Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6, 728-737
2024
Publisher: Learning Gate
DOI: 10.55214/25768484.v8i6.2144

E-tutors' experiences with integrating technologies in online course modules: A case of open distance e-learning

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Abstract: This study aims to explore how e-tutors' experiences influence their ability to integrate technologies, with a focus on the realities of technology knowledge during the facilitation of modules in an Open Distance e-Learning (ODeL) context. A survey was conducted to investigate the experiences of e-tutors in integrating technology across various modules within a department of an ODeL institution. Six e-tutors participated in the survey, and their involvement was voluntary, with no impact on their employment contracts, ensuring informed participation. The research utilized the constructivist learning theory to examine how e-tutors prioritize student engagement and promote active involvement in technology-enhanced constructivist learning environments. Data collected were organized and displayed in tables. The findings revealed that e-tutors had positive experiences integrating technologies into online module teaching. Additionally, they recognized the role of technology in supporting and enhancing the teaching of online student activities. These results provide further insight into the use of technology as a valuable educational tool in ODeL institutions, helping students deepen their understanding of subject matter. Moreover, students exposed to technology-integrated modules were more likely to adopt technology for independent learning.

Keywords: *E-tutors, Experiences, Multimedia technologies, Open distance e-learning.*

1. Introduction

What is already known about the topic is that technology is a teaching tool and that there is still a greater need for more technology integration especially in higher education institutions that model Open Distance eLearning (ODeL) environments. This paper adds to e-tutorship scholarship within ODeL and how Technology-enhanced constructivist learning environments might provide insights into advanced technologies during e-tutoring processes. Its implications for policy and practice propose enhanced professional development for e-tutors, institutional support for technology integration, and general promotion of online students' autonomy and lifelong learning.

Institutions that model as ODeL rely on technologies for continual existence in the space of distance. An assumption is that during facilitation, the integration of technologies by e-tutors during the online course modules' instructions is advanced. A caution to the assumption is that e-tutors do not receive any additional offers for competence development that might address the advancements of competencies for technology integration [1]. The paper's aim is "What are the e-tutors' experiences with the integration of technological knowledge realities during the facilitation of modules in an ODeL context? To achieve the aim set for the paper, a synthesis of literature was considered. The literature was content-specific with constructs that addressed to develop the aim further. The literature set parameters that focused on the 2023-year literature whose aim was to achieve some credible recent convergence about the topic. The following constructs grounded the discussions, e-tutor maintenance of

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virtual classrooms, how they teach the 3d and 2d diagrams for the course modules in design thinking, and the integration of technologies while teaching course modules.

The integration of technologies provides a pedagogical approach that creates chances for modules in distance classes that give students a rich and diverse educational environment [2]. Technology integration has the power to enhance some technological tools to fulfill predetermined teaching and learning activities in course modules [3]. In this study, the concept of technology included all forms of educational technologies that are used in an online environment. Such technological tools enable e-tutors to overcome some challenges by carefully determining how and when students interact with course content [4]. The case study ODeL institution uses the Learning Management System (LMS) for e-tutors to engage with students during student support activities. An LMS is frequently used in higher education, and it serves as a doorway to teaching and learning with opportunities to create, distribute, track, and manage various types of training and educational materials for online students [5]. LMS platform allows for a variety of feedback formats, which might give an e-tutor a chance to engage with the students [6]. An assumption is that online e-learning envies skilled e-tutors who are technologically competent to support students online.

E-tutors should be aware of the value of integrating technologies in virtual classrooms as opposed to just using those classes in general to provide educational materials to the students [7]. The e-tutors who create and provide the online learning materials in a virtual classroom are an essential component of virtual learning [8]. During virtual learning, assignments, forums, and quizzes can be used to identify student's weaknesses and misconceptions about their modules' content [9]. Different technologies that are thought to be crucial for e-tutors to organize and maintain a virtual classroom are a vital necessity for the integration of technologies throughout the delivery of the online modules' content. Within the LMS, technologies of telecollaborative platforms [10]; JointNet screen [11]; Multimedia video technologies [12]; Möbius strip VR tool [13] and flipped learning, [14] were identified for exemplification purposes of technological tools for integration during student support.

Studies that positioned themselves on the integration of technologies in module courses were found. Telecollaborative platforms offered useful activities encouraging engaging and fruitful online conversations from online students [10]). Some e-tutors helped students with topics while integrating technologies [15]. Participants stressed the significance of ICT tools that may help integrate technology for effective teaching [16]). JoinNet screen technologies were crucial for e-tutors to communicate with students during the COVID-19 pandemic. JoinNet's compatibility with multimedia presentations was able to assist e-tutors with immediate feedback for the students (Tran et al. 2023[11]. Flipped learning has been shown to improve student learning and assessment (Tang et al. 2023[17]). Multimedia content of videos were discovered to be a successful tool for improving students' knowledge retention and transfer (Hazratkulovich, 2023 [12]). Students appeared to be acutely aware of the integration of Möbius strip as an illustration of a non-orientable surface tool [18]. Virtual Classrooms provided a positive atmosphere during learning in response to teacher-student interaction especially since the students' engagement with homework increased [19]. There was satisfaction from study respondents that exposure to virtual classroom settings had a significant and direct positive impact on the perceived usefulness and perceived ease of use of the tool [20]. Training opportunities for technologies offered more motivation to groups and the levels of anxiety about technologies improved by the time the online training was over [21].

There were concerns raised about the integration of technologies in literature for the student recipients and e-tutors. The student participants were unaware of the VR tool which was new and that it added stress to the students and harmed their performance [22]. Students felt they lacked the necessary technological pedagogy and subject-specific skills and were more likely not use technology in virtual classrooms [23]. There was a lack of consistent virtual classroom spaces and students experienced a lack of constant communication with e-tutors [24] During online instruction, the majority of students experienced the absence of technological interactions and practices due to their e-tutors' lack of ICT [25]. E-tutors encountered occupational stress because of limited digital skills, and

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 728-737, 2024
DOI: 10.55214/25768484.v8i6.2144

digital pedagogy after the initial enthusiasm and evident commitment to ensuring continuity in learning [26].

E-tutors were assigned to teach both 3d and 2d diagrams for design thinking (Technology Education) module courses for the online students. There were literature searches to ground how e-tutors comprehend the teaching of both 3D and 2D diagrams online. Design thinking e-tutors were advanced in their technological methodological know-how module courses [27]. Students involved in the conceptual design process were satisfied with the visual expressiveness of their 3D diagrams based on the technologies employed by e-tutors [28]). Students were able to view the 3D design from various angles making it simpler for them to learn and comprehend the concept of 3D education [29]. Students reported that they understood the purpose of 3D diagrams from A11yBoard's design for 3D diagrams, which prevented them from feeling overwhelmed by the 3d designs [30]. The students valued the way they created and edited features by primarily employing comprehensive models and 2D and 3D drawings for certain inquiries [31]. The literature also offered opposite conclusions to those mentioned above. There were fewer tidy 3D drawings on objects in consideration of the fact that high detail precision is necessary with size when making prototypes [32]. 3D printing did not offer opportunities for e-tutors to change teaching or learning in the case of online education [33].

The opposite literature findings were obtained about both 3d and 2d diagrams. E-tutors are frequently constrained in their capacity to explain 3D ideas and concepts to their students in basic module courses [13]. E-tutors were not able to use a variety of hardware and software to help their students develop and work with 3D prototypes, [27]. E-tutor competence in the use of digital tools based on 3D software for both teaching and learning in module courses was inadequate [27]. It is difficult for online teachers to communicate to students the true view of 3D shapes [34]. Teachers experienced it impossible to explain computer technologies for 2D images when they are mapped in a 2D array of pixels [34]. Literature grounds the purpose which was set for the study which needed to examine the e-tutors' facilitation experiences related to the technologies' integration in online course modules.

2. Method

2.1. Context

The University of South Africa (UNISA) was founded in 1873 to provide certificates, diploma-level qualifications, degree-level programmes, honours, masters and doctoral degrees across the world. It originally started as a correspondence learning mode later blended and has now moved to become fully online where lecturers and e-tutors engage with students online. UNISA's reliance on technology to engage and support students is at a hundred percent. Students engage with lecturers and e-tutors through course modules. Course modules range from certificates, diploma-level qualifications, degree-level programmes, honours, masters and doctoral degrees. This study was undertaken in a department within a college of seven colleges and institutions within the university. Within the department, there are four units with design and thinking as the fourth of the units where this study took place. Students register and are not restricted to a number of modules courses for different programmes. For this paper, the module courses were from February to October and were credited at 120 points. The modules for this paper varied where some are assessed online for examinations while others are of a continuous type of assessment. This paper was conducted with two modules that the researcher was assigned to teach.

2.2. Participants

The survey design was administered to six e-tutors who were the informants in course modules within the design thinking course module. Their appointment was based on their qualifications which was set as a criterion from the institution. The number corresponded with the number of students who were enrolled in a course programme which required a total of one hundred students per e-tutor. The e-tutors started at the beginning of the term until the end of the term when the students were about to sit

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 728-737, 2024
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for their final examinations. The e-tutors' participation in the questionnaire was fair in that they were adequately informed, warned, agreed to participate and it had no impact on their employment contracts.

2.3. Materials

Quantitative and web questionnaires were employed for data collection in this paper. Questionnaires were used as data collection instruments designed to gather specific information from respondents [35]. It incorporated a range of statements regarding the integration of technologies. The original questionnaire questions from a research project were divided into six thematic groups: E-tutor abilities to organize virtual classrooms; E-tutor abilities to teach 2d and 3d diagrams with technologies (7 aspects); E-tutor abilities to integrate technologies while teaching course modules (8 aspects); E-tutor abilities to deliver online tests for online students (6 aspects); E-tutor abilities to encourage students to use online technologies for content learning 6 aspects) and e-tutor abilities to encourage students' familiarity with multimedia technologies during their online learning process (10 aspects). The division was thought justifiable since it provided coherent themes and also abilities to comprehensively analyse the topic under discussion. This paper focused on single items within three themes of: e-tutor abilities to organize virtual classrooms; e-tutor abilities to teach 2d and 3d diagrams with technologies and e.-tutor abilities to integrate technologies while teaching course modules.

The focus on three constructs within the original scale was to ascertain particular competencies which were guided by the main research question formulated for the paper. The purpose of the data alteration process was to broaden and enhance comprehension [36]. A Microsoft form supported with the collection process where within the forms, a five-point Lickert Scale with rating scales was used. The scale's simplicity ranged from "Strongly Disagree" to "Strongly Agree"; "Disagree to Agree" and "Neutral") makes it easy for respondents to understand and respond to survey items [37]. The validity and reliability of the measurement instruments accurately assess intended constructs and yield consistent results from the design and pretest by senior experts in the field specialization [36;38].

2.4. Data Analysis

In terms of the data analysis, the data was obtained from the Google responses as soon as a response was received from an e-tutor, it generated data in the form of tables. The analysis was based and organized in pie charts from the percentages which were obtained about each construct. Three constructs were built to explain how e-tutors utilize technology in modules from the use of tables. The following structures were presented with the use of three tables: Table 1 broadened the statement "I have abilities to organize virtual classrooms," Table 2 caught the statement "I can teach 2D and 3D diagrams with the use of technologies," and Table 3 clarified the statement "I can integrate technology while teaching a course module."

3. Framework for the Paper

Constructivism learning theory grounded an understanding of how e-tutors integrate technologies in online course modules. Technology-enhanced constructivist learning environments advanced educational technologies that have enabled the development of interactive and multimedia-rich constructivist learning environments in ODeL [39]. In this paper, anticipation is for e-tutors to integrate technologies where online students construct meaning from their learning interactions with e-tutors. Scholars, (Barak 2007; Leshem 2012) [40;41] explained that constructivist teaching prioritizes the students and emphasizes their active involvement in the learning process, along with the integration of ICT has become more prevalent in the current paradigm of teaching. The intersection of constructivism and e-tutors advances towards leveraging technology for active learning where students engage in hands-on activities and exploration. The technologies that promote active learning experiences assist e-tutors in selecting appropriate technologies and a construction may be that the students who engage with e-tutors online might construct new knowledge based on their comprehension of the theory.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 728-737, 2024
DOI: 10.55214/25768484.v8i6.2144

4. Results

This section of the results is based on the constructs mentioned in the paper earlier about: e-tutor abilities to organize a virtual classroom; e-tutor abilities to teach 2d and 3d diagrams with the use of technologies and e-tutor skills to integrate technologies while teaching a course module.

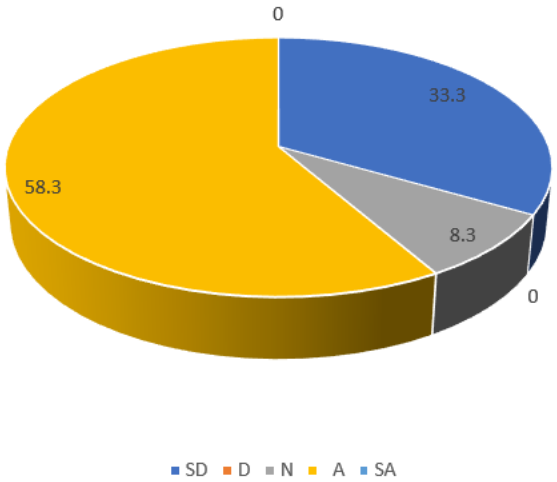

Figure 1.
I have abilities to organize a virtual classroom.

Figure 1 was expanded to reflect the e-tutors' facilitation experiences from maintaining virtual classrooms for an online course module. 91.6 % of the online test takers said in response to Table 1 that they agreed or strongly agreed with the construct. From the reflection, it can be inferred that e-tutors have abilities to organize the virtual classes. A report like this one has the advantage of giving us the chance to better understand what neutral, disagree, and strongly agree mean. 8,3% of those surveyed claimed they did not know their concept. Based on what we know about the fraction of those who strongly agreed and disapproved along with those at neutral, the remaining 1% can be separated into those who agreed and disagreed about the construct. We can infer from these explanations that e-tutors were successful in upholding virtual classrooms.

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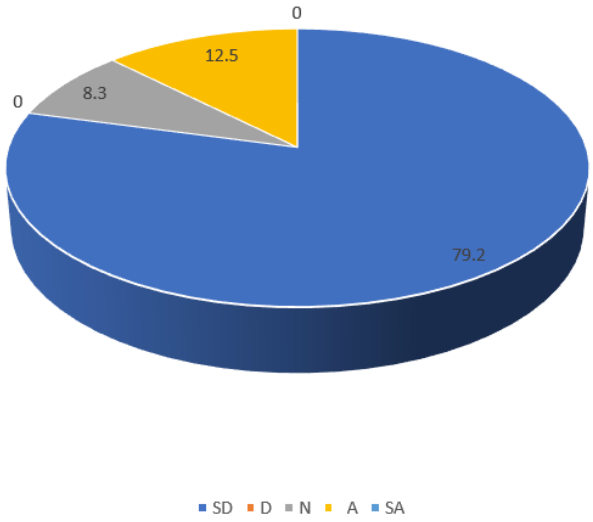

Figure 2.
I can teach 2d and 3d diagrams with the use of technologies.

Six online tutors responded to a survey question concerning their expertise in imparting knowledge of 2D and 3D diagrams derived from technological applications. The table shows that 91.7% of respondents either strongly agree with the construct or agree with it. The conclusion that the e-tutors were able to control and utilize technologies to teach 2D and 3D diagrams was informed by the crucial denominator of 91.7%. In contrast, 8.3% of respondents who were deemed neutral reported no appreciable differences from the findings of those who strongly agreed or agreed with the notion. Others have drawn attention to the zero score percentages they gave the construct for lack of relevance (strongly disagree and disagree). Findings about how well e-tutors may use technology in the teaching of a course module are presented in the following table.

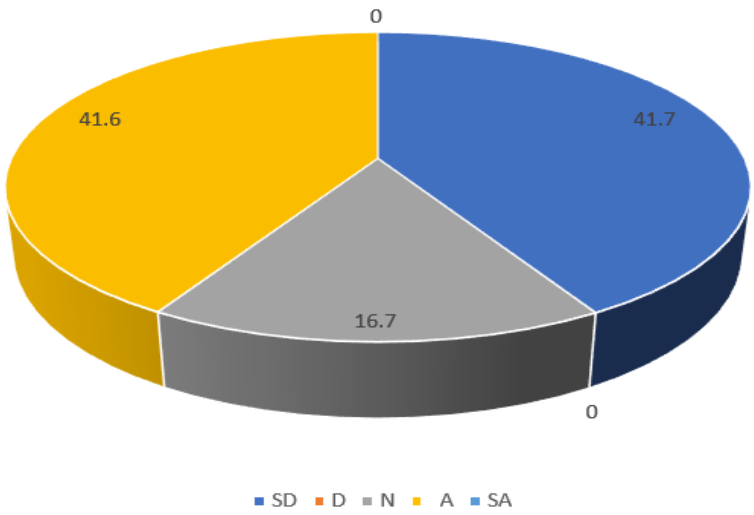

Figure 3.
I can integrate technologies while teaching a course module.

Figure 3 was created to give information about how likely it is that technology will be incorporated into the teaching of a certain course module. According to Figure 3, 83.3% of respondents strongly and

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 728-737, 2024
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generally agree that they are capable of integrating technologies throughout the delivery of course modules. One might assume that e-tutors were able to incorporate technology when they were teaching a course module based on how strongly agreed and agreed everyone was on the construct that has been stated so far. The findings were compared to the results of 16.7% of individuals who reported neutral outcomes from analyses that showed no deviation from the results so far. Another set of data came from those who gave them 0 points in either the strongest disagreement or the overall disagreement categories.

