Reinforcement Measures for Sustaining the Integration of Innovative Teaching and Learning Technologies in Selected Tanzanian Universities

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Abstract: Whereas the integration of innovative technology in facilitating learning is crucial in higher education institutions (HEIs), its sustainability has been a challenge, especially in developing countries. This paper reports the findings of a qualitative study that explored academic leaders' views, perceptions and experiences on sustainability strategies for the integration of innovative teaching and learning technologies (ITLTs). The paper contributes empirically to the educational discipline by developing a deeper understanding of specific strategies for the sustainability of the ITLTs integration in HIEs. Specifically, the study examined reinforcement measures related to rewards, culture, policies, and capacity building used by academic leaders for the integration of ITLTs in the selected Tanzanian universities. Secondly, the study looked into the perceived level of importance regarding attribute to effective integration of ITLTs in the respective universities. A semi-structured interview was used to collect data among 13 academic leaders from two public universities. Lewin's change management model guided the study in theorising and analysis of the findings. Thematic-deductive analysis revealed that most participants favoured capacity building strategy reinforcements. Meanwhile, implicit policies were reported to have a higher positive likelihood of enhancing the sustainability of effective integration of ITLTs. Concerning rewards, in-house training and recognition for what academics do were regarded as favourable strategies. Additionally, participants reported that the culture of offering directives and communication through online platforms has promoted the integration of ITLTs. Lastly, the capacity building and policies were vital on enhancing effective integration of ITLTs. There is a need to strengthen ITLTs policies development, rewards, and capacity building strategies for more effective and sustainable integration of ITLTs. This further supports the cultural transformation of ITLTs usage among academics in universities.

Keywords: innovative technology, blended learning, rewards, culture, sustainability, reinforcement measures

1. Introduction

Reinforcement measures for change are also regarded as the sustainability for change strategies in organisation. Armstrong (2016) argues that reinforcement measures for technological change are potential for maintaining acceptable way of doing things. These measures ensure solidification of new behaviour as a norm and if skipped, people in the organisation may get back to their traditional way of doing things (Will, 2015). Sustainability of technological change in education is one of the most prominent challenge higher education and that its failure leads to various negative education outcomes. For instance, a relatively low usage of innovative teaching and learning technologies (ITLTs) is still a significant challenge to most Tanzanian public universities as it also impacts the sustainability of ITLTs (Landa, Zhu & Sesabo 2021).

However, while there has been some research on various reinforcement strategies and their impact on the use of ICT in education (Jacobsen, 2013; Ward, 2013), most do not explicitly trace academic leaders' experiences rather than instructors'. Subsequently, a few studies have investigated academic leaders' perceptions of such experiences relating to sustainability of ITLTs. Studies indicate that academic leaders plan for instructors' development, participate in their development sessions, provide feedback about their performance, praise and encourage instructors to integrate technology (Heintzelman 2017), therefore, knowing how they reinforce ITLTs is paramount. Furthermore, a study by Savelyeva & Lee (2012) pinpointed that, academic leaders engage the instructors in formal and informal development opportunities to learn how to integrate technology into classroom curricula. The results of such academic leadership support lead to clear expectations for students, provide direct instruction, and guide technology integration (Heintzelman 2017). As such, this study explores academic leaders' perceptions and experiences with reinforcement measures on the integration of ITLTs so as to develop deeper understanding and specific strategies towards supporting effective implementation and sustainability of ITLTs-integration in Tanzanian universities.

2. Reinforcement measures for the integration of ITLTs in higher education

The integration of technology in teaching and learning is crucial in higher education. Worldwide, the integration of ITLTs has been growing rapidly due to many factors including technology advancement. Its acceptable benefits globally lead scholars to find out how can educational institutions support it or keep it going smoothly. "Indeed, it is argued that several conditions need to be fulfilled if technology is to serve as a benefit, and not an obstacle to learning, and thus boost the delivery of quality education" (Danniela et al., 2018).

A previous study by Terry (1997) suggested that reinforcement measures are to be encouraged within the HEIs' for maintaining and sustaining any commitments that support instructional technological innovation. His study put forth on mechanisms such as formal policies, development programmes and rewards for sustaining ITLTs. Other studies (Nworie 2014; Marienko et al., 2020) add up that effectiveness of technology use in instruction could be evaluated on its continuous sustainability measures that leaders are putting forth.

Despite the low uptake of ITLTs integration evidenced in most developing countries such as Tanzania, HEIs are also struggling to put in place various strategies to support sustainable use of ICT in education. A study by Katundu (2008) shows that, measures for sustaining ICT use in education are important in Tanzanian higher education for facilitating effective local planning and development of technology integration. However, the same study further argued that efforts were not made to sustain the innovation to ensure continued integration of ITLTs.

Besides, to encourage sustainability and continuous integration of innovations in teaching and learning, suggestions are made on systems, structure and supported strategies that enable the sustainability and widespread adoption of instructional innovations (Dinh, 2021). The findings reported by Savelyeva and Lee (2012) identify school cultural promotion, focusing on students' needs, respondent's commitment, and willingness of the leaders as necessary attributes for sustaining technological innovations in education. Accordingly, Zayim Kurtay and Zhu (2019) coincide in the view that college leadership should apply long-range plans for updating technologies in teaching and learning through leadership. Only a few theoretical studies have focused on sustainability measures to integration of ITLTs, literature is limited to how sustainable integration of ITLTs- can be achieved through academic leadership, which is also a case in Tanzanian HEIs.

Considering such a background, this study explores academic leaders' perspectives on reinforcement measures for the integration of ITLTs. The research questions (RQs) are as follows: What reinforcement measures related to rewards, culture, policies and capacity building are used by academic leaders for the integration of ITLTs in the selected Tanzanian universities? (RQ1); and What is a perceived level of importance regarding reinforcement measures in which academic leaders attribute to effective integration of ITLTs in the selected Tanzanian universities? (RQ2). Thus, the study empirically contributes to the education by developing deeper understanding of specific strategies towards supporting sustainability of the effective implementation of the ITLTs integration in higher education in Tanzania. This study follows Lewin's change management model which determines the sustainability strategies for enhancing innovative use of ITLTs(Armstrong 2016). The models entail that sustainability measures ensure solidification of new behaviour as a norm. Thus, it involves careful attention to support strategies including incentives, policies and guidelines, