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The Influence of Instructional Media on Students' Success in Tanzania Secondary Schools

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ABSTRACT

This study seeks to unpack the influence of instructional media on students` success in secondary schools located in the rural district of Southern Tanzania. The study used a quantitative research approach with randomization and simple sampling procedures to select schools and respondents. The study employed a physically administered survey, targeting 1,246 respondents randomly selected from designated secondary schools. The study employed two steps in data analysis, including descriptive data analysis followed by inferential data analyses. Furthermore, the study examined the influence of different determinants of instructional media usage. The exploratory and confirmatory factor analyses were deployed to establish the constructs' validity and reliability. Further, the stepwise multiple ordinary least square regression analyses were deployed to test the strength and direction of relationships among variables (factors). The findings reveal that learners' characteristics significantly predict instructional media use (r = 0.1541, p < 0.05) in secondary schools. Similarly, instructors' characteristics (r = 0.1257, p < 0.05) and perceived ease-of-use (r = 0.1390, p < 0.05) were positively related to media use. The findings imply that using appropriate and modern instructional media during teaching significantly impacts students` understanding and success. Irrefutably, proper use of instructional media appears to influence students' success, which can be achieved when instructional media are correctly determined and selected during its uses.

Keywords: *Instructional Media, Instructional Media Usage, Students' Success, Secondary Schools*

INTRODUCTION

Finding more effective teaching-learning methods and appropriate instructional media in resource-constrained areas is one of great concerns for both pre-service and in-service secondary school teachers. Instructional media like YouTube, WhatsApp, Voice Notes, illustrated books, flashcards, interactive whiteboards, billboards, flip books, posters, smartphones, displays, slides, chalkboards and recorded lectures have been used by teachers to enhance the quality of teaching and learning in both online and face to face classroom (Rajabu & George, 2025; Hadiani et al., 2023). From a school perspective, the Coronavirus Disease 2019 (COVID-19) emphasized the use of online interactive media, ICT-based instruction, digital learning platforms, digital media, e-learning, blended learning (URT, 2025b), and instructional technologies (Aulia et al., 2024). Instructional media is everything used to convey messages during the process of teaching (Fitriasari et al., 2020). A recent study established that instructional media includes all

equipment and physical means an educator may use to enforce instruction and promote the achievement of educational goals among students (Lusiyani & Anindya, 2021).

According to Andayani et al. (2021) instructional media are various types of media that can be applied in the teaching and learning process that can increase students' interest and motivation during the learning process. The instructional media are useful in stimulating students' thoughts, feelings, interests, and concerns so that the learning process occurs. The use of media in the classroom can increase the desire, interest, motivation, and stimulation of learning activities, as well as have a psychological impact on students (Dewi et al., 2022). For many years, instructional media have been developed to reflect recent teaching-learning situations and technology.

The instructional media's evolution has simplified the teaching-learning process and improved the communication between teachers and learners (Lusiyani & Anindya, 2021). The world of teaching-learning has witnessed the process of teaching-learning entering the era of the Industrial Revolution 4.0 (Education 4.0), where the space for information and communication is massively open, requiring teaching staff to be able to effectively use instructional media, both conventional and digital instructional media (Ramzi et al., 2023).

In this regard, instructional media can be described as materials within the five senses of seeing, feeling, hearing, tasting and touching, enhancing the teaching and learning process (Aulia et al., 2024). Conventional instructional media refers to the teaching-learning process using available local materials (i.e., chalkboards, hand-outs, charts, actual items, and movies) to facilitate students' learning. However, in developing countries, the use of modern instructional media is still lagging slowly compared to developed countries (Kessy & Pessa, 2022; Petina et al., 2023).

Recent studies identified that traditional media have been in use for decades. However, in the context of the study, evidence of students' low achievements in secondary schools is disturbing stakeholders' efforts to influence students' success (Anggorowati, 2025). Moreover, studies have shown that a good number of private secondary schools use modern instructional media to enhance students' success and maintain a competitive position (Muhammad et al., 2020). Also, teachers tend to use instructional media due to their availability, affordability and accessibility (Dewi et al., 2022). Research has indicated that the effective use of instructional media depends on the class size, students' attendance and teacher-student ratio (Onyancha et al., 2024).

In line with this, empirical evidence hypothesized that using instructional media facilitates the students' outcomes, which are measured by the grades obtained and the level of engagement during the teaching and learning process (Maede & Juma, 2023). Moreover, with the use of instructional media, students' high performance in the final years, level of students' engagement and participation is obvious in the teaching and learning process compared to when instructional media are not used (Kessy & Pessa, 2022). As a result, instructional media must be considered as a factor that influences students' learning progression.

Existing literature, in Tanzania, reveal that there are problems with the use of instructional media due to inadequate funds allocated for acquiring instructional media, which affects students' learning (Shirima, 2013). Pedagogical reforms and intervention programs are underperforming and factors like inappropriate textbooks, lack of computers (Maede & Juma, 2023), projectors and other visual aids that affect students' success (Rajabu & George, 2025). Other factors contributing to low students' success include lack of libraries, laboratories, and classrooms (Mhagama, 2020). However, despite such challenges, efforts have been in place to rectify the situation such as Tanzania Education Reform Compact (ERC) (URT, 2022), digital teaching media (URT, 2025b), The SEQUIP (World Bank, 2019; 2020). Most of these programs and projects objected to increasing instructional media in schools, improving education quality

in public schools at primary and secondary school levels (URT, 2025a) and student-teacher enrichment programs (Mhagama, 2020).