5. Discussion

Three figures in this paper—not in any particular order—provided some kind of support for the objective that helped the piece develop. The action implied that each table could be independently connected to a certain construct that could be measured with a specific rationale, which justified the objective. The results of Figure 1 provide information regarding the percentages that can be seen to strongly agree and agree about the construct. It was possible to conclude that online tutors could keep up with virtual classrooms. [7; 8; 21] have found similar results to those observed in this work. According to a report from [20], there was satisfaction due to the use of virtual classrooms in two study groups of girls and boys because of its considered good impact utility and perceived ease of use. The current results appear to be in line with earlier studies by [19] that discovered noticeably favorable responses following the adoption of virtual learning, where teacher-student interactions were typical of doing the study sessions and homework. The studies concluded that the students were able to complete their homework properly because of being exposed to a virtual learning environment. If the two results are combined, they may via association offer more value to the construct. According to an association with a study by [21], the control group that was exposed to virtual learning saw beneficial changes in motivation and anxiety at the conclusion of the course, particularly during the COVID-19 pandemic. The discussion that follows focuses on Table 2 of the publication.

Figure 2 was created for a specific reason related to how e-tutors use technology to teach 2D and 3D graphics. What was discovered was that 91.7% of the online tutors claimed they could alter and use technology to teach 2D and 3D designs. Their assertion was verified by reading works by (29; 28; 31;30;27] all of whom reached the same conclusions. According to the Gao (2023) report, students could view the design from a variety of perspectives, which made it simpler for them to grasp and comprehend the idea of three dimensions. According to the findings of [28], the semantic transparency and the visual expressions pleased the students' involvement with 3D iconic images during the conceptual design process. In a similar vein, findings from [30] support those from [29] and [28] in those students never reported feeling overwhelmed by 3D diagrams due to the use of an A11yBoard in the design. According to [31] the students valued the way they created and edited features by primarily employing comprehensive models and 3D and 2D drawings for particular inquiries. The topic of technology integration used by e-tutors to teach module courses is presented in Figure 3 below.

What was found from a construct that became significant to establish, in particular, the efficacy of e-tutors with the integration of technologies during the teaching of module courses, is what was acquired as the results in Figure 3. The results that were obtained with an indication that e-tutors were able to integrate technologies during the teaching of a course module were enhanced by the stated purpose. After 83.3% strongly agreed and agreed about their capacities to integrate technologies while teaching a course module, it was concluded that they were able to do so. Similar results from other studies to these have been found. According to [5] telecollaborative platforms technology encouraged students to engage in productive online conversation during practical exercises for assessments. [15] found that some instructors helped students with the topic or worked on it with the integration of technologies was confirmation of this. [16] echoed this sentiment when they asserted that successful technology integration necessitates having the fundamental ICT skills that are essential for successful technology integration. The JoinNet screen technologies were important tools for communicating with students during the COVID-19 pandemic, where e-tutors were able to receive feedback from students

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 8, No. 6: 728-737, 2024
DOI: 10.55214/25768484.v8i6.2144

immediately and that e-tutors were also able to adjust lessons from the compatibility in JoinNet that supports multimedia presentations, according to a supporting report by [11].

Additional research was found to support the conclusion made about Figure 3. With the design of Figure 3, [14] expanded further accords of knowledge. The inclusion of flipped learning led to fewer disturbances during online learning, and it was noted that students' learning focus and evaluations of their learning improved as a result. According to [12], the inclusion of multimedia content like videos increased students' knowledge retention and transfer in online information security courses, including STEM courses. Students appeared to be very aware that the Möbius strip is an example of a non-orientable surface technology, which was introduced to them by the e-tutor who was pedagogically aware that it registers a striking outcome during project teaching online, according to additional study results by [13], which also concur with the purpose.

6. Conclusion

It has been demonstrated that e-tutors' incorporation of technology effectively improves both the teaching and learning processes, especially in virtual settings. The results of this study's numerous numbers show that most e-tutors can use technology to teach difficult subjects topics in modules like 2d and 3d graphics and include multimedia resources in course modules. These findings support the notion that technology-enhanced learning environments and virtual classrooms promote in-depth comprehension, active student participation and academic achievement. The examined research provides compelling evidence that virtual learning environments may mimic traditional approaches in terms of comprehension and in some cases even outperform them. This is in line with the overarching goal of using digital learning tools to enhance students' performance.

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ISSN: 2576-8484
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