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A Reflection on the Transformational Leadership Approach to E-learning Ecologies Towards the Pedagogy for Enhanced Student Learning

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ABSTRACT

The effect of the COVID-19 pandemic propelled the use of digital technology in the educational landscape. This paper reflects on the transformational leadership approach in digital technology integration in instructional activities at the Namibia University of Science and Technology (NUST). The paper used a Technological Pedagogical Content Knowledge (TPACK) framework to reflect on the context. Furthermore, the paper addressed the following objectives: 1) to evaluate the TPACK features on academic staff of the university, 2) to develop a strategic plan for enabling digital technology for effective instructional activities at the university and 3) to assess the implementation of the designed strategy to ensure its effectiveness and sustainability. The study employed deductive content analysis through a qualitative research method. The data was obtained through the existence and intensity of certain phenomena, their relationships and dependencies, to describe the circumstances and a variety of elements of content, to conclude on their characteristics. Moreover, data was analysed using ATLAS.ti. Through the reflective assessments, the findings were that the transformational leadership approach is needed in an era of digital technology in order to provide transformational teaching and learning. Thus, the paper recommends that continuous professional development is needed through on-the-job training and workshops. These academic developmental initiatives should move the academics from the periphery towards the centre where technological, pedagogical and content knowledge are combined to enable effective teaching and learning in a higher educational context.

Keywords: Transformational leadership, Student learning, Digital technology, TPACK, Namibia University of Science and Technology, ATLAS.ti

1. INTRODUCTION

This paper focuses on the area of academic technology and is an in-depth assessment of the needs and a comprehensive proposal for a sustainable and holistic approach to meeting those needs. It aimed at enhancing academic technology with the objective of enabling an effective integration of technology towards student learning. Studies have confirmed that technology enables effective student learning (Iqbal et al., 2021; Ghavifekr & Rosdy, 2015). The effective integration of technology at the Namibia University of Science and Technology (NUST) plays a pivotal role in fostering collaboration, communication, exchange, and the dissemination of information, which in turn significantly impacts the creation of a rich learning environment that effectively prepares students to thrive and excel in an increasingly technology-driven world. For instance, Simataa (2015) indicated that in Namibia, computer technology is integrated in teaching and learning. To elaborate further,

Kanyemba and Josua (2023) posit that ICT played the role of enabling online teaching, learning and assessment during the COVOD-19 pandemic. Despite the challenges that were experienced, there were also opportunities that could be exploited to enhance effective teaching, learning and assessment in educational settings.

In order to successfully accomplish the task of maintaining a pioneering position in technological integration, NUST has developed an encompassing and forward-thinking technology plan that serves as a robust guideline for the purposeful utilisation of technology to support and propel its mission. This exemplary plan, not only establishes a solid foundation for technology initiatives but also provides a clear vision in which to cultivate and expand in the realm of technology integration. Technological initiatives at NUST are designed in a way that integrates and promotes the use of information and communication technologies (ICTs) in support of learning, teaching, and research functions of the institution. Of course, it is not just the presence of the technology that is important, but the willingness of both students and staff to use and exploit these technologies for the benefit of their learning, teaching, and research tasks. Adequate support by institutional staff and careful planning has made the most impact on these developments. Some key initiatives that have been implemented and/or explored at NUST include the establishment of computer literacy centres or common learning spaces, use of the learning management system (LMS) platform for teaching an online component of a module, use of multimedia or web tools to teach a module, use of online simulation resources, accessibility to the educational institution's website, etc. This carefully crafted plan therefore serves as the pivotal starting point for numerous technology initiatives that seek to elevate and enhance both administrative and academic technology services offered at NUST. Archer (2003, 1996, 1996)'s domains of structure, culture and agency form a foundation of NUST's vision of the consolidation of the e-environment from a structural point of view. A domain used to provide a big picture view of how the various components of integrating technology at the university interrelate with each other.

1.2 Objectives of the paper

The paper attempted to address the following objectives:
1) to evaluate the TPACK features on academic staff of NUST,
2) to develop a strategic plan for enabling digital technology for effective instructional activities at NUST,
3) to assess the implementation of the designed strategy to ensure its effectiveness and sustainability at NUST.

1.3 Statement of the problem

Globalisation's swift progress, which diminishes international obstacles and revolutionises the corporate realm, is concurrently broadening the prospective influence of academic institutions. It is crucial for the Faculty of Commerce, Human Sciences, and Education (FoCHSaE) to maintain a technological advantage. Thanks to advanced communication technology, higher education institutions (HEIs) are no longer restricted to serving only local student populations or accessing educational resources within their immediate geographical areas. Similarly, the increasing requirement for continuous learning opportunities in order to stay up-to-date with social, economic, and technological advancements drives the desire for accessible alternatives to traditional in-person, campus-based teaching. Furthermore, the presence of rivalry among HEIs fosters the progress of technology within universities. Universities face numerous obstacles when it comes to implementing technology-based advances. Many academics are hesitant to embrace new educational methodologies, including computers or communications devices due to the influence of academic traditions, such as the faculty-centred lecture.

With such challenges, technology may enhance education by fostering interactivity and collaboration. Furthermore, successful e-learning benefits as a solution greatly benefit from the right type of transformational leadership skill, vision, or directive characteristics and the necessary personal qualities to succeed in implementing a process with information communication technology proficiency, can bring about significant enhancement within teaching and learning outcomes. Like any other strategic direction, for e-learning to succeed, there is need for teaching and management staff to learn how to embrace e-learning and its potential to engender change by adopting digitally augmented platforms for the improvement of teaching and learning. This solution is in line with the study conducted by Schmitz et al. (2023) who opines that transformational leadership exerted a substantial and favourable influence on the digital school infrastructure, teachers' optimistic attitudes towards digital technology, their technical proficiency, and their ability to educate using digital technologies.

Emails, online platforms for courses, and computer-mediated chat rooms are a few examples of technology-enhanced services that promote communication and collaboration among students. Studies conducted on

education have demonstrated that collaborative learning chances improve memory retention, comprehension, and problem-solving abilities (Vázquez-García, 2018; Yang et l., 2016). Technology may significantly facilitate the functioning of collaborative teams, groups, and other sorts of learning groups, especially among students who are not geographically close and cannot physically meet for seamless learning. The advent of technology has revolutionized lives, and the educational setting has seen significant changes in recent years. Therefore, the purpose of this paper is to reflect on the transformational leadership approach in a digital technology integration in instructional activities at the Namibia University of Science and Technology (NUST).

2. LITERATURE REVIEW

Previous research on the impact of transformational leadership and TPACK on digital education has established that wise technology integration is not simply a matter of selecting to use, but a matter of how to effectively use technology in context within the curriculum (Choi & Young, 2019). In their study conducted in the United States of America, Choi and Young (2019) opine that technology integration cognition should thus be thought of as pedagogical design thinking that involves critically examining the affordance of learning technologies and then strategically applying them to teach particular subject matter ideas within a specific classroom context. To better describe such teacher cognition concerning technology integration, their study proposes TPACK-L, an expanded framework for teachers' technology integration knowledge, by adding the principles of learning theory to the existing TPACK framework, and delineates this pedagogical design thinking.

The literature further highlights a study by Thyssen et al. (2023) carried out in Germany on TPACK digitality-related pedagogical and content knowledge model in Science, Technology, Engineering and Mathematics (STEM) Education. Their study findings revealed that digital transformation in STEM teaching requires additional professional knowledge considering the transformation of communication, mediatisation and society. Thyssen et al. (2023) point out that teachers require professional knowledge to reflect, analyse, use and shape digital transformation, which is regularly demanded of them by national and international educational standards.

A comprehensive literature review of Schmitz et al. (2023), in their study conducted in Switzerland, they examined if the transformational leadership methods employed by school administrators effectively assist teachers in utilising digital technologies to promote students' engagement in intellectually challenging learning activities during class. The study findings narrate that the transformational leadership exerted a substantial and favourable influence on the digital school infrastructure, teachers' optimistic attitudes towards digital technology, their technical proficiency, and their ability to educate using digital technologies. With the exception of digital school infrastructure, all of these criteria were found to predict increased degrees of technology integration strongly and positively. These findings highlight the importance of principals' transformational leadership techniques in supporting teachers as essential contributors to the integration of technology in the classroom.

Kwan (2020) attempted to evaluate transformational leadership theory, revisiting the integrative effect of instructional leadership and transformational leadership on student outcomes. The study provides empirical evidence from 177 assisted schools to confirm the moderating impact of transformational leadership. It identified a discrepancy in the influence of instructional leadership on student outcomes, based on different levels of transformational leadership implementation in schools.

3. RESEARCH METHODOLOGY

3.1 Research design

The paper employed a qualitative research approach as the focal methodology. The design fits to the application to the study's objectives, that sought to extract qualitative data. Firstly, the researchers opted for this approach because it emphasises explicit knowledge; secondly, it is an open-ended process; thirdly, data is based on human experiences and observations. Finally, because the design may be built and reconstructed to a greater extent, it is flexible (Maxwell, 2012). With this kind of design, the researchers wanted to necessitate matching research philosophies and reasoning. The paper used a phenomenological design, this design enabled human experiences provided by the respondents, a description and interpretation of their shared experiences. Phenomenology captures the essence or meaning of the current experience as the participants are currently

living it (Frechette et al., 2020). In reporting the data findings, the paper demonstrates that through adopting a phenomenological approach, the task was to describe the structure of the phenomena and to provide a thematic analysis that represents a unique view of the experiences of the participants. Phenomenological inquiry is traditionally focused on exploring one single but complex central study objective. Frechette et al. (2020) notes that phenomenologists also study the meanings or essences of phenomena interactively through the innovative strategy of collecting data in an in-depth, open-ended, conversational manner.

3.2 Population and sampling

The target population for this study consisted of the two lecturers in the FoCHSaE and 5 students studying towards bachelor's and master's degrees. The study opted for purposeful sampling, which attempted to establish a sample with various perspectives that would give both depth and diversity (Creswell, 2016) and respondents who provided information regarding the topic under examination (Maxwell, 2012).

The criteria of the participants selection were to achieve narrow specific themes in participants' experiences, not general social processes upon which members of a category might be expected to have a wide range of experiences; general social processes and relationships among them, but still with an emphasis on the specific experiences of specific participants with regards to e-learning ecologies. The contingent nature of these decisions in part depended on decisions regarding the adequacy of the sample. Frist's criterion was of relevance to the research objectives. Using only people with explicit knowledge to ensure that participants possess the expertise to understand the particular phenomenon that is to be studied rather within the defined study scope was important. This enabled for rich, original, relevant, and pertinent information and understanding to satisfy the contextual aim of a study.

The second criterion, was information richness. In addition to the establishment of information richness in a sample, the degree of authority in local expertise of the sample was important. Authority inherently draws on the acceptance of believability, credibility, and trustworthiness outside the individual's own unique frame of reference. The purposeful selection of participants based on situational and structural conditions derived from their role was an explicit search for ascribed authority. Scientific criteria that guides the decision in selecting participants for a qualitative study are eligibility and characteristics that assure richness of the sources of information and enhance the authority of the findings. Information richness is derived from the degree of variation inherent in the data, and in qualitative research, it is a direct result of who, where, when, and what of the research objectives (Tsui, 2020).

According to Hiebl (2023), in qualitative research, the sample size is not as easily determined as in a quantitative study. Typically, researchers are more concerned with achieving the necessary saturation and focus pertinent to their specific study, rather than ensuring their findings maintain a generalizability to the broader population. Although these concerns may at first seem to take the weight from this specific criterion, the importance of conducting investigational work that includes an adequate number of participants cannot be downplayed. Therefore, the investigator should take care to ensure the sample size is appropriately determined for the specific research task. However, to improve the goodness of the paper and be able to be satisfied that the sample size is consistent with the use to which the data will be put, the study was able to show that the participant selection process was appropriate as narrated in the selection criteria. It is argued that the criteria for participant selection and the strategies for addressing the issue of the sample size should be more fully explicated at the design stage of studies (Hiebl, 2023).

3.3 Data analysis

The study employed deductive content analysis to discuss outcomes and pinpoint the paper objectives. Also, to determine if any recommendations for future research might be made based on the themes observed during the study. Initially, the data was observed and this was followed by identifying the consistencies and differences. The analysis involved identifying patterns and their connections within and between categories. Lastly, the themes were interpreted by drawing connections. Content analysis enabled for a disaggregated attribute into specific detailed themes and codes which where both analysed using ATLAS.ti. The researchers created a new project in ATLAS.ti and named it a reflective transformative leadership approach to e-learning. After that, the researchers imported the data, including audio transcripts into ATLAS.ti and created a word file saved with a unique name.

3.3 Trustworthiness

Trustworthiness is about ensuring the paper's worthiness by addressing the credibility, confirmability, dependability and transferability (Kasirye, 2021; Amin et al., 2020) resulting in the confirmation of the degree to which findings of the qualitative paper can be trusted. This paper encompassed trustworthiness issues such as the credibility of the data collection instrument because credibility provides confidence in how well data and the analysis processes addressed the study's intended focus (Schreier, 2018). Responsibilities in maintaining trustworthiness and credibility entailed engaging in ongoing reflection, and personal dialogue regarding one's behaviour. Rapport, respect, empathy, and trust in the field can only serve to heighten the research accounts of how such processes have been harnessed and crafted successfully if the researcher-sanctioned invisibility and/or omniscience is replaced by a more convincing portrayal of the researcher as a participant, knowledge facilitator, and facilitator of the production of knowledge.

Selective reporting places research credibility and trustworthiness at risk. To be able to read reports that establish the credibility and trustworthiness of research within the small details that others may include requires that the accounts be plausible, orderly, craftable, reasonable that lessons to be learned about the topic be exciting, inviting, enlightening (Sperling, 2022). Also, enhancing trustworthiness and credibility helps address issues about the researchers, the form and processes of the inquiry, collaborator perspectives, and purposed outcomes. Strategies and techniques to address these issues include establishing a foundation that reflects collective competence; acknowledging and monitoring subjective factors; explicating purposes, design, activities, and products/projects; examining and presenting the perspectives of collaborators; and assuring rigor and relevance (Sperling, 2022).

3.4 Ethical considerations

The researchers carried out the study with academic honesty, integrity, and modesty. NUST's Ethical Committee was consulted before the commencement of the fieldwork. After receiving ethical clearance from the university, participants were approached to provide information relating to the study. After participants granted permission to conduct the study, the participants' information papers detailing the study's objectives, predicted benefits, and participants' right to withdraw were distributed to the potential participants. Anonymity and confidentiality were maintained. While all research designs and approaches face unique challenges, qualitative research is particularly susceptible to concerns surrounding the protection of the rights of individuals who participate in research as well as the broader research community itself. In the following brief section, the paper outlines some common challenges, specific to qualitative inquiry and offer suggestions for mitigating these concerns. Although these suggestions are meant to provide broad guidance, the paper also encourages readers to consult with the many resources available that focus on research involving susceptible populations and ethical considerations in qualitative research. The study did not have any ethical challenges as researchers were well versed with key ethical principles in qualitative research.

4. ANALYSIS

Word cloud

Figure 1. ATLAS.ti word cloud (Researcher's own compilation, 2024)

The word cloud was exported from ATLAS.ti to visualise and assist readers with exploratory textual analysis by identifying words that frequently appeared in a set of data collected such as that from interviews and this entire paper in general (see Figure 1, Figure 6 and Figure 8). The researchers enabled for word cloud analysis to elicit meanings from a block of qualitative text data. Utilising this tool as part of an analysis increased popularity and indeed a sign of the shift from a traditional, statistics-driven content analysis to a more focused, artifact-driven inquiry, where the researchers look for patterns, key concepts, and dominant themes without necessarily using extensive statistical operations. Some word clouds were used as analysis in support of the normal network heuristics that ATLAS.ti provides in aiding with analysing data. The word clouds proved to be an enlightening, easy-to-understand overview of the particular experience regarding the reflective transformative leadership approach to e-leaning ecologies to pedagogy from enhanced student learning.

Word clouds serve a useful purpose in supporting the researchers themselves during a multi-stage analysis of qualitative data. Here, word clouds present a high-level view of the data and was implemented very easily. Word clouds can be implemented at the initial stages of reviewing, through to the more advanced stages of data analysis. Their worth during this process has been demonstrated through examples of thematic analysis, primarily addressing their appropriateness during the entire analysis process, distinct increased capabilities offered by implementations of word cloud-generated methodology.

The following is how the word cloud contributed to the analysis and findings. 1) Gave an at-a-glance understanding of important themes in the text that have received more emphasis. 2) Highlighted key terms within the content and allowed spotting of areas related to critical content. 3) Employed the use of data reduction techniques. Words in the data were eliminated using stop words (words that do not add much meaning to the document such as are, is, etc.) so that less important content was filtered out. 4) Investigated the patterns of language generated by NUST students and addresses the importance of the transformational leadership approach to e-learning ecologies towards the pedagogy for enhanced student learning. Furthermore, analysing qualitative data was important in understanding the feelings, thoughts, and desires of the participants. Word cloud is a simple, interactive, and a low-cost technique used to generate insights and answer the questions/objectives of terminal values, instrumental values, and speech acts type and more in the qualitative data.

Code distribution view

Apart from the Word Cloud, the researchers were also able to analyse data using the code distribution view to examine codes and their relationships to conduct simple queries. The distribution of coded segments and an aggregated list of document titles in which coded segments were located are visually presented in Figure 2. These views are useful for inspecting the most canonical codes and code hierarchies in the documents in which they occur. This form of summary gave the researchers an impression and initial understanding of what part of the data is coded. The distribution view in ATLAS.ti allowed the researchers to interpret patterns of codes allowing the researchers towards emerging themes and to identify relationships between codes, themes and sets of qualitative codes and documents against different measures. To interpret patterns, the researchers examined the network heuristics as indicated in Figure 3 to gather details at a glance, focus on the variables of interest, understand the distribution patterns, build associations and explanations, and report on the findings. Figure 2 shows the code distribution view exported from ATLAS.ti.

Code distribution analysis is an important procedure for examining the frequency at which data segments are sorted into particular codes. This type of analysis is crucial for confirming the consistency of interpretations coded into the data. The examination of how code frequency is distributed throughout the data can be instructive. By inspecting a frequency distribution, large numbers of codes can be plotted against the particular data segments to which they are assigned. The level of coding can be contrasted to the visual representation of the frequency distribution. It is particularly useful for examining the distribution of indicator codes - codes like words, phrases, or reference reports and literature citations. The paper used code families to place a set of closely related codes together in a structure for example, as a hierarchical cluster in the code manager in ATLAS.ti, code distribution analysis contributes and is useful to understanding more about the frequency of subdivision codes that are nested inside higher level codes (Figure 2). It is noteworthy to narrate that code distribution is a fundamental part or heart of the qualitative research process as it assists researchers in supporting a variety of qualitative research objectives and activities, including exploratory data analysis techniques to understand the depth and

breadth of datasets, identify data patterns and salient themes, support line-by-line coding, and/or narrow and focused coding as part of thematic, grounded theory, or phenomenological framework development.

From previous sections and from the foregoing explanation, this paper points out that the code distribution tool plays a significant role in the context of qualitative data analysis.

Figure 2. Code distribution view in ATLAS.ti (Researcher's own compilation, 2024)

5. RESULTS AND DISCUSSIONS

Theme development

The following discussion was designed to clarify and support the paper's findings. The responses for this category were all related to the documents reviewed and interview questions. The data analysis and discussion of each theme are presented to the following algorithm: "Network heuristic ⟷ Data analysis ⟷ Theory..." Following is the analysis and a discussion of the data analysis of each of the four themes, developed from the study objectives. Theme one being the transformational leadership approach.

Theme 1: Transformational leadership approach to e-learning ecologies

Theme 1 explored and tested the transformative leadership approaches that foster academic quality by developing improved e-learning ecologies to enhance student learning outcomes. The researchers explored changes to current leadership, management, governance, and e-learning pedagogy within an overarching value network, facilitating stakeholder-generated technology and network evolution. Data was used to create communicative systems, and processes for influencing and implementing change. Furthermore, good e-learning leadership can inspire the attainment of the educational excellence required in HE in the future, using a values-based vision. In relation to e-learning, the notion of leaders as those who are able to effectively engender educational change and create context for the enhancement of student learning experiences in authentic e-

learning environments is a guiding and organising idea. Below is the network heurist figure exported from ATLAS.ti as part of the analysis of theme one:

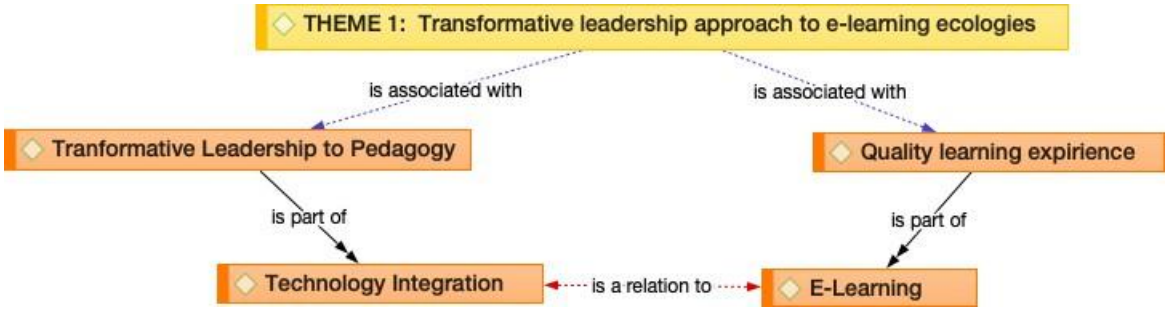

Figure 3. ATLAS.ti Network Heuristic: Transformative leadership approach to e-learning ecologies (Own compilation, 2024)

The study findings narrated that transformative leadership and quality learning experience deliverables *are associated with* transformative leadership approach to e-learning ecologies. Technology integration and E-learning are presented as sub-deliverables being *a part of* the main deliverables which then responds to calls for identifying elements to consider when creating student leadership in an e-learning context of instructional dialogues. The study findings opine that e-leadership capital dimension responds to the call for a need to impart knowledge and skill to empower online learners to lead within e-learning contexts, and it aims to provoke student questioning and engagement in dialogues. The analysis in Figure 3 reveals that e-learning ecologies pose opportunity to respond to subject material at a deep level. The ecologies with a relation to pedagogy propose a unique approach by linking globally responsible leadership, e-leadership capital, and fostering student online leadership development to address the effects of change in accelerating e-learning.

Furthermore, data in theme 1 responds to calls for the development of a transformative leadership approach for teaching leadership online in building character and creating meaningful and purposeful lives through e-learning. The theme addresses leadership development through fostering student questioning within dialogic e-learning and reflects student world views. The study findings moreover, propose for a transformative leadership approach, which identifies key elements that need to be addressed within instructional dialogues between students, instructors, and world perspectives in e-learning environments to support student leadership within expanding online learning contexts. According to the respondents, theme 1 relates to building leadership skills to help students build the qualities they need in e-learning environments in order to be adaptable through responsiveness, risk-taking, resilience, determination, commitment, and having self-efficacy to engage in collaborative group activities that are expected from transformative leadership. It furthermore, addresses how the pedagogy embedded within transformative leadership instructional design questions and values student and world perspectives, while promoting a caring leadership approach towards soul development and enabling of others in the world. Enabling the advancement in contemporary e-learning ecologies, which engage both the community and the learner, resource e-learning, supports the development of e-pedagogy, acknowledge the changing role of e-learning staff in HE and facilitate and assure a quality learning experience for students.

Badura et al., (2022) emphasizes the imperativeness of leadership and how it can be a contributing phenomenon to e-learning ecologies. It is a guiding idea distributed through a social system and enabling and engaging context-building and partnership. In their views, Badura et al., (2022) opine that leadership is often acknowledged as concentrated and configured within those roles connected to power, decision-making, setting and sustaining direction, purpose, and vision that are referred to as leaders. Separate from that, students, as part of the respondents under theme 1 were asked if e-learning is a possible learning barrier? The study findings established that 50% were neutral, while some respondents both agreed and disagreed at the rate of 20%, with only 10% fully agreeing.

After evaluation of the respondents' answers on the question regarding some of the types of potential e-learning barriers, it appears that all types of e-learning barriers are confirmed, as a such, been reported as neutral. The type of potential e-learning barriers for which the network performance was the most frequent were technical difficulties followed by intermittently or alternately, both problems using e-learning and orientation problems. The study established that the common challenge faced by students is cost, which is an important factor for e-learning

because it directly influences the decision to register for a course. NUST in partnership with MTC offer WIFI dongles to students as they register, thus providing an opportunity for students to access e-learning platforms. However, the study established that some students do not have enough money to buy data, while data is expensive. Students claim that the free data provided per month is not enough, whereas half of the other students narrated that they are managing with the supplied free data (hence neutral responses).

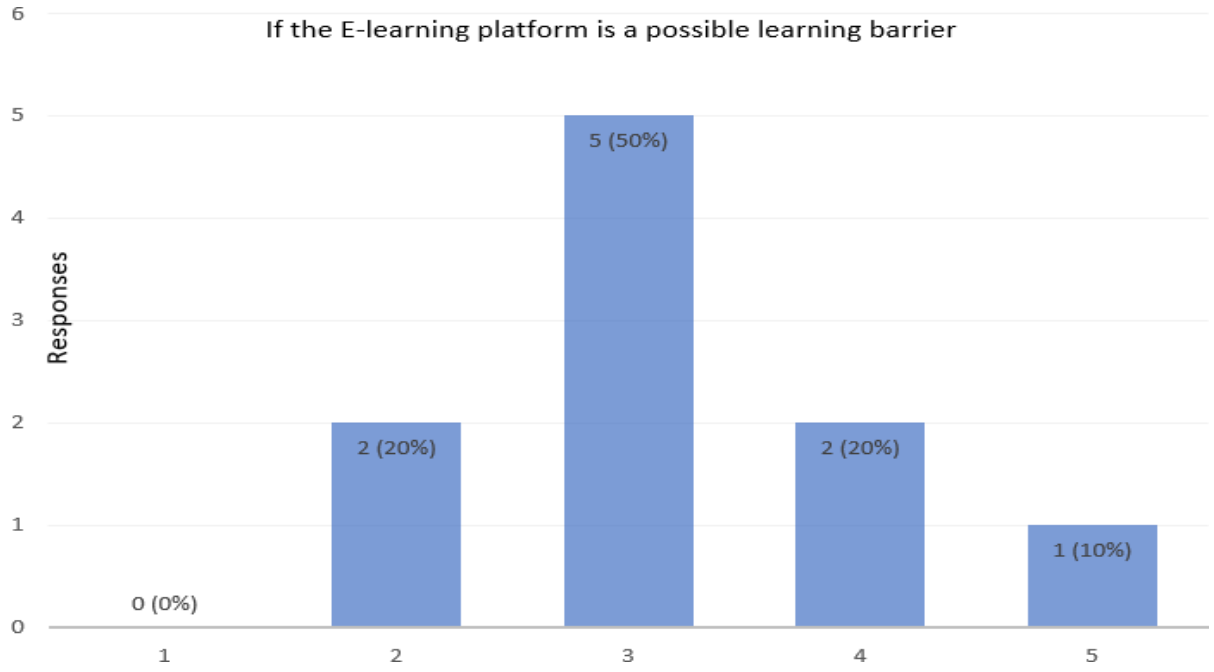

Figure 4. E-learning platform to possible learning barrier (Own compilation, 2024)

The study findings established that, although some students face challenges using e-learning platforms, these online solutions allow students to access lessons at their own convenience. It has expanded the amount of time students can spend learning beyond the usual "one to two hours" classroom session with the lecturer, allowing for extended hours for individual students. This advantages the lecturers, and students as it would result in significant gains. Additionally, it was established that the advent of technology has significantly contributed to the complexity of contemporary achievements. Undoubtedly, technology has greatly facilitated the development of a more enhanced rapport with both the researchers, students and coworkers. Incorporating technology into lesson plans and utilising it to enhance understanding of the subject matter can have a significant impact in the classroom.

Theme 2: Utilising scaffolding and transformation techniques in FoCHSaE

Study findings as per Figure 4 reveal that scaffolding is one of the most important concepts in education. Respondents narrated that scaffolding is an important process through which a teacher adds support for students in order to enhance learning and aid in the mastery of tasks. The support is then withdrawn when the student is able to do the task independently. Scaffolding is all about helping the student to complete the task. This can be done by posing questions, simplifying the task, providing resources, modelling the task and providing a hint. This study findings are in line with Ikawati (2020) who conducted a similar study on Scaffolding in teaching writing, in Japan. He highlights that the concept has been introduced by a few educationalists, including Jerome Bruner in the 1970s (Suwastini et al., 2021). Bruner is said to have introduced the term when discussing cognitive development in children. Vygotsky (1978) further developed Bruner's ideas.

Ikawati (2020) in his study further opines that a focus on transforming students' e-learning ecologies to pedagogy needs to be the priority, an emphasis of the paper's golden threat for this paper. The study findings point out that transformation has been known as a higher form of learning with e-learning being a process of moving from one state to a higher level and will involve an increase in complexity and productivity. This view considers that the ultimate goal of education is to prepare students to be creative problem solvers for the world using

technology. It was found that e-learning is a technology that enables students to have solid technical knowledge, although they still need to be flexible thinkers and be able to self-regulate their learning. Figure 5 illustrates the analysis as discussed in theme 2.

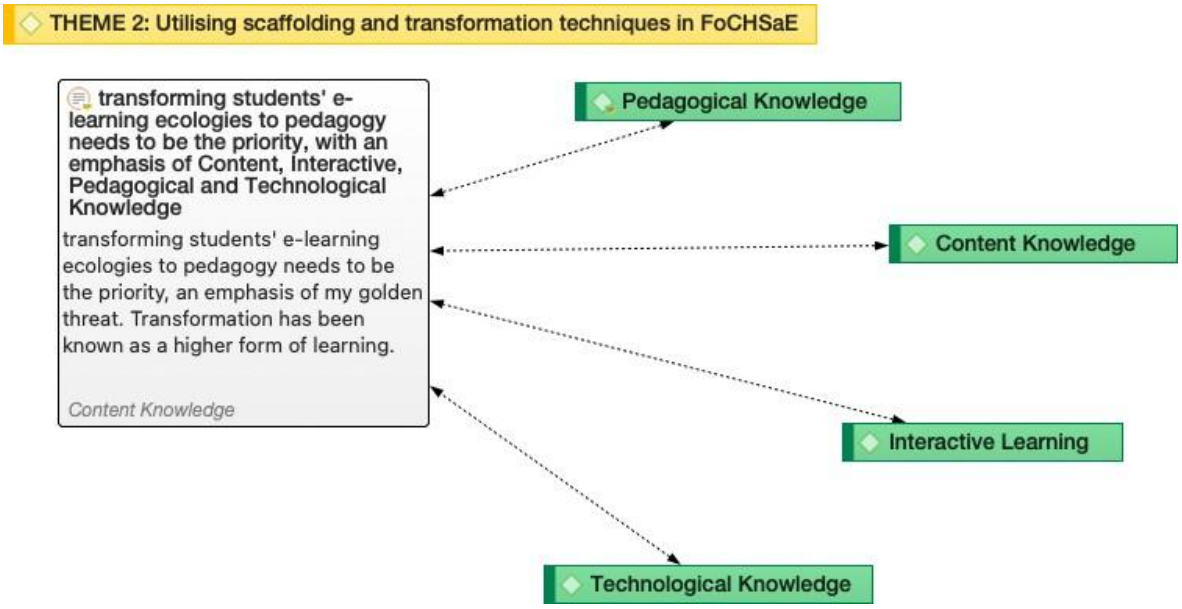

Figure 5. ATLAS.ti Network Heuristic: Utilising scaffolding and transformation techniques in FoCHSaE (Own compilation, 2024)

Undoubtedly, technology has facilitated the development of a more robust connection between the researchers, lecturers and the students. It has now been realized that by utilising the internet, the lecturers are able to discover material that will captivate students. Incorporating technology into lesson planning, as well as utilising it to enhance an understanding of the subject matter, can have a substantial impact for both the researchers and lectures. It was demonstrated that utilising technology in the lectures also fosters the development of critical thinking skills for students. The task for an educator is to establish a learning environment that prioritises the needs and interests of the students. However, based on the researcher's personal experience, incorporating the internet and social media into the classroom often leads to students being easily distracted from the course material as they focus on searching for information on social media platforms.

Furthermore, the study narrated that, it should be noted that although students may have immediate access to supplementary information during the lecture, there is a potential danger of them overlooking the subsequent part of the discussion, resulting in a failure to fully optimise their learning experience. This could also result in students misinterpreting vital evaluative elements of the course, so reducing their chances of achieving success in the course. Additionally, it was established that, what the researchers have seen is that while technology facilitates the dissemination of information, educators should not presume that all pupils will inherently possess access to the technology being utilised in the classroom. The paper's findings are in line with Howell (2021) who conducted a study on the benefits of active learning, reflective practices and flipped classroom pedagogies. Howell (2021) points to similar difficulty with reference to how online learning might be observed regarding electronic submission of assignments.

Theme 3: Structure, culture, and agency in technology integration

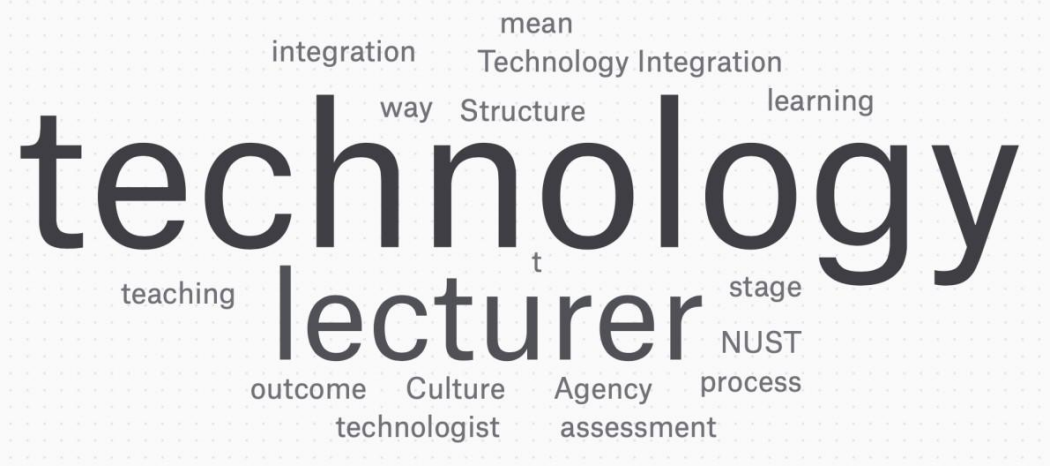

Figure 6. ATLAS.ti word cloud (Own compilation, 2024)

Culture within NUST, including shared beliefs, values, and behaviours, is another significant factor that is deeply ingrained and difficult to change. The shared beliefs regarding the adoption of technology at NUST, reflected the current preference for using processes to allocate resources, and ensure student effective learning. Effective technology integration at NUST effectively segregates the issues into three areas: structure, culture, and agency. In considering the role of various structures in technology integration, the steps taken in designing the new NUST have proven both empowering and inhibitive. NUST recognises the need for technology to be accessible and for institutions to provide necessary equipment (e.g. laboratories, library, and student computing facilities). This approach allows current FoCHSaE and administrative staff to understand and contribute to the implementation of technological resources.

This also reduces barriers to technology integration by planning for the further installation of an infrastructure that supports information technology efficiently. It will ensure continuity and retention of knowledge to students. By establishing a baseline through assessment and identifying best practices, staff development in information technology can be fostered and supported during the transition to the next level of technology integration. This comprehensive approach prepares individuals to effectively use technology, rather than simply accommodating what is current, regardless of their understanding of the process. The domains of structure, culture, and agency sets the stage for analysing the conditions under which change of any kind, and particularly technological change, is most likely to occur (see Figure 7).

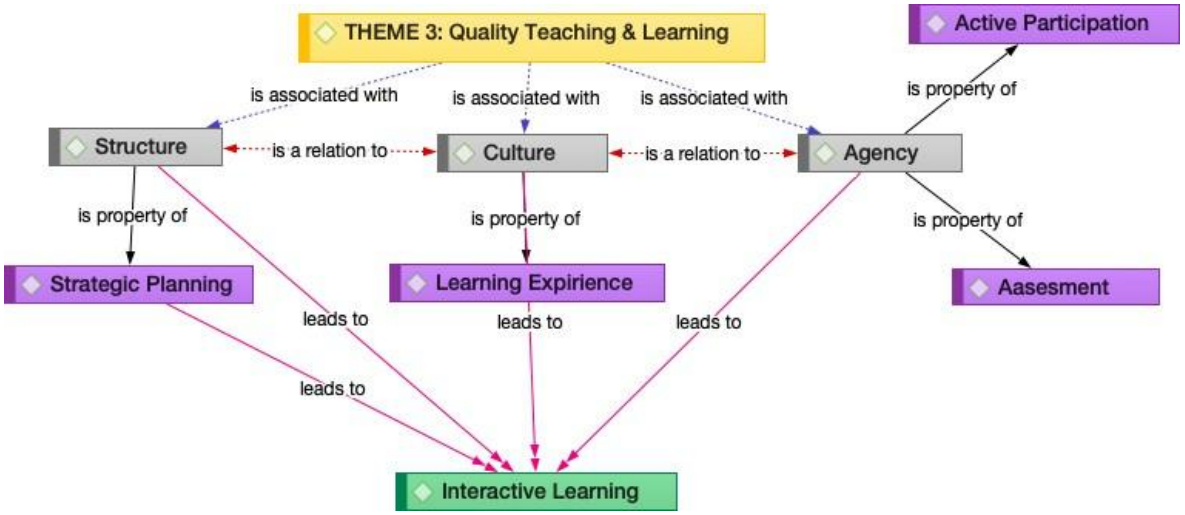

Figure 7. ATLAS.ti Network Heuristic: Quality teaching and learning (Researcher's own compilation, 2024)

Them 4: Quality teaching and learning

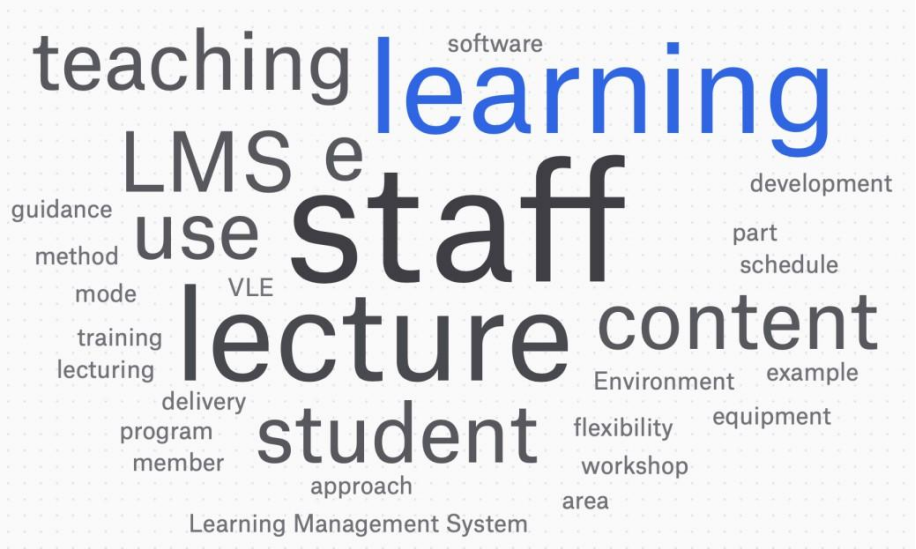

Figure 8. ATLAS.ti word cloud (Own compilation, 2024)

Howell, 2021 states that active learning is defined as any instructional method that engages students in the learning process. In short, students are doing things and thinking about the things that they are doing. This study has established that, NUST promotes project-centred learning as the medium of instruction in all its undergraduate and postgraduate programs. That means more group work and also more hands-on projects to do. With the use of projectors/laptops and other modern teaching aids, it is possible for lectures to be more interactive, and there is now the technology to conduct simulations for clearer explanations. An example of promoting active learning using technology is recorded lectures, which can be made available on NUST's Virtual Leaning Environment (VLE) for students to view. This allows more flexibility in a student's schedule. They can then plan to attend a lecture for more interactive learning and view the recorded lecture a second time to better absorb the content. Recorded lectures are part of e-learning, which is the main delivery mode in all personalised learning approaches.

Separate from that, it was established that, training workshops for staff are being conducted on e-content development and lecturing using the Learning Management System (LMS). Latest software and equipment are also being promoted for use in teaching. Furthermore, there is also a mentoring program available, should a member of staff require further guidance on adopting a new teaching method. An example would be on the use of the LMS. This is where a senior staff member that is proficient in this area is paired with a staff member who is less experienced. The senior staff member would then offer guidance and coaching to the junior staff on improving their teaching method using the LMS. The goal of teaching at NUST and in particular the FoCHSaE is to produce quality graduates and highly competent professionals. The university has an extensive teaching and learning program which it offers to both staff and students. These programs are aimed at enhancing teaching methods, promoting active learning, and offering personalised learning approaches. All of these are done with the view to ensuring that a NUST graduate is versatile with good problem-solving and lifelong learning skills.

Social realist domains

Structure

Any change in educational technology is ultimately a behaviour change on the part of teachers and students. Under structure, in the FoCHSaE the researchers examined the nature of educational systems. It was established that, educational systems are similar to organisations in that they are amenable to change at some levels and resistant to change at others. Structure serves as the foundation for analysing the conditions that enable change of any kind, particularly technological advancements, to take place.

Culture

According to Moyo et al. (2023) most individuals from the beautiful country of Namibia, along with the rest of the diverse continent of Africa, have been accustomed to the concept of acquiring and delivering information through the rich tradition of oral communication. The practice of written documentation and the utilisation of technology in teaching and learning bring about substantial contrasts to the methods adopted in the Western world (Moyo et al., 2023). It was established by this study that, successful integration of technology in HE, is crucial to precede its implementation with culture-based professional development activities. These activities should encompass

critical thinking exercises aimed at empowering individuals to engage in self-directed learning. Additionally, it is vital that these activities be undertaken independently from the technological implementation.

On the other hand, the study findings narrate that, learners themselves may grow frustrated due to the heavy reliance on teacher-focused learning and limited accessibility to resources necessary for exploring alternative approaches. Consequently, the successful implementation of educational technology initiatives is often impeded, resulting in a disconnect between frustrated learners and educators. This challenge necessitates a careful and thoughtful approach to address the discrepancies between cultural values and the integration of technology in educational settings. Hence the paper's golden threat of a reflective transformative leadership approach of e-learning ecologies to pedagogy for enhancing student learning. By recognising the need for e-learning ecology to pedagogy, it values the community aspect of learning, educators can support and guide learners through the incorporation of technology, ultimately fostering an environment conducive to holistic educational growth at the institution.

Agency

It was established that, NUST is a university built on dreams for a better tomorrow and technology being an ever-evolving entity. Under these impressions, the study found that, NUST has taken steps to increase its structural capacity and has paved the way for increased integration on several fronts. Often, integration occurs because of the impetus of one or two staff members at the department or project team level. This results in varying degrees of success. If the initiative is strong enough, there will be an attempt to obtain external resources, be it software or consultation, narrates one of the respondents. Agencies are an attribute that can be varied throughout the university, or department level by level and team by team. At the FoCHSaE the researchers experienced a wide array of acceptance or rejection of technology by various staff members or even among project teams within the same department. Often, systems or technology are developed or purchased that are mandated for use by all levels of staff and faculty. At the highest levels, this comes in the form of strategic systems, and at the operational level, this can be curriculum tools. The variance occurs in the degrees of participation in these endeavours. Frequently, teaching and administrative or technical support staff are excluded from the decision-making process.

It was established that, NUST struggles to fully utilise the available technology to its maximum potential. This, in turn, hinders the overall progress and growth of the institution. To address this issue, NUST has implemented measures to enhance the utilisation and integration of technology across all levels and departments. These measures include providing training and professional development opportunities for staff and faculty, ensuring their active involvement in the decision-making process regarding technology implementation, and creating a collaborative environment where ideas and feedback are valued and considered. By fostering a culture of inclusivity and empowerment, NUST aims to harness the full potential of technology to drive innovation, efficiency, and productivity. Furthermore, the institution recognises the importance of aligning technology with the needs and preferences of its diverse student body. Student input and feedback are actively sought and taken into consideration when implementing new technological solutions. This approach ensures that the technology employed by NUST caters to the educational needs and enhances the overall learning experience for students.

Enhancing teaching through TPACK framework

Enhancing teaching methods through technology integration is a complex task that will take time to develop. There needs to be a comprehensive strategic plan developed that focuses on enhancing the teaching methods along with the curriculum. There will need for collaboration between the lecturers, deans, and heads of departments. Offering incentives and active participation will boost morale and ensure the success of this strategy. This will then lead to tailoring technology professional development workshops to better effect the teaching methods. A mentor system would work well here, pairing the more technology-literate lecturers with the less technology-literate lecturers to learn from each other. Like our students, our lecturers also prefer learning in their own time and pace, so providing online resources and support will offer them flexibility and immediate application of their learning, narrates a respondent. As a result of this, the TPACK assessment can be performed regularly to gauge the improvement. This assessment can then feed back into the strategic plan, allowing continuous enhancement of teaching methods. The TPACK framework has been used to carry out assessments on the extent to which technology integration was taking place within learning and teaching environments (see Figure 9).

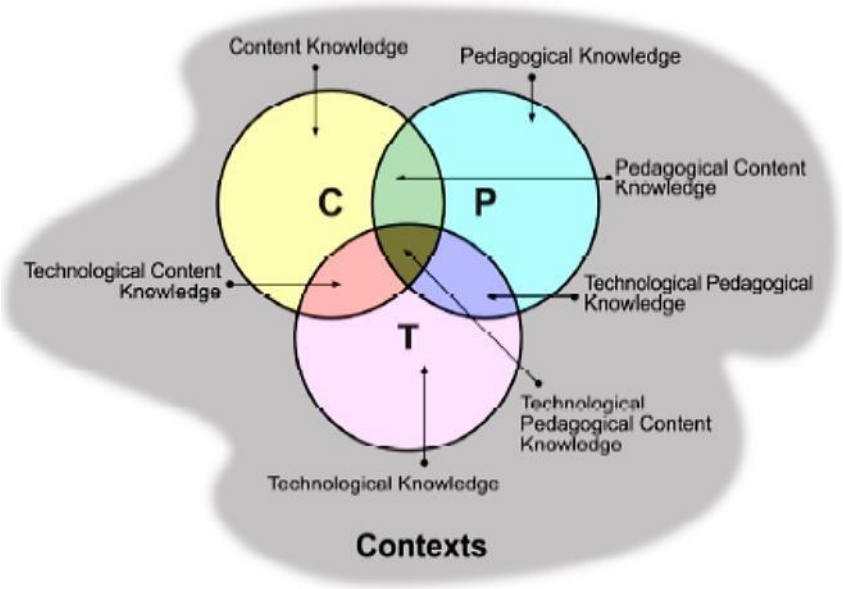

Figure 9. TPACK framework

Additionally, it was established that blended learning utilises a combination of platforms to give training information to students, meeting their expectations and enhancing their skills. This opportunity provides the FoCHSaE with a chance to explore and implement new methodologies and pedagogies through student learning. Integrating technology into face-to-face lectures exposes students to online learning and the TPACK paradigm. The TPACK framework delineates an intricate interplay among three domains of expertise: content, pedagogy, and technology, resulting in the acquisition of adaptable knowledge necessary for the seamless integration of technology into education. The interaction among these three domains is essential for the development of adaptable knowledge required for effectively integrating technology into teaching. The TPACK framework is a methodological approach for examining the essential components necessary for successful teaching using technology.

Assessment strategies

The study has established that, it is at this early stage of planning that NUST lecturers, guided by educational technologists, are urged to consider how technology can be used to meet certain learning outcomes and how it can facilitate assessment. This is key in promoting effective technology integration in that it gets lecturers thinking critically about the teaching and learning process and how technology can be employed in ways not possible through conventional means. An example would be the use of a simulation activity in which knowledge gained throughout the course is applied to solve a real-world problem. In this case, students could work in groups and consult with external experts to solve the problem.

Online course design in NUST, aimed at promoting effective technology integration commences during the early stages of course development. As standard practice, course developers refer to the NUST policy on outcomes-based education and course alignment. This policy calls for the alignment of course objectives with planned learning activities and assessment in such a way that these elements collectively contribute to the achievement of the course objectives (NUST, 2023). This practice aligns very well with the principles of quality learning and teaching (see Figure 10).

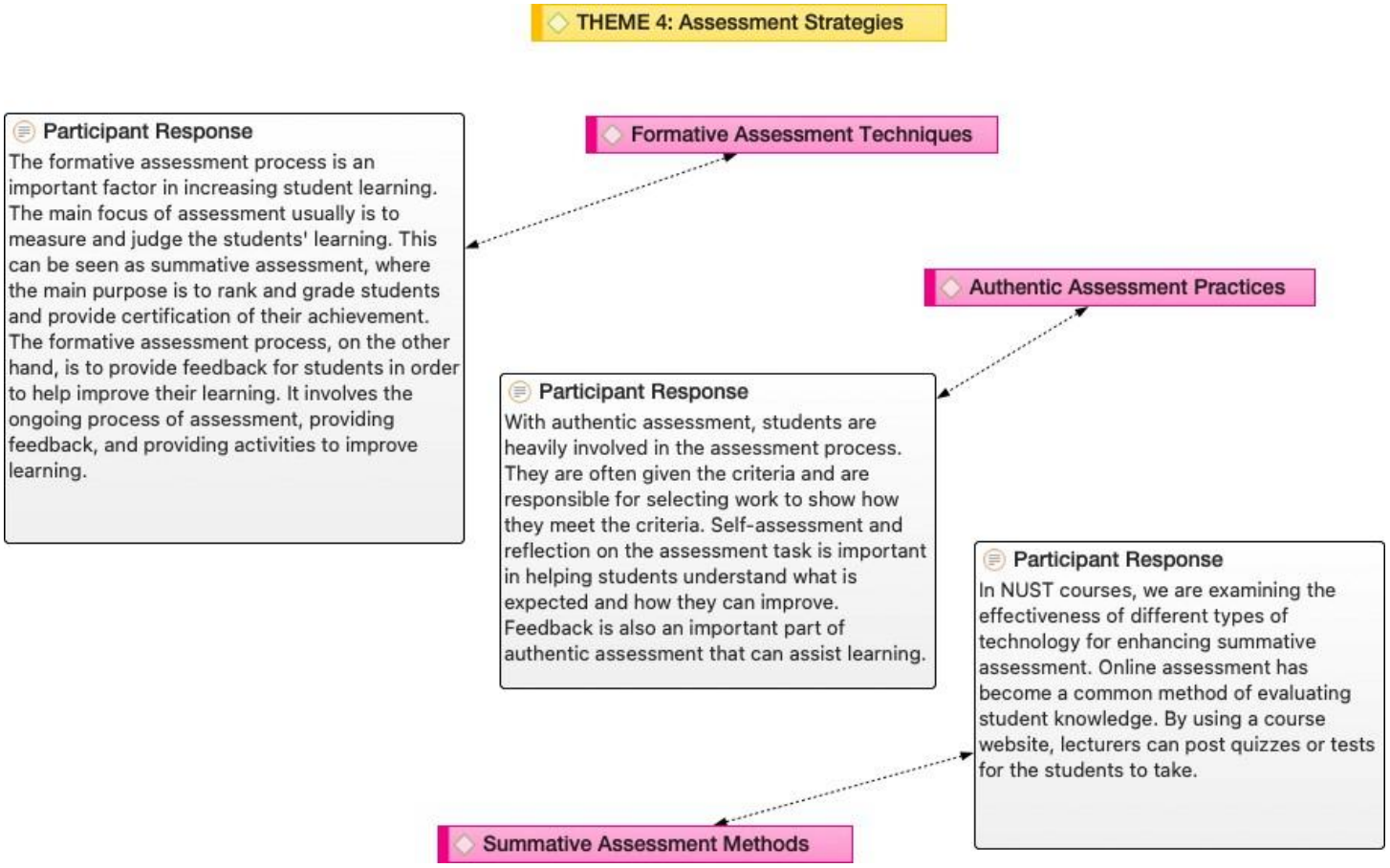

Figure 10. ATLAS.ti Network Heuristic: Quality teaching and learning (*Own compilation, 2024)*

Formative assessment techniques

There are a variety of techniques to elicit evidence of student learning. One of the main ways the researcher does this in his lectures is to set regular short tests throughout the learning. This includes the usage of clickers for questions posed in a big lecture, to a one-minute paper at the end of a class. This short test can motivate students to revise and can give both the lecturer and the student a clear idea of what topics they understand and what they need help on. This would then also guide the teaching and learning activities. On the other hand, it is important for students themselves to monitor their gaps in knowledge. This can be achieved by using concept mapping, where the students can articulate their understanding visually. This should be handed in and reviewed so that the lecturers can understand the students' level of knowledge.

It was found in this study that; the formative assessment process is an important factor in increasing student learning. The main focus of assessment usually is to measure and judge the students' learning. This can be seen as summative assessment, where the main purpose is to rank and grade students and provide certification of their achievement. The results of these findings are similar to Bass & Vinsonhaler (2015) who conducted a study on pedagogy of e-learning approach towards students in New York. Their findings revealed that, the formative assessment process provides feedback for students in order to help improve their learning. It involves the ongoing process of assessment, providing feedback, and providing activities to improve learning.

Summative assessment methods

This type of assessment often weighs content coverage and student knowledge. Summative assessment is generally more structured than formative assessment and takes place after a period of learning (Howell, 2021). It was established that, for NUST courses, lecturers examine the effectiveness of different types of technology for enhancing summative assessment. Online assessment has become a common method of evaluating student knowledge. By using a course website, lecturers can post quizzes or tests for the students to take. This is an effective method for tracking what the student has learned. However, the most effective feature of online testing is the automatic grading and feedback. There are several software options available at NUST. According to the

Centre for External Studies, there is a multiple-choice testing application available through Moodle. This software is very simple to use and allows for automatic grading and feedback of the test (NUST, 2023).

Another similar software option that the researchers would like to recommend the institution is Quick Key and Grade Mark used for online assessment. Quick Key and Grade Mark allows the lecturers to mark and grade written assignments online. There are many useful features with this software, such as voice comments and grading rubrics. According to Howell, 2021 both Quick Key and Grade Mark are methods that are simple to set up, however, the lecturers would have to be qualified to use these services. Furthermore, apart from LMS, NUST uses the application of the plagiarism checking software Turnitin.

Authentic assessment practices

Howell (2021) opines that, authentic assessment is seen as an effective way to measure higher order learning and complex thought. Traditional assessment has a right or wrong answer which does not let students express the depth of their knowledge. The concept of the right answer in the traditional assessment often leads to teaching focused on remembering information students need for the test, that will promptly be forgotten. With authentic assessment, students are heavily involved in the assessment process. They are often given the criteria and are responsible for selecting work to show how they meet the criteria. Self-assessment and reflection on the assessment task is important in helping students understand what is expected and how they can improve.

Feedback is also an important part of authentic assessment that can assist learning. With a more complex criterion, authentic assessment tasks often provide information about how different students performed and how they can improve. The rise of constructivism has come hand in hand with discussions regarding authentic assessment. This is how students demonstrate what they have learned in a real-world context. Comparison is then made between the students' performances and the criterion that has been set. Multiple forms of data are collected that enable a judgment to be made about the student's understanding and skill.

Student supervision in research

Technology has the potential to facilitate research projects as a learning experience for both undergraduate and postgraduate students. It enables access to real-world data and resources, more flexible communication and project management, and also allows the dissemination of results to a wider audience. As an academic, the researchers see research as an important contributor to increasing students' learning experience through active involvement in real research projects. It has the potential to increase learning as a result of team projects between lecturers and staff, and student dissertations in the final year of study. The context for the teaching and learning process in research is complex and variable across different disciplines. This component aims to understand how academic staff and students engage in research projects and the impact of technology on the teaching and learning in this process. The study established that, research at NUST is an important module, which supports the application of new knowledge to a wide community in Namibia, through consultancy, public and voluntary sectors, and education.

6. CONCLUSIONS

In sum, the proposed transformative leadership approach emerges as a valid background for leading successful e-learning initiatives. It provides the pedagogical underpinning for what is required when operating in e-teaching spaces and includes other e-learning conditions not previously considered. However, strong leadership is acknowledged as a catalyst which can foster, facilitate, and guide the implementation of e-learning strategies and the development of critical e-learning conditions. The proposed e-learning ecology aligns well with the fundamental approach to e-learning and challenges the prevalent techno-centric discourse of e-learning research and practice. In the e-learning ecology, technology is regarded as an enabling and intermediate element which can mediate students' learning experiences. With appropriate leadership provided, the development of such enabling e-learning conditions is more likely to take place, facilitating enhanced student learning.

The need for NUST to provide effective and high-quality education to a diverse group of students, whether remotely or in person, is a relevant educational and institutional goal. The study established

that, to address the contemporary challenges, e-learning will prosper and thrive when the educators view e-learning as a potent and potentially rewarding alternative. This organised, pedagogically principled paradigm based on expertise, mutual relations, worth connections, social coordination has the potential to empower and promote pedagogical transformation in instructional practices at the university. The study findings are in the same vein as those established in the study of Schmitz et al. (2023). The present work provides an avenue for achieving successful implementation through structural analysis, transformative leadership, and alignment with the university's mission statement. Furthermore, the present work demonstrates the potential of transformative leadership to address contemporary e-learning challenges and to redesign online programs in line with the institution's educational and pedagogical values.

Specific implications are presented for practice, leadership of e-learning, and transformative leadership theories, as well as solutions to challenges in specific areas such as student engagement, instructor presence and support of online learners, knowledge construction and assessment in e-learning will allow academic leaders to maintain the connection between the educational experience of online students and the institution's established educational values. Online educational programs at the university can be transformed through leadership intervention, providing education aligned with the goals established, in response to current challenges and beneficial for the post-pandemic era.

To conclude, NUST is committed to embracing technology as a catalyst for progress and growth. Through strategic planning, active participation, and a student-centric approach, NUST aims to leverage technology to its full potential. By doing so, the university endeavours to create an environment where technology seamlessly integrates into the daily operations, empowers staff and faculty, and enriches the educational journey of every student. In this paper, e-learning is seen as not only being concerned with new technologies, but also as a sociocultural discourse on flexible and adaptive teaching and learning that enable the satisfaction and achievement of student needs within the university in rapidly changing networked societies. Using the lens of the transformative leadership framework is neither a positive spin regarding using the latest technologies nor the current debates on whether face-to-face teaching is better than online teaching. It is proposed that the transformative leadership framework can provide a robust heuristic for the design and evaluation of e-learning activities and explore and develop innovative e-learning ecosystems in Higher Education. To sum it up, the Namibia University of Science and Technology could benefit from this, once leaders take charge of leading the institution to transform the teaching, learning and assessment activities with the help of technological transformation.

REFERENCES

Amin, M. E. K., Nørgaard, L. S., Cavaco, A. M., Witry, M. J., Hillman, L., Cernasev, A., & Desselle, S. P. (2020). Establishing trustworthiness and authenticity in qualitative pharmacy research. *Research in Social and Administrative Pharmacy, 16*(10), 1472-1482. https://doi.org/10.1016/j.sapharm.2020.02.005

Archer, M. (1996). *Culture and Agency, the place of culture in Social theory*. Cambridge University Press.

Archer, M. (2003). *Structure, agency and the internal conversation*. Cambridge University Press.

Archer, M. S. (1995). *Realist Social Theory: The Morphogenetic Approach*. Cambridge University Press.

Badura, K. L., Galvin, B. M., & Lee, M. Y. (2022). Leadership emergence: An integrative review. *Journal of Applied Psychology, 107*(11), 2069. https://doi.org/10.1037/apl0000997

Bass, R.K & Vinsonhaler, J. F. (2015). *Educational Technology*, New York.

Choi, B., & Young, M. F. (2021). TPACK-L: teachers' pedagogical design thinking for the wise integration of technology. *Technology, Pedagogy and Education, 30*(2), 217-234.

Creswell, J. W. (2016). *Qualitative inquiry and research design: Choosing among five traditions*. SAGE

Publications.

Frechette, J., Bitzas, V., Aubry, M., Kilpatrick, K., & Lavoie-Tremblay, M. (2020). Capturing lived experience: Methodological considerations for interpretive phenomenological inquiry. *International Journal of Qualitative Methods, 19*, https://doi.org/10.1177/1609406920907254

Ghavifekr, S., & Rosdy, W. A. W. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science, 1*(2), 175-191. https://doi.org/10.21890/ijres.23596

Hiebl, M. R. W. (2023). Sample Selection in Systematic Literature Reviews of Management Research. *Organizational Research Methods*, *26*(2), 229–261. https://doi.org/10.1177/1094428120986851

Howell, R. A. (2021). Engaging students in education for sustainable development: The benefits of active learning, reflective practices and flipped classroom pedagogies. *Journal of Cleaner Production*, *325*, 129318-. https://doi.org/10.1016/j.jclepro.2021.129318

Ikawati, L. (2020). Scaffolding in teaching writing. *AL-TARBIYAH: Jurnal Pendidikan (The Educational Journal), 30*(1), 48-58.

Iqbal, S., Niazi, S., & Hafeez, M. (2021). Developments on technology integration in language teaching and learning. *Global Educational Studies Review, VI*, 6, 21-28.

Josua, L. M., & Kanyemba, S. (2023). Technology as a Key Driver in Enhancing Scientific Education during the COVID-19 Era at the University of Namibia. *Journal of Learning for Development, 10*(1), 109-121.

Kasirye, F. (2021). A Conceptual Paper on Ensuring Quality in Qualitative Research. *Department of Communication, International Islamic University Malaysia: Kuala Lumpur, Malaysia*.

Kwan, P. (2020). Is transformational leadership theory passé? Revisiting the integrative effect of instructional leadership and transformational leadership on student outcomes. *Educational Administration Quarterly*.

Maxwell, J. A. (2012). *Qualitative research design: An interactive approach* (2nd ed.). Sage.

Moyo, I., Intja, N., & Mangundu, A. F. S. (2023). Developing the Four Macro-Communication Language Skills amongst Rumanyo Learners: Perspectives of Rumanyo Teachers in Namibia. *Open Access Library Journal, 10*(10), 1-16.

Namibia University of Science and Technology, (n.d.). *Mission and Vision*. http://nei.nust.na/?q=vision-mission-and-values

Schmitz, M. L., Antonietti, C., Consoli, T., Cattaneo, A., Gonon, P., & Petko, D. (2023). Transformational leadership for technology integration in schools: Empowering teachers to use technology in a more demanding way. *Computers & Education, 204*, 104880.

Schreier, M. (2014). Qualitative Content Analysis. In U. Flick, W. Scott, & K. Metzler (Eds.), *The SAGE Handbook of Qualitative Data Analysis* (pp. 170–183). SAGE Publications Ltd.

Simataa, G. M. (2015). *The integration of computer technology in the Namibian education system* (Doctoral dissertation).

Sperling, D. (2022). “Could You Help Me Die?”: On the Ethics of Researcher-Participant Relationship and the Limitations of Qualitative Research. *International Journal of Qualitative Methods, 21*, 16094069221105076.

Suwastini, N. K. A., Ersani, N. P. D., Padma Dewi, N. N., & Artini, L. P. (2021). Schemes of scaffolding in online education. *Retorika: Jurnal Ilmu Bahasa, 7*(1), 10-1

Thyssen, C., Huwer, J., Irion, T., & Schaal, S. (2023). From TPACK to DPACK: The "Digitality-related pedagogical and content knowledge"-model in STEM-education. *Education Sciences, 13*(8), 769.

Tsui, A. S. (2022). From traditional research to responsible research: The necessity of scientific freedom and scientific responsibility for better societies. *Annual Review of Organisational Psychology and Organisational Behaviour, 9*(1), 1-32. https://doi.org/10.1146/annurev-orgpsych-062021-021303

Vázquez-García, M. (2018). Collaborative-group testing improves learning and knowledge retention of human physiology topics in second-year medical students. *Advances in physiology education*.

Vega, N., Stanfield, J., & Mitra, S. (2020). Investigating the impact of Computer Supported Collaborative Learning (CSCL) to help improve reading comprehension in low performing urban elementary schools. *Education and Information Technologies, 25*(3), 1571-1584.

Yang, Y. F., Lee, C. I., & Chang, C. K. (2016). Learning motivation and retention effects of pair programming in data structures courses. *Educ*