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Original Article

The Influence of the Contemporary Instructors' Digital Training Practices on Students Learning Outcomes in the Selected Higher Learning Institutions in Tanzania

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ABSTRACT

Since the introduction of Information and Communication Technology in the 1990s globally, Higher Learning Institutions (HLIs) have been experiencing digital transformation in delivering instructions. In Tanzania, HLIs are among the sectors that encountered digital instability in facilitating digital training programs in this technological era. The instructors' digital training practices are of great concern in the process of achieving the desired students' learning outcomes. This research article, therefore, assesses the Influence of the contemporary instructors' digital training practices on students' learning outcomes in the selected higher learning institutions in Tanzania. A sample of 237 instructors from two higher learning institutions were selected randomly. A self-administered questionnaire, key informants interview and focus group discussion were employed as data collection tools. The findings indicate a significant influence of instructors' digital training practices on students' learning outcomes specifically in the key parameters of using digital resources such as laptops, and interactive internet software such as Zoom meetings, emails and websites. The findings imply a more pronounced relationship between the variables, indicating a greater inclination towards advanced digital teaching practices among the instructors in higher learning institutions in Tanzania. It is concluded that the instructor's digital training practices encompass the use of digital technology in the training/ learning process. However, the instructors' digital training practices require improvement since the tested variables indicated a weak/low coefficient It is recommended that instructors improve their digital practices for the impactful contribution to their student's learning outcomes.

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INTRODUCTION

Instructors' digital interaction is considered to improve respective training instructional activities. The overall insights on the instructors' digital practice help to identify strengths and respective weaknesses as far as Higher Learning Institutions (HLIs) training is concerned. Tanzania Higher learning Institutions are adopting digital technology in facilitating their training. The question that remains unanswered is to what extent digital usability influences the students' learning outcomes. This is because the integration of technology into training facilitation has attracted the attention of many scholars whereby a mixed picture of digital training practices is vivid, where those with interactions have more practice unlike those with certifications Puteh et al. (2017). In the same vein, the respective influence on student learning outcomes raises the discussion on the instructor's digital training practices that encompass the use of digital technology in the delivery of learning instructions.

In the course of assessing the trend of digital technology usability practices, Wilhelmsen *et al* (2009) study found that the response rate among mentor teachers was quite low than the responses from the trainer teachers as far as ICT usability. Schlebusch et al. (2023) indicated that initially, lecturers from both universities had limited digital literacy as they were in the process of transitioning from traditional face-to-face teaching methods and required guidance on integrating technology into their instructional practices. Therefore, the availability of digital tools, software, and the Internet automatically equips student teachers with the required competencies to include technology in their instructional methods. In addition, Mizova et al. (2021) found that 82.93% (out of all the 1002 teachers in the survey) took part in 5 or more 5 training courses, 43.71% in 10 or more courses, whereas 32.93% in more than 10 trainings. However, despite attending such trainings there are many issues teachers and students encounter during the online teaching and learning process.

In principle, the instructor's digital practice concerning what is trained adds value to the entire learning process. In assessing the influence of instructors' digital practice on students learning outcomes Pinto, & Leite (2020) indicated the use of technologies in students' learning process and outcomes revealed to be positive, used to promote students' active engagement and participation in the learning process inside and outside the classroom walls. This indicated that digital technologies support more transmissive ways of teaching, facilitating students individually to access, share and publish information, and are significantly less used to promote collaborative and cooperative learning. Ghavifekr, & Rosdy (2015) indicate that teachers' well-equipped preparation with ICT tools and facilities is one of the main factors in the success of technology-based teaching and learning.

Burac et al. (2019) indicate that the use of e-learning systems shows a positive influence on student learning. Most instructors utilized the e-learning system as a presentation and preparation tool in teaching and learning. Most instructors positively confirm that e-learning supports teaching and learning effectively implemented. Baki *et al.(*2013) found that, on average, students in online learning conditions performed modestly better than those receiving face-to-face instruction.

On the contrary, the trainers' delivery and use of visual aids do not have a significant influence on the assimilation of training content (Andoh et al., 2022). Martins *et al.* (2023) point out a clear recognition of the advantages of digital technologies in the teaching-learning process of students with Specific Needs, not being so evident about Technologies as a decisive factor in the process of inclusion of these students. It was also further verified that the teachers'

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perceptions do not always agree with the usefulness of their practices.

The comparison study between face-to-face and blended mode indicated an advantage over face-to-face classes was significant in those studies contrasting blended learning with traditional face-to-face instruction but not in those studies contrasting purely online with face-to-face conditions. Studies have shown that course organization and structure, student engagement, learner interaction, and instructor presence have accounted for considerable variance in student satisfaction and perceived learning in online learning environments through a range of pathways (Gray, & DiLoreto 2016; Baki et al., 2013). Similarly, Hollister *et al.* (2022) found that the students reported that they struggled with staying connected to their peers and instructors and managing the pace of coursework.

Studies have indicated a promising practice of instructors' digital practice in facilitating training towards achieving positive student learning outcomes supported by the frequency of Instructors' digital interaction and training. It was also found that professional development training programs for teachers also played a key role in enhancing students' quality learning yet some studies indicated little or no contribution of instructors' digital practices in achieving expected student outcomes in Higher Learning Institutions in Tanzania. Hence a need to map contemporary digital practices towards students' learning outcomes.

RESEARCH METHODOLOGY

The study employed a cross-sectional design. The design was chosen since it allows data to be collected at once from different cases (Kumar, 2011). The design fit for this study because the data was collected from two institutions running digital training (online programmes) which were located in different regions at one point in time. Also, cross-sectional design has been proven to be suitable for estimating the prevalence of behaviour in a population (Sedgwick, 2014). In this case, the study comprehensively investigated the influence of digital training practices on students' learning outcomes.

Study Area

The study is based in the United Republic of Tanzania (URT) specifically the selected higher learning Institutions. URT is a sovereign state made up of the former Tanganyika and Zanzibar. Tanzania is among the five countries in East Africa and lies between latitudes 1 degree and 12 degrees south of the equator and Longitude 29 degrees and 41 degrees Greenwich. Tanzania has about 12 public higher learning institutions, and 24 private higher learning institutions TCU (Guide book 2022). Additionally, the higher learning institutions registered under NACTEVET were about 537 (NACTEVET Guide Book 2023). The Open University of Tanzania (OUT) which is one among the 12 public higher learning institutions under the TCU and the Institute of Accountancy Arusha (IAA) which is among the 537 higher learning institutes under NACTEVET were selected for this study. The selection of the two institutions (OUT and IAA) was based on the following reasons they were among HLIs practising blended mode and have much experience in employing digital training practices in facilitating HLIs training, whereby digital training among instructors has been reported to be low, and its effectiveness in achieving students' learning outcomes is not clear. OUT delivers its courses through a blended mode while IAA delivers some of its courses through the same blended mode.

Population of the Study

The study population consisted of all employed academic staff of the two selected academic institutions who are engaged in online teaching, regardless of their specialization. The two selected institutions are estimated to have more than 583 academic staff with designations starting from tutorial assistants to full professors who are currently engaging in teaching and research activities in the selected higher learning institutions.

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Table1. Population Distribution

S/No	Institution Name	Population
1	Institute of Accountancy Arusha	260
2	Open University (Dodoma, Dar es Salaam, Manyara and Arusha)	323
Total		583

Source: Prospectus 2023.

Sample Size and Sampling Procedure

A sample size of 237 academic staff was derived from an estimated population of 583 employed academic staff from the two selected higher learning institutions based on the Yamane formula of 1967;

$$n = \frac{n}{1 + N\,e^2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where n is the sample size, N population size e is the level of precision. The formula assumes that p=.05 (maximum variability). The desired confidence level is 95% and the degree of precision/sampling error accepted is 5%. Therefore;

$$n = \frac{583}{1 + 583\ (0.0025)} \approx 237$$

Every element in the sample was selected by using simple random sampling; where a proportion of the population of each selected institution will be equally and randomly picked from the employment records through the lottery method. The procedure considers the sampling elements to have homogenous characteristics since all were academic staff. However, the key informants and focus group participants will be purposively selected.

Table 2. Sample size

S/No	Institution Name	Population	Sample Size
1	Institute of Accountancy Arusha	260	$\frac{260}{583} \times 237 = 106$
2	Open University	323	$\frac{323}{583} \times 237 = 131$
Total		583	237

Data Collection Methods

Both primary and secondary data were collected in this study. The primary data collected include socio-demographic characteristics of the respondents, specialization background, years of teaching experience, digital training practices and impact on the learning process. For the case of secondary data, reports indicating digital tools bought by the institution and instructors' digital use records were analysed. Four data collection techniques were employed in collecting the data. These include questionnaire surveys, Interviews, focus group discussions and observation.

A total of 237 open and closed self-administered questionnaire copies for the selected academic staff were developed to cover the four specific objectives. The content development of questionnaires was guided by the TPACK and TAM frameworks Mishra, & Koehler (2006); Davis (1989). Questionnaires were divided into several subsections based on specific objectives and general preliminary information. A normal five-point Likert scale was developed for collecting data. TPACK customized five Likert scales with additional items developed for collecting data. TAM customized five Likert scale tools with additional items developed to collect data. The pretesting of the questionnaire was carried out on at least five percent of the selected sample size. The selection of the questionnaire has several benefits including offering an efficient and cost-effective means of gathering data from a large number of participants simultaneously, a crucial advantage when faced with resource constraints (Bryman, 2016).

Interview

Interviews are highly valuable when researchers aim to explore the depth of information, particularly opinions, perceptions, and views that may be

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concealed by the respondents (Adegoke, & Bolu-Steve, 2017). A face-to-face interview was conducted whereby a total of 8 participants were selected for this study as key informants for the interview. For each institution, 4 key informants were purposively selected per institution making a total of 8 key informants. The proposed number for the key informants was adequate for data triangulation and saturation purposes. These key informants included heads of departments and deans of faculties who are directly engaged in ICT usability and digital training practice.

Data Analysis

The objective of this study is to investigate the influence of contemporary instructors' digital training practices on students' learning outcomes in the selected higher learning institutions. Therefore, for quantitative data analysis, it employed descriptive statistics like mean, standard deviation, and frequency distributions to summarize variables related to training practices concerning students' learning outcomes. Additionally, inferential statistics, including binary regression was employed. Key assumptions for the binary regression were tested including no extreme outliers, collinearity tolerance and linearity of independence.

The assumption that there are no extreme outliers was tested using Cook's Distance Assessment. The analysis included 237 valid cases with no missing data. The mean Cook's Distance was 0.071036, and the median was 0.010914, indicating that most of the data points had minimal influence on the regression model. The standard deviation was 0.149226, suggesting a relatively low spread of influence scores. The range of Cook's Distance values was 1.30201, with a minimum value of 0.00005 and a maximum value of 1.30206. Importantly, the maximum value was well below the threshold of 5, confirming that there are no extreme outliers in the dataset that could disproportionately affect the model.

The presence of multicollinearity among the independent variables was assessed using Tolerance and Variance Inflation Factor (VIF) values. All Tolerance values are above 0.1 and VIF values are below 10, suggesting that multicollinearity is not a concern in this model. Specifically, Tolerance values closer to 1 and VIF values under 3 indicate a low level of multicollinearity, meaning that the independent variables are not excessively correlated, and each contributes uniquely to the model.

The binary logistic assumption test examines the linearity of independent variables in a logistic regression model. In this analysis, each item represents a statement related to the respondent's use of digital technologies in teaching, with mean squares indicating the variation in responses, F-coefficients representing the strength of the relationship, and significance values suggesting whether the relationship is statistically significant. Generally, lower significance values indicate stronger evidence of linearity between the independent variables and the likelihood of the respondent engaging in specific digital teaching practices. Notably, items with higher F-coefficients and lower significance values, such as "I do create and modify different types of teaching resources" and "I do set up and adapt complex and interactive training resources," suggest a more pronounced relationship between the variables, indicating a greater inclination towards advanced digital teaching practices among respondents.

Qualitative Data Analysis

The recorded qualitative data was coded and organized thematically. The thematic analysis was used to identify and analyze recurring themes or patterns within the qualitative data (Jack, 2019). Thematic analysis is suitable for this study due to its exploratory nature, enabling to assessment of digital training practices' impact on student learning. It is a qualitative method that facilitates a deeper understanding of instructors' digital practices, offering flexibility to adapt study objectives. It is also useful in recognizing patterns in qualitative data, providing rich descriptions, and accommodating inductive theme development, all essential for comprehensively exploring digital training practices and their effects on learning outcomes.

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Validity of the Study

To ensure that the instrument covers all the components and valid information, the entire process of developing the questionnaire was guided by content validity. This type of validity was ensured by reviewing the previous studies in assessing the adequacy and accuracy of what it measures. Different methods of data collection are employed to ensure the validity of the qualitative information (construct validity). In addition, the validity of the qualitative data was ensured by collecting data from credible sources including government reports and high rigor publication houses. For the case of the interview-based data relevancy of the expertise was considered in the selection of the interviewed participants.

Reliability of the Study

Reliability encompasses the consistency of a research study and the reproducibility of findings in the future. If research results can be consistently duplicated or reproduced, they are considered reliable. Internal reliability of items for the self-administered questionnaire was measured by Cronbach alpha as defined by;

Fami (2000) $\propto = K/K-1 \times S_T^2 - \sum S_I^2$ ..... (2)

Where α (alpha) coefficient; K the number of items; S_T^2 is the total variance of the sum of the item and the variance of the individual item. The reliability of variables is indicated by a Cronbach Alpha (α) value exceeding 0.70. The pairwise deletion method was applied in performing the reliability analysis. Therefore, within the framework of this research, reliability focused on the consistency of responses to questions in repeated measurements, aligning with the precision and accuracy of the measuring instrument.

FINDINGS AND DISCUSSION

Socio-demographic Characteristics of the Respondents

Three socio-demographic characteristics concerning respondents who participated in the study were established. These include age, sex and name of the institution. The attributes were considered to have influence on the employed digital pedagogy which in turn could have indirectly assumed influence on students' learning outcomes. The findings are indicated in Table 3 below.

Table 3: Respondents' Socio-demographic Characteristics

Variable	Attribute	frequency	Percent
Sex	Male	160	67.5
	Female	77	32.5
Age category	Below 30	22	9.3
	30 to 39	105	44.3
	40 to 49	85	35.9
	50 to 59	23	9.7
	Above 59	2	0.8
Name of the higher learning institution	OUT	115	48.5
	IAA	122	51.5

The finding indicates more males participated in this study than females. This indicates that there are more male instructors than females in higher learning institutions in Tanzania. The number is attributed to gender historical issues of few enrolment of females as far as education delivery is concerned in the Tanzania community context. This concurs with the study on vital statistics on university education in Tanzania (Tanzania Commission for Universities, 2022) which indicates there are more male than female instructors in higher learning Age-wise, the majority of instructors are between ages 30 years to 39 years reflecting the young aged population of the country. The participation as per selected institution is almost equal in number with IAA leading the figures as per established employment records. The two institutions have records of integrating ICT in their training delivery.

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The Influence of the Existing Instructors' Digital Training Practices on Students Learning Outcomes

In assessing the extent of instructors' influence of digital practice on students' learning outcomes, the researcher established 15 Likert scale items which were later indexed. The findings in Table 4 generally indicate a positive significant influence of instructors' digital practices on students' learning outcomes. The strength of this relationship varies between the items reflecting specific practices with details indicated in Table 4 below.

Table 4: The Influence of the Existing Instructors' Digital Training Practices on Students Learning Outcomes

Item	Beta (β)	SE	Odd R.	P-Value
I do create worksheets with a computer	0.237	0.11	1.268	0.032*
I do create digital presentations, but not much more	.197	.126	1.218	0.117
I create and modify different types of teaching resources digitally	.620	.173	1.858	<0.001**
I set up and adapt complex and interactive digital training resources	0.806	.163	2.238	<0.001**
I do not only use technology in class but also outside class	0.231	.118	1.260	0.050*
I do make only basic use of available equipment eg; digital whiteboards or projectors	0.191	.145	1.210	1.210
I use a variety of digital strategies in my teaching	1.197	0.252	3.31	<0.001**
I do use digital tools to systematically enhance teaching	1.395	0.274	4.034	<0.001**
I use digital tools to implement innovative pedagogic strategies	1.252	0.246	3.497	<0.001**
I regularly monitor and analyse my students' online activity	0.729	.160	2.073	-
My students work in groups via digital platforms	0.006	0.127	1.006	0.964
In most cases, I can integrate digital technologies into group work	0.138	0.127	1.147	0.277
I do require students working in teams to use the internet to find information and present their results in a digital format	.668	.163	1.951	<0.001**
My students exchange information and jointly create knowledge in a collaborative online space regularly.	.952	.190	2.591	<0.001**

The results of the binary logistic regression analysis reveal that the predictor variable "*I do create worksheets with a computer*" has a significant impact on the outcome variable (P=0.032). The beta coefficient (β) of 0.237 suggests that holding all other variables constant, individuals who do not use computers to create worksheets are associated with 1.268 times higher odds of affecting the outcome compared to those who do. This finding underscores the importance of digital tools in educational practices, suggesting that utilizing computers for worksheet creation may positively influence learning outcomes in the selected higher-learning institutions. This finding is supported by Rafiq et al. (2024) highlight the need for improved technical support, professional development, and institutional support to maximize the benefits of digital learning platforms that contribute to the understanding of digital tool integration in higher education and provide practical recommendations for enhancing learning outcomes in similar contexts. The finding is further supported by one of the key informants has this to say,

> "*I understand and am able to create worksheets, word, PowerPoint, Excel and e-learning assignments using a computer* ".

This indicates that the practice of instructors depends on the presence and availability of computers that assist them in performing different digital practices that enhance students' learning outcomes.

Similarly, the results of the binary logistic regression analysis indicate that the predictor variable "*I do create and modify different types of digital teaching resources*" significantly influences the outcome variable (P<0.001). The beta coefficient (β) of 0.62 suggests that individuals who engage in creating and modifying various teaching resources are associated with 1.858 times higher odds of impacting the outcome compared to those who do not. This finding highlights the importance of educators actively

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engaging in the creation and adaptation of teaching materials, emphasizing its positive impact on student learning outcomes in higher learning institutions. A study by Alemu (2015) reveals some crucial factors that have prevented instructors and students from using ICT in teaching and learning, among these the institutional ones such as lack of proper access to ICT resources, overcrowded classrooms, lack of technical and pedagogical support are more influential on the integration process. The researcher then recommended that the Ministry of Education and Sample University should pass a bill at the national assembly on the use of effective ICT facilities in the educational system by providing adequate funds, securing ICT experts in the university and ensuring that these facilities are monitored from time to time. This finding is supported also by one of the key informants who has this to say:

> *"I can develop digital lecturers through Zoom and mobile device applications when get connected to the internet"*

This indicated that instructors have the ability to create digital resources that can be used in delivering instructions in the presence of an internet connection.

Indeed, the p-value for the predictor variable "*I do set up and adapt complex and interactive digital training resources*" is less than 0.001, indicating an extremely high level of statistical significance. The beta coefficient (β) of 0.806 indicates that individuals who engage in setting up and adapting complex and interactive training resources are associated with 2.238 times higher odds of influencing the outcome compared to those who do not. This finding underscores the crucial role of incorporating complex and interactive training resources in instructional practices, emphasizing their substantial positive impact on student learning outcomes in higher learning institutions. This finding was once supported by Okoye K *et al.* (2023) that the users upheld the emphasis on lack of training, infrastructures and resources, and access to the internet and digital platforms, as the main challenges to the teaching-learning process. Supporting online learning includes faculty support for instructional design, technology selection and usage, creating accessible materials, and evaluating courses and faculty instruction. To support continuous improvement, faculty need data about their online courses to help improve their teaching practice and to help ensure that changes made in future course offerings are data-driven (Reid et al., 2015).

One of the focus groups supported this finding by saying:

> *"I have used digital technologies such as PowerPoint, zoom lectures, online assignments and short videos in teaching my class over the years and I can perform the key operations successfully"*

Certainly, the results of the binary logistic regression analysis demonstrate that the predictor variable "*I do not only use technology in class but also outside class*" has a significant impact on the outcome variable (P=0.05). The beta coefficient (β) of 0.231 suggests that individuals who incorporate technology both inside and outside the classroom are associated with 1.26 times higher odds of affecting the outcome compared to those who do not. This finding underscores the potential importance of utilizing technology not only within the classroom but also extending its use beyond formal instructional settings, albeit with a slightly weaker statistical confidence compared to other predictors. The study by Al-Samarraie (2019). Web videoconferencing (WVC). WVC, as compared to DVC and IVC, appears to provide a more promising learning environment for students to freely collaborate and communicate effectively through different interaction channels. Also, Alison Lockman et al. (2020) indicated that most of the strategies with promising effectiveness in the online environment are the same ones that are considered to be effective in face-to-face classrooms including the use of multiple pedagogies and learning resources to address different student learning needs, high instructor presence, quality of faculty-student interaction, academic support outside of class, and promotion of classroom cohesion and trust. One of the focus groups has this to say:

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> "*Anyone can be involved in online learning wherever he or she is what matters is the presence of an internet connection*"

This means that the instructor's use of technology can be applied anywhere but internet availability matters in facilitating the delivery of instructions to enhance students' learning outcomes.

In the same way, the binary logistic regression analysis for the predictor variable "*I do use a variety of digital strategies in my teaching*" yielded a significant impact on the outcome variable, with a p-value of <0.001. This suggests that educators who employ diverse digital strategies in their teaching approach are associated with 3.31 times higher odds of affecting the outcome compared to those who do not, after controlling for other variables in the model. This finding underscores the importance of utilizing a wide range of digital tools and methods in educational practices to potentially enhance student learning outcomes. Offering professional development that meets online faculty needs will require a collaborative effort among all stakeholders in higher education (Carpenter et al., 2016). Additionally, Coswatte, & Shelton (2017) provide elements that could be used as a checklist to help certify faculty who are ready to serve as online instructional faculty and those who would be ready to serve as online course development faculty after completing training. One of the focus groups supported these findings by saying:

> *"I can ask students to perform different digital functions by allowing online discussion during teaching, online presentations and quizzes did online*"

As one of the strategies of delivering instructions, this helps the instructors to identify easily the areas that need more emphasis during teaching and learning.

However, the results indicate that the predictor variable "*I do use digital tools to systematically enhance teaching*" also significantly influences the outcome variable, with a p-value of <0.001. This implies that educators who intentionally incorporate digital tools to enhance their teaching methods are associated with 4.034 times higher odds of impacting the outcome compared to those who do not. This highlights the effectiveness of systematic integration of digital resources in educational practices, potentially leading to more favourable learning outcomes among students. This finding is supported by Chen et al. (2010) who point to a positive relationship between Web-based learning technology use and student engagement and desirable learning outcomes.

Furthermore, the predictor variable "*I use digital tools to implement innovative pedagogic strategies*" exhibits a significant impact on the outcome variable, with a p-value of <0.001. This suggests that educators who leverage digital tools to implement innovative pedagogical approaches are associated with 3.497 times higher odds of affecting the outcome compared to those who do not. This underscores the importance of embracing innovative teaching methods facilitated by digital technologies to foster enhanced learning experiences for students. This finding is supported by the study done by Karen, & Brinkley-Etzkorn (2028) that revealed that instructors demonstrated: (a) statistically significant changes in their incorporation of elements into the redesign of course syllabi and (b) improvements in their teaching abilities as self-reported in the follow-up survey. However, there were no significant changes in their student evaluations of teaching pre-training and post-training. Overall, instructors demonstrated modest improvements in their teaching effectiveness. Also, Bonk (2006) found that the most important skills for an online instructor during the next few years will be how to moderate or facilitate learning and how to develop or plan for high-quality online courses. In effect, the results indicate that planning and moderating skills are perhaps more important than actual "teaching" or lecturing skills in online courses. Additionally, Chukoskie *et al.* (2022) found that students' ratings of their professors and course staff remained positive, there were significant decreases in lecture engagement, attendance, and perceived ability to keep up with coursework, even as expected grades rose.

Furthermore, the predictor variable "***I do require students working in teams to use the internet to find information and present their results in digital format***" significantly influences the outcome

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variable, with a p-value of <0.001. This implies that instructors who mandate internet usage for collaborative work among students are associated with 1.951 times higher odds of impacting the outcome compared to those who do not. This emphasizes the potential benefits of integrating digital collaboration tools into educational practices to promote teamwork and information literacy skills among students. This finding is supported by Chen et al. (2010) who show a generally positive relationship between the use, the learning technology and student engagement and learning outcomes. The study done by Alison S. Lockman; Barbara & Schirmer (2020). Indicate that the online environment is user-friendly technology tools, orientation to online instruction, opportunities for synchronous class sessions, and incorporation of social media and methodological designs from which claims of causality can be made or meta-analyses could be conducted.

In addition, the predictor variable "***My students exchange information and jointly create knowledge in collaborative online space regularly***" exhibits a significant impact on the outcome variable, with a p-value of <0.001. This suggests that educators who facilitate regular collaborative online activities among students are associated with 2.591 times higher odds of affecting the outcome compared to those who do not. This highlights the importance of fostering a collaborative learning environment enhanced by digital technologies, potentially leading to a more effective knowledge construction, and sharing among students. Henderson (2018) developed a framework from a review of the relevant literature that explores engagement in educational contexts with five key elements considered essential to effective online learning: social engagement, cognitive engagement, behavioural engagement, collaborative engagement, and emotional engagement. Learning and teaching online is complex and we continue to learn how to more effectively support the online learning journeys of students. Educators and researchers will continue to develop tools and strategies to overcome the challenges of our work in the online space.

CONCLUSION AND RECOMMENDATIONS

The instructor's digital training practices in higher learning institutions in Tanzania are very important. The instructors are more familiar with digital operations in delivering instructions. It is generally concluded that digital practices significantly influence student learning outcomes. This implies that digital practices support the delivery of instructional design and materials for the learning process among students. In this changing era of technology, the findings have policy implications on preparing the enabling environment for instructors and students to improve training delivery, especially on a few parameters that did not indicate a positive relationship.

It is recommended that there is much we can do to create online learning environments that enhance learning and teaching outcomes, provide opportunities for students to engage online, and foster connections with each other, instructors, the educational institution, and the industry while developing strong disciplinary knowledge and multidisciplinary skills. As the number of students enrolling in online courses in higher learning institutions is on the rise, it is important that the instructors get the current digital training practices so as to cope with the current technological demand in teaching and learning and explore the nature and quality of engagement. Higher learning institutions should improve internet accessibility and deliberately train instructors for effective delivery of instructions to students. At individual levels, instructors are encouraged to enrol themselves in online training programs that are free to develop their respective digital skills, knowledge and experiences in delivering their programs.

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