Inevitably, there is little to no information available about how these goals were accomplished because students' learning is still in a dilapidated state and factors like large class sizes, poor internet access, a declining recurring budget that also lowers the amount of money available for accessing modern instructional media, and a lack of teachers' training on how to use them, all of which have an impact on students' success. (World Bank, 2020). Thus, it calls for a study that would investigate how successful this government initiative was, and that the following research question ought to be unpacked. (i) What determines the usage of instructional media among selected secondary schools? (ii) What is the relationship between instructional media usage and students' success in secondary schools? (iii) Does the perceived ease-of-use moderate the relationship between instructional media usage and students' success in secondary schools? Unlike prior studies, this research explored underlying factors influencing the use of instructional media and its relation to students' success in rural Tanzania secondary schools.

LITERATURE REVIEW

Instructional Design Theory (IDT)

In the 1980s and 1990s, the awareness of and interest in instructional design theories increased with Reigeluth's books on instructional design theories and models (Reigeluth, 1999). Instructional theories offer explicit guidance on how to help people learn and develop (Abuhassna et al., 2024; Reigeluth, 1999). IDT has significance in developing teaching and learning media and designing learning materials by creating different strategies that support teachers and learners (Bell et al., 2017). The advances in instructional media and learning theories contributed to the development of instructional design theories and models (An, 2021). Reigeluth (1999) posits that instructional design theory has the following components: instructional methods, instructional conditions, and instructional outcomes.

As teachers engage in designing instructions, the components should be justifiable to influence students' learning (An, 2021). Instructional methods facilitate learning and when these methods are applied in teaching and learning to influence students' learning. For instructional conditions as a component inform that teachers and students must be able to access a teaching and learning framework, media, and materials which are effective, easy to use and accessible. Further, the theories hold that the choice and application of a particular media should consider features like goal orientation, flexibility (probabilistic and non-deterministic), situational (conditions for using the instructional method) and prescriptive (method to be used) (Abuhassna et al., 2024).

In an educational context, instructional design theory assists teachers in the selection of instructional media that are favourable according to learners' situations (i.e., emotional, spiritual, physical, cognitive) and teaching environment (Abuhassna et al., 2024). Chukuwuemeka et al. (2020) encourage teachers to adapt instruction models and frequently update their knowledge on new instructional media to make teaching and learning successful and enhance academic success. Through IDT, instructors can visualize problems that are likely to be encountered in their educational experience and be able to design solutions and instructional media (Birgili, 2019). However, some scholars analysed the challenges accompanying the application of using instructional design theory, as listed by Wang et al. (2016): teachers' limited knowledge, restrictions in teachers' creativity and students' creativity, and lack of operability practice. The IDT informs the current study that to achieve students' success, successful instructional media usage should be carefully designated, planned, selected and executed.

Instructional Media Usage in Secondary Schools

For many years, instructional media usage in secondary schools has undergone different transformations. Technological change has enhanced the shift from traditional instructional media to modern instruction media (Dube, 2019). However, there is still uncertainty about which instructional media is suitable because many instructional media are being developed. More importantly, teachers do not need many instructional media but better media that can enhance students' success (Ramzi et al., 2023). Scholars have discussed the use of diverse instructional media such as graphic maps, infographics, pictures and videos to enhance students' learning in secondary schools (Lusiyani & Anindya, 2021). Along this line, a study by Mathews & Wikle (2019) critically revealed that in science subjects (i.e., biology), instructional media like laboratories and their facilities, projectors and computers are regularly used in secondary schools. In the context of Tanzania, most secondary schools have different courses of study, leading to essential requirements of several subject-based oriented instructional media both in print and non-print media. However, in most secondary schools in Africa and Tanzania exclusively, both modern and traditional instructional media are insufficient, making it difficult for teachers to use proper instructional media (Haidiani et al., 2023). In line with the above explanation, it is essential to note that if available and utilised effectively instructional media have appeared to influence students' learning in secondary schools. Maede & Juma (2023), further pointed out that instructional media like infographics, digital platforms and laptops are inadequate in secondary schools. Some schools have no electricity; thus, some instructional media such as computers, radio, television, and projectors cannot be used (Morrison & David, 2023). Given this reality, lack of appropriate instructional media, in secondary schools, affects the standard of students' learning.

Determinants of Instructional Media Usage in Secondary Schools

Education is an essential aspect of today's world which requires teachers to use specific instructional media that can easily deliver the lesson to learners (Aini, 2013). The selection of instructional media differs depending on different criteria put forward by different scholars in the literature. Dube (2019) reported that the selection of instructional media depends on the nature of students, entry-level, nature of the subject content, cost of media, and objectives to be achieved. Omenge and Mosol (2016) added that availability, accessibility, suitability, simplicity and affordability are the determinants during the selection of media choices. Scholars claim that learning media selection in secondary education is based on several factors including practicality (Andayani et al., 2021), students' appropriateness (Reftyawati, 2017), and instructional appropriateness. The practicality of the media consists of availability, cost-efficiency, time efficiency and instructors' knowledge of the media (Seechaliao, 2024). Students' appropriateness analyses whether the instructional media are appropriate according to learning conditions and students' characteristics (Ramzi et al., 2023). Although there is a common goal of attaining students' success, their determinant differs according to the environment. Economic conditions force developing countries, especially public schools, to utilize costly traditional instructional media.

Teachers encounter several challenges during the selection and use of instructional media. Aini (2013) argue that teachers encounter challenges such as limited time, limited cost allocation, lack of enough instructional media and a negative belief of teachers towards instructional media. These challenges provide the reason for the difference in the utilisation of instructional media. In addition, some teachers lack important skills in using certain instructional media such as projectors or computers. The reason is that there are not enough strategies to offer seminars to teachers to use these instructional media. Moreover, sometimes teachers have limited access to instructional media, which compel them to use other instructional media incompatible with the subject (s).

Instructional Media Usage and Students' Success

Students' success is an important criterion to signify teachers' performance in their teaching process. Teachers must use the right instructional media to present clear messages to students, which can boost their academic success (Dewi et al., 2022). Literature suggest that the association between instructional media use and general students' success. For instance, Petina et al. (2023), posited that instructional media use and students' success have a positive relationship and concluded that the use of instructional media leads to students' success. The clarification should be based on whether traditional and modern instructional media influence students' success. In addition, not only are varieties of instructional media needed but appropriate instructional media should also be applied. Anggorowati (2025) found that the use of digital media such as interactive *Powerpoint* learning media can increase students' learning activity and learning achievement which is very significant. As such, teachers having instructional media, is not enough until students' views are heard for successful instructional media usage for their success. This can be enbaled by creating two-way classroom interaction, henceforth boosting students' participation and success in their learning.

Some scholars have different perceptions on the association between instructional media use and students' success. Thrasher et al. (2011) argue that instructional media are delivery tools that do not influence students' learning outcomes, which depend on self-motivation and other unrelated factors. Selimogue and Arsoy (2009), in their discussion of the effects of PowerPoint on students' performance, found no effect of using PowerPoint on students' learning outcomes. In this case, students' success is not only associated with instructional media usage but also a combination of instructional technologies, learners' background, delivery methods and individual differences among students (Thrasher et al., 2011). These arguments compel a critical discussion on the influence of instructional media on students' learning success.

Moderating Role of the Perceived Ease-of-Use of Instructional Media

Literature indicates that teachers' perception of media is predicted by how teachers feel about the use of media in the teaching-learning process (Kessy & Pessa, 2022). Perceived ease-of-use of instructional media refers to how teachers think about the role of instructional media as an instructional aide, not an instructional system (Manjale & Abel, 2017). Perceived ease-of-use of instructional media has been shown to have a significant impact on teachers' intentions to adopt instructional media as they teach to influence students' learning success. Amir et al. (2020) defined perceived ease-of-use as the amount of mental and physical effort a user puts into using instructional media. This implies that teachers tend to use instructional media that they can use due to their skills, experiences and/or training. In addition, there are psychological components in teachers' perception of instructional media, which means when new instructional media is developed, rejecters and acceptors show different personality features (Fitriasari et al., 2020). Other teachers perceive instructional media as threatening and inhuman (Resti & Rachmijati, 2020). This differentiates teachers on the use of instructional media since most teachers use instructional media that they can utilise even though sometimes it may not fit the learners.

Research studies indicate that instructional media is perceived as a virtual channel between a teacher and students when delivering learning lessons (Dewi et al., 2023). Perceived ease-of-use of instructional media is a measure of how easy it is for users to use instructional media such as videos, tutorials, and other educational materials. In support of that a study by Abdulrahman and Soetan (2018) indicates that teachers are likely to select instructional media that they perceive to be quickly applied, easy to use and which do not extend the need for technical support. Furthermore, positive beliefs and attitudes toward the ease-of-use of instructional media result in students' success. Since perceived ease-of-use enhances less effort in teaching, learning outcomes are said to be positive (Samarasinghe & Chandarasiri, 2019). Perceived ease-

of-use of specific instructional media drives teachers to utilize that media. Therefore, teachers can present the instructions or lessons due to the comfort of using that media. However, teachers sometimes perceive instructional media as easy to use but unsuitable for lesson presentation, resulting in poor performance. Due to this backdrop, students' success differs in schools since teachers use instructional media that are most convenient, and which fit their capabilities.

METHODS

Research Design

This study employed quantitative research design. The selection of this design was based on gathering quantifiable data and ease of performing statistical or mathematical techniques from the studied variables. These variables could simply be quantified through the use of quantitative design and establish the association or cause-effect relationships through the hypothesis tested. Additionally, since the study sought to attain greater knowledge and investigating instructional media's influence on students` academic success, the selection of this design was inevitable. This is because the greater knowledge could only be achieved though having large sample size which is only attained through quantitative research design.

Participants and Sampling Procedures

Both public and private secondary schools were involved. Heads of schools signed consent forms for students' participation since all were below 18 years (a constitutional adult age in Tanzania). The study employed random sampling to select students from five purposefully selected secondary schools. Slovin's formula was used to select 1,246 samples who were integrated with instructional media. A confidence level of 95% (equivalent to an error margin of 0.05) was used in this study. The study uses the school's student registration database as of March 2021/2022. Regarding gender, the studied sample comprised approximately 53% of males, while the females comprised about 47%. Moreover, the majority (about 74%) were between 16 and 20 years old, followed by those between 11 and 15 years (23%). Few had the age of 21 and above.

The majority (about 90%) were from public schools, while the rest, about 10%, were from private schools. This was associated with the fact that the studied area is populated mainly with public schools rather than private. Therefore, including responses from private school students was necessary for comparability. Moreover, the number of responses (117 responses) from private secondary school students was still enough for rigorous statistical analyses. Furthermore, in terms of their class (form) level, the majority were between form one and form Four which is ordinary secondary school. Moreover, about 40% of the respondents prefer social science (art) subjects. However, a few (about 28%) respondents preferred science subjects, while about 29% preferred science and art subjects. The rest of the respondents (about 3%) were found to prefer business studies. The study also included information about the parents` education.

The majority (about 85%) of respondents' parents had a basic (primary or secondary) or tertiary (certificate or diploma) education level, while few of them (about 3%) were reported to attend higher education. About 12% of the respondent's parents were reported to have not attended school. Moreover, regarding family economic status, the majority, about 69%, reported that they belong to middle-income families. This is followed by 28% of those who belong to low-income families. Few (about 3%) belonged to high-income families. Also, the survey included information about the distance between school and students` homes. Further, it was noted that the majority (about 43%) take 30 minutes or below to reach school, followed by those taking at least one hour to get there, about 38%. The rest of the respondents (about 19%) take more than one hour to reach the school (see Table 3).

Instrument

The study used a self-made close-ended questionnaire as a data collection tool. The content was mostly created and developed based on researchers' knowledge and experience about instructional media at various levels of education. Through various literature and central research questions, we developed and shared our designed instrument to prospective samples for feedback before actual data collection. As such, we shared the first draft with rural secondary school teachers in Mvomero District for feedback. Their feedback assisted in producing a camera-ready instrument. The instrument had five sections: demographic characteristics; instructional media usage; students' success; determinants of instructional media usage and perceived ease-of-use of instructional media. Before administering the questionnaire to the intended sample, a pilot study was conducted on a smaller group of respondents with similar characteristics to improve the data collection instrument. The main aim was to test whether the questionnaire is comprehensible, appropriate (questions are well defined), clearly understood, collect the intended data, and presented consistently. Furthermore, the data reliability was evidenced through the Composite Reliability. The cut-off point for composite reliability should be 0.7 and above. All constructs were observed to have a Composite Reliability of more than 0.7

Data Analysis

Data validity and reliability tests were performed using the indices extracted from Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Both descriptive statistics and inferential data analyses were conducted. Moreover, the factor loadings enabled the computation of the average variance extracted (AVE), which refers to the overall explanatory power of the scales on the construct. For the latent construct to be valid, it should have an AVE of 0.5 and above. Lastly, the ordinary least square (OLS) regression was used for hypothesis testing.

RESULTS AND DISCUSSION

Results

The findings of this study are based on the physically administered survey among secondary school students in Tanzania. A total of 1,246 filled questionnaires were collected. This amounts to a 96% response rate compared with the initially intended sample size of 1,295 students. Before further analysis, the Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were performed on the latent constructs to establish their validity and reliability. In addition, various cut-off points (benchmarks) were used to gauge the (convergent and discriminant) validity and reliability of the latent constructs.

Firstly, the EFA was performed on the original dataset to establish the convergent validity of the studied constructs through the factor loadings and the average variance extracted (AVE). Convergent validity refers to the degree to which two or more measurement scales of a particular construct that are theoretically related are, in fact (empirically) related. To ensure this, the factor loadings of the measurement scales within a construct should be 0.7 and above. However, in some cases, scales with factor loadings that hover around 0.6 can be considered. Thus, all scales below the cut-off points were dropped from further analyses. Retained measurement scales within each construct were then rotated within the CFA to ensure sufficient rigour of the retained scales for every construct. Moreover, the factor loadings enabled the computation of the average variance extracted (AVE), which refers to the overall explanatory power of the scales on the construct. For the latent construct to be valid, it should have an AVE of 0.5 and above. Table 1 presents the EFA and CFA results.

Table 1. Exploratory and Confirmatory Factor Analyses on Latent Variables

Latent Variables and their Related Measurement Items	FL	CR	AVE
Students' Success			
Academic assignments, tests, and exam scores	0.81***	0.90	0.70
Behaviours such as class attendance	0.74***		
Mental and physical health	0.59 (Removed-insufficient FL)		
Self-esteem	0.87***		
Sports and games participation	0.91***		
Instructional Media Usage indicators			
Traditional instructional media such as chalkboards and textbooks are much more used in our school than modern ones.	0.9***	0.87	0.69
Modern instructional media such as projectors and computers are much more used in our school than traditional ones.	0.63 (Removed-insufficient FL)		
Instructional media usage influences understanding of the lessons.	0.80***		
Some instructional media such as pictures and television make the lessons more interesting and enjoyable.	0.79***		
Students' Characteristics			
Our behaviours, such as independence and self-awareness, always influence teachers` modes of instruction.	0.75***	0.91	0.71
Our teachers switch their means of instruction depending on our learning capacity.	0.88***		
Our interest in specific instructional media influences teachers to use certain media.	0.9***		
Our knowledge and experience with specific instructional media influence teachers to use that media	0.84***		
Teachers' Characteristics			
Teachers use instructional media according to their experience.	0.79***	0.89	0.66
Teachers have knowledge of using certain instructional media.	0.70***		
The personal interest of our teachers influences them to use a specific mode of instructional media.	0.86***		
Teachers' behaviours, such as being goal-oriented and independent, influence them to use a particular mode of instruction	0.89***		
Socio-economic Factors			
Teachers adopt commonly used instructional media in our school.	0.67 (Removed-insufficient FL)		
Teachers use instructional media that are not costly.	0.82***	0.89	0.68
Teachers at our school use expensive instructional media such as computers because the school facilitates them.	0.76***		
Teachers do not use some expensive instructional media at our school because the school fails to afford them.	0.93***		
Our parents facilitate (contribute some money for) the use of some instructional media such as laboratory facilities.	0.78***		
Subject Content			
Instructional media used are different according to the content of the subjects.	0.90***	0.89	0.62
Teachers use different instructional media depending on the nature of the subject.	0.74***		
Instructional media used for science subjects are hard to understand than those in social science (art) subjects.	0.76***		
I prefer most social science (art) subjects because their contents are easy to understand.	0.70***		
I prefer most science subjects because their contents are easy to understand.	0.81***		
Ease-of-use on instructional media indicators			
Our teachers prefer to use instructional media that do not require much effort.	0.93***	0.88	0.70

Instructional media used by our teachers do not consume time to complete the lesson.	0.80***		
The modes of instructional media used are easy to understand.	0.78***		
Instructional media used are very useful in delivering lessons.	0.54 (Removed-insufficient FL)		
Extracurricular Activities			
I always engage in games such as soccer, netball, and volleyball.	0.72***	0.87	0.62
I always engage in artistic activities such as music and fashions.	0.77***		
I always engage in agricultural activities such as cultivating a family farm and keeping and feeding family cattle.	0.89***		
I always engage in family business activities such as selling the family shop and other business activities.	0.76***		
I prefer most to spend time on social media such as Instagram, Facebook, and WhatsApp.	0.6 (Removed-insufficient FL)		

Note: Comparative Fit Index (CFI) = 0.91, Tucker-Lewis Index (TLI) = 0.94, Root Mean Square Error of Approximation (RMSEA) = 0.013, Standardized Root Mean Square Residual (SRMR) = 0.051. FL= Factor loadings, CR= Composite Reliability, AVE= Average Variance Extracted. ***= Statistical significance at 1%

Moreover, the discriminant validity, which refers to the degree to which a measurement scale differs from (i.e., does not correlate with) another measurement scale having a conceptually separate underlying construct, was observed. It happens when the AVE of a particular construct is higher than the correlation factors square from other constructs (see Table 2). Furthermore, the data reliability was evidenced through the Composite Reliability. The cut-off point for composite reliability should be 0.7 and above. All constructs were observed to have a Composite Reliability of more than 0.7 (see also Table 1).

Table 2 Discriminant Validity

Latent Variables Correlation Square Matrix								
Factors	suces	extcur	Use	Stx	Tix	sbc	Sef	eou
Suces	1.000							
Extcur	0.015	1.000						
Use	0.016	0.042	1.000					
Stx	0.071	0.012	0.024	1.000				
Tix	0.028	0.006	0.016	0.192	1.000			
Sbc	0.018	0.000	0.003	0.076	0.041	1.000		
Sef	0.000	0.002	0.017	0.005	0.001	0.003	1.000	
Eou	0.028	0.008	0.019	0.090	0.063	0.036	0.009	1.000
AVE	0.700	0.620	0.690	0.710	0.660	0.620	0.680	0.700

Note: suces= Students' success, Extcur= Extracurricular activities, Use=Instructional media usage, Stx= Students` characteristics/behaviour, Tix= Teachers/instructors` characteristics, Sbc= Subject contents, Eou= Perceived ease-of-use, Sef= Socioeconomic factors.

Descriptive Statistics and Correlation Results

The descriptive statistics (Table X) reveal that the majority of respondents (52.6%) were male, and most (74.2%) were aged between 16 and 20 years. The data show that 90.6% of the participants attended public schools, reflecting the typical Tanzanian educational context. Regarding the socio-economic background, 68.5% of students reported belonging to middle-income families, while 28.8% were from low-income households.

Concerning the latent constructs, students reported moderate levels of instructional media usage (M = 3.045, SD = 0.549) and fairly high levels of learners' characteristics (M = 3.564, SD = 0.642). However, socioeconomic factors recorded the lowest mean score (M = 2.813, SD =

0.555), implying that financial constraints may hinder effective utilization of instructional media. The results suggest that while both learners and instructors possess favorable attributes for integrating instructional media, contextual and resource-related challenges still persist. Table 3 presents the results of the descriptive statistics on the respondents' general information.

Table 3. Descriptive Statistics on the Respondents' General Information

Variable	Obs	Freq	Mean	Std.Dev	Min	Max
Gender						
Female	1,246	590	0.474	0.499	0	1
Male	1,246	656	0.526	0.499	0	1
Age						
11 - 15 yrs	1,246	291	0.234	0.423	0	1
16 - 20 yrs	1,246	925	0.742	0.438	0	1
21 - 25 yrs	1,246	30	0.024	0.153	0	1
School type						
Public	1,246	1,129	0.906	0.292	0	1
Private	1,246	117	0.094	0.292	0	1
Form level						
Form One	1,246	116	0.093	0.291	0	1
Form Two	1,246	238	0.191	0.393	0	1
Form Three	1,246	375	0.301	0.459	0	1
Form Four	1,246	383	0.307	0.462	0	1
Form Five	1,246	77	0.062	0.241	0	1
Form Six	1,246	57	0.046	0.209	0	1
Subject Preferences						
Science	1,246	347	0.278	0.448	0	1
Social science (art)	1,246	496	0.398	0.490	0	1
Business	1,246	41	0.033	0.178	0	1
Both	1,246	362	0.291	0.454	0	1
Father`s education						
Did not attend sch	1,246	135	0.108	0.311	0	1
Basic/tertiary	1,246	1,055	0.847	0.360	0	1
High	1,246	56	0.045	0.207	0	1
Mother`s education						
Did not attend sch	1,246	148	0.119	0.324	0	1
Basic/tertiary	1,246	1,068	0.857	0.350	0	1
High	1,246	30	0.024	0.153	0	1
Family economic status						
Low income	1,246	359	0.288	0.453	0	1
Middle income	1,246	853	0.685	0.465	0	1
High income	1,246	34	0.027	0.163	0	1
School distance						
30 min and below	1,246	529	0.425	0.494	0	1
30 - 1 hour	1,246	476	0.382	0.486	0	1
More than 1 hour	1,246	241	0.193	0.395	0	1
Latent variables						
Students' success	1,246		3.788	0.449	1	5
Instruction media usage	1,246		3.045	0.549	1	5
Perceived ease-of-use	1,246		3.278	0.525	1	5
Students` characteristics	1,246		3.564	0.642	1	5
Instructors` characteristics	1,246		3.525	0.643	1	5
Socioeconomic factors	1,246		2.813	0.555	1	5
Subjects` contents	1,246		3.111	0.470	1	5

Extracurricular activities	1,246	3.023	0.470	1	5

Additionally, the pair-wise correlation analysis was performed on all identified variables. The aim was to spot whether there are highly correlated variables leading to multicollinearity problems. The results in Table 4 show no serious multicollinearity problem reported as the correlation values among variables were below the cut-off point of 0.7. The analysis revealed that students' characteristics were positively and significantly correlated with instructional media use ($r = 0.1541$, $p < 0.05$). This indicates that learners with higher motivation, readiness, and self-efficacy are more likely to utilize instructional media effectively. Similarly, instructors' characteristics ($r = 0.1257$, $p < 0.05$) and perceived ease-of-use ($r = 0.1390$, $p < 0.05$) were positively related to media use. The findings support the argument that both learners and teachers' attributes play a critical role in promoting technology integration. Although socio-economic factors were also correlated with media use ($r = 0.1312$, $p < 0.05$), the strength of this relationship was relatively weaker, suggesting that individual and pedagogical factors may outweigh contextual limitations in influencing instructional media usage. The variance inflation factor (VIF) further confirms these results in Table 5, where all variables had the VIF below the cut-off point of 5.

Table 4. Pairwise Correlation among the Factors in the Eight Model

Factors	Suces	extcur	Fedu	Medu	Econ	gen	schldist	use
suces	1							
extcur	0.1235*	1						
fedu	0.1112*	0.0132	1					
medu	0.0285*	0.0041	0.4798*	1				
econ	0.1387*	0.006	0.1228*	0.0804*	1			
Gen	0.0915*	-0.0191	0.0149	-0.0302*	-0.0611*	1		
schldist	-0.0084	-0.0936*	-0.0450*	-0.0096	-0.0454*	-0.0778*	1	
Use	0.1269*	0.2053*	0.0028	-0.008	0.0352*	-0.0037	0.0378*	1
Stx	0.2662*	0.1113*	0.1021*	0.1040*	0.0980*	-0.0691*	0.0233*	0.1541*
Tix	0.1688*	0.0762*	0.0320*	0.0528*	0.1076*	-0.012	0.0627*	0.1257*
Sbc	0.1351*	0.0159	-0.0095	0.0139	0.0838*	-0.0388*	0.0333*	0.0523*
Sef	0.0054	-0.0409*	0.0261*	0.0584*	-0.0835*	0.1370*	-0.019	0.1312*
Eou	0.1663*	0.0898*	0.0458*	0.0506*	0.1180*	-0.1133*	-0.0047	0.1390*
Schl	0.1026*	-0.0230*	0.0956*	0.0156	0.1080*	-0.0584*	0.2162*	0.0758*
uzEz	-0.018	0.0066	0.0599*	0.0519*	-0.0106	0.0644*	0.0240*	-0.0970*
uzSc	0.0463*	0.0714*	0.0026	0.003	0.0330*	-0.0301*	0.1321*	0.3046*
	Stx	Tix	Sbc	Sef	Eou	schl	UzEz	uzSc
Stx	1							
Tix	0.4384*	1						
Sbc	0.2751*	0.2031*	1					
Sef	0.0700*	0.0299*	0.0513*	1				
Eou	0.2998*	0.2504*	0.1886*	-.0973*	1			
Schl	0.1534*	0.2059*	0.1291*	0.1234*	0.1530*	1		
uzEz	0.0283*	0.0149	0.0114	0.0239*	-.0425*	0.0264*	1	
uzSc	0.0582*	0.0879*	0.0452*	0.0429*	0.0703*	0.2266*	0.1175*	1

Note: suces= Students' success, Extcur= Extracurricular activities, Use=Instructional media usage, Stx= Students` characteristics/behaviour, Tix= Teachers/instructors` characteristics, Sbc= Subject contents, Eou= Perceived ease-of-use, Sef= Socioeconomic factors. Fedu= Father`s education, Medu= Mother`s education, Econ= Economic status, Gen=

Gender, Schldist= School distance, Schl= School type, UzEz= The interaction/moderator (Use X Eou), UzSc= Interaction/moderator (Use X School type), *= Statistical significance.

The findings in Table 5 indicate that there was no significant multicollinearity among the predictors, suggesting that each variable contributed independently to the explanation of instructional media use among students.

Table 5 Variance Inflation Factor Analysis for Multicollinearity Check

Variable	VIF	1/VIF
Stx	1.4	0.71408
Fedu	1.34	0.74623
Medu	1.32	0.75931
Tix	1.31	0.76243
Use	1.22	0.81837
Schl	1.2	0.83465
UzSc	1.19	0.83699
Eou	1.19	0.84375
Sbc	1.12	0.8929
Sef	1.1	0.90776
Schldist	1.09	0.92101
Extcur	1.08	0.92934
Econ	1.06	0.94638
Gen	1.05	0.95254
UzEz	1.05	0.95352
Mean VIF	1.18	

Note: suces= Students' success, Extcur= Extracurricular activities, Use=Instructional media usage, Stx= Students` characteristics/behaviour, Tix= Teachers/instructors` characteristics, Sbc= Subject contents, Eou= Perceived ease-of-use, Sef= Socioeconomic factors. Fedu= Father`s education, Medu= Mother`s education, Econ= Economic status, Gen= Gender, Schldist= School distance, Schl= School type, UzEz= The interaction/moderator (Use X Eou), UzSc= Interaction/moderator (Use X School type).

Regression Model Assumptions Tests for Goodness-of-Fit

Table 6 Regression Model Assumptions Tests for Goodness-of-Fit

Regression Assumption	Test	Benchmark
No Heteroskedasticity problem	Breusch-Pagan hettest	
	Chi2(1): 3.846	> 0.05
	p-value: 0.0624	
No multicollinearity problem	Variance inflation factor	< 5.00
	See Table 4.5	
Residuals are normally distributed	Shapiro-Wilk W normality test	
	z value: 6.136	> 0.01
	p-value: 0.152	
No model specification problem	Link test	
	t-value: 1.194	> 0.05
	p- value: 0.233	
Appropriate functional form	Test for appro. Function form	
	F(3,1227):0.564	> 0.05
	p-value: 0.639	
No influential observations	Cook`s distance	
	No distance is above the cut-off	< 1.00

The CFA estimates (see Table 1) and various regression model assumptions tests (see Table 6) were used to establish the model goodness-of-fit. Several benchmarks confirmed the model's goodness of fit. The CFI and TLI of 0.91 and 0.94, respectively, were close to the cut-off point of 1.00. The RMSEA and SRMR of 0.013 and 0.01 were below the cut-off point of 0.08. Moreover, the results from Table 6 show no heteroskedasticity problem as the p-value from Breusch-Pagan's hettest result of 0.062 is above the cut-off point of 0.05. Heteroskedasticity problems happen when there is a consistent shift in the dispersion of the residuals over the range of observed values. The results also showed that the data were normally distributed based on the Shapiro-Wilk W normality test, where the p-value was above the cut-off point of 0.01. Furthermore, there was no evidence of a model specification problem as, based on Link test results, the p-value was greater than the cut-off points of 0.05. The results also confirm the presence of appropriate functional form based on the p-value of 0.639, above the cut-off point of 0.05.

Discussion

The results suggest that instructional media usage in teaching and learning aim to assist teachers in delivering quality and meaningful learning among students. It is in this understanding the study sought to find out the determinants of instructional media usage. Three aspects emerged including students' characteristics, instructors' characteristics, and socio-economic factors. In doing so, several items were used to proxy the students' characteristics as the construct. These include independence, self-awareness, interest, learning capacity, knowledge, and experience. The results indicate a positive relationship between learners' characteristics and instructional media usage. This can be interpreted that when learners are independent, instructors are motivated to use certain instructional media such as textbooks for self-review. On the contrary, when learners are dependent, instructors use other instructional media such as group discussions and presentations. This finding is more intelligible if we put it in the context of Tanzania secondary schools whereby the use of appropriate instructional resources and media is in line with competency-based doctrines (competence-based education). The instructional media design theory supports these findings. The need for media choice by the instructor is necessary for learning purposes as it was discussed under the theory of instructional media design that states the requirement of different media to teach different individuals of varying learning capacities. The findings concur with Morrison and David (2023) who found that learners' characteristics (age, level of education) determine instructional media usage.

Socio-economic factors were also more evident with several measures developed to capture the construct: cost, school support, and parents' support. The results suggest that teachers use instructional media which are affordable (not costly). Thus, instructional media with a low acquisition cost are commonly used, such as chalkboards and textbooks. Hence, when the instructional media are costly, the more the limitation on its usage by instructors. Furthermore, instructional media are less applicable when there is low school and parents' support. The schools, especially private schools, provide instructors with more instructional media such as laboratories, models, computers, and plenty of textbooks. This finding agrees with that of Ramdhani and Muhammadiyah, (2015) who revealed that socio-economic factors such as the cultural behaviour of schools determine the use of specific instructional media influences teachers to adopt similar instructional media.

Relationship between Instructional Media Usage and Students` Success

This study examined the relationship between instructional media usage and students' academic success captures the main objective of this study. The results confirmed a positive relationship between instructional media usage and students' academic success. The current findings align with other prior studies, such as Maede & Juma (2023) and Majoko (2018), which

pointed out that instructional media usage is positively related to students' academic success. It is agreed that variety and appropriate instructional media which enhance students' academic success should be in place for quality teaching and learning among students and teachers. When the school is associated with various instructional media, teachers can have various choices to use when teaching. The outcome of having various instructional media such as textbooks, computers, laboratories and chalkboards exposes students and teachers to effective teaching and learning.

