting the BLA adoption in secondary schools. Third, it is sufficient to conclude that the level of BLA usage in studied secondary schools was in varying levels. In other words, a good number of teachers were provided with training on the use of BLA in their respective schools, in retrospective, good understanding of BLA, teacher training and supportive school learning environments increases the level of BLA usage.

Recommendations

The results of this study have several implications. The research findings revealed that stakeholders are interested in the use of blended learning approach in schools. This calls for the government policy action to extend and stabilize the approach to be implemented in other schools across the country. It is, further, recommended that the decision-makers in education should consider the need to improve the practice of in-service training for teachers and other education officers on the use of BLA and related learning technologies. Finally, the following recommendations are made: Since some teachers who were reported to have not attended any training on the use of BLA, there is an urgent need for the government, non-governmental organisations, and other stakeholders to set aside resources and provide training on the use of BLA. On the basis of the

findings, further study should focus on assessing the role of BLA in improving students' academic performance. Another new area for further research could be related to the assessment of the relationship between teachers' level of BLA mastery and the use of BLA knowledge in teaching lessons.

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