Furthermore, appropriate instructional media plays an important role in influencing students' academic success. For instance, laboratory usage is appropriate for practical studies when teaching science subjects. However, the results of this study are contrary to Selimogue and Arsoy (2009), and Rufus & Muhammad (2018), who argued against the positive relationship between instructional media and students' academic success. These researchers have a negative notion that instructional media usage does not correlate with students' academic success.

According to these researchers, students' academic success depends on self-motivation and other factors not associated with instructional media. This study adds instructional media as another credible influence on students' academic success. With reference to this research theory, the research findings in this regard are supported by the Media Richness theory, as it was said earlier that the richness of the media triggers the selection and usage of the particular media even though this selection is based on a number of reasons which includes Perceived ease-of-use and its usefulness, instant feedback, and the media should take little effort for students and instructor to communicate. With all these, the media usage enhances the students' performance, which is marked as students' academic success.

Moderating Role, Perceived Ease-of-Use and Instructional Media Usage

Since the study developed a positive relationship between instructional media usage and students' academic success, it was necessary to analyse their moderating variables. The study used perceived ease-of-use as among moderating variable between instructional media usage and students' academic success. The results indicated that perceived ease-of-use positively moderates the relationship between instructional media usage and students' academic success. As discussed earlier, perceived ease-of-use includes mental and physical efforts in using instructional media. The study found that, when there is high perceived ease-of-use on a specific instructional media, it is more likely to use that media. When less effort is used during teaching and knowledge acquisition via certain instructional media, students' academic success will likely be higher.

Teachers use instructional media, which they perceive to be easy when delivering lessons. The outcome is that less effort and time are applied when teaching, resulting in students capturing the lessons fast. However, when instructors struggle to use certain instructional media, it is more difficult to deliver clear lessons, ultimately causing poor performance. Difficultness in using instructional media is due to less experience and training in using new instructional media introduced. The evolving technology has transformed instructional media from traditional to modern, requiring knowledge. So, when instructors are not trained, it is more difficult for them to use the new media such as tablets and projectors.

Similarly, the media richness theory discusses the perceived ease-of-use of instructional media and marks it as key to media selection. However, the fact could not stand alone as many named factors could make difficulties in the use of the media. For example, the factors likely could be the ability of users to adapt easily to the evolvement of technology or advanced technology that needs training. In these regards, the media richness theory supports the findings of this study, encouraging instructors and learners to perceive the ease-of-use of instructional media.

Implications, Limitations and Directions for Future Research

The results obtained from the study support the instructional design theory and media richness theory, which were discussed in an earlier chapter. The research observed that during the selection of instructional media, there are several factors which instructors consider. These include teachers' characteristics, students' characteristics and socio-economic factors. The study supports instructional design theory, which considers the teaching environment and learners' state. The approach of instructional design theory conceives the determinants of instructional media usage. This study adds more determinants of instructional media usage which have not been theorized in instructional design theory. These include socio-economic factors and instructors' states. Again, the advantage of instructional media on students' academic success has been indicated in this study. The use of instructional media attributes to students' performance in secondary schools. The results provide knowledge on using appropriate instructional media during teaching and learning.

Although this study generated research knowledge in analysing instructional media usage and students' performance, it has encountered some limitations that call for the need for further research. To begin with, the study did not verify the positive relationship between subject content and instructional media usage. Instead, the results indicated the presence of a negative relationship. Non-conformity of this variable triggers more research to investigate further the association between the subject content and instructional media usage.

On other grounds, the study analysed the influence of instructional media usage on students' academic success in secondary schools. Future research can investigate whether students' performance and success in higher learning institutions are influenced by instructional media usage. Also, the determinants of instructional media usage in higher learning institutions can be analysed. This is useful in obtaining the similarities and differences between what influences students' academic success in secondary schools and higher learning institutions. Lastly, the study established academic knowledge on instructional media usage as among the factors of students' academic success. Further research can explore other leading factors for students' success besides instructional media usage, such as individual attributes, behaviour, and self-motivation.

CONCLUSION

The study aimed to explore the influence of instructional media on students' academic success in selected secondary schools in Nyasa District. The researcher established several hypotheses, which were tested to reach on reliable conclusion. The study first tested the determinants of instructional media usage: students' characteristics, teachers' characteristics, and socio-economic factors. The findings indicated that these determinants positively influence instructional media usage. Hence, students' characteristics and instructors' characteristics have a strong influence on instructional media usage. These variables determine which instructional media to use as the study proves them positively related to instructional media usage. In addition, the study established the hypothesis on the relationship between instructional media usage and students' academic success.

The results indicated a positive relationship between instructional media usage and students' academic success. Conclusively, instructional media usage enhances students' academic success. The study combines the determinants of instructional media usage with students' academic success; and that students' academic success can be achieved when instructional media are correctly determined during their use. In addition, perceived ease-of-use and school type were analysed to test their influence on instructional media usage and students' academic success. The results showed that these moderating variables influence a positive relationship between instructional media usage and students' academic success. Therefore, the study concludes that the positive relationship between instructional media usage

and students' academic success is achieved with perceived ease-of-use and school type.

CONFLICT OF INTEREST

The authors declare no conflict of interest. This research was conducted honestly and solely for its intended academic purpose.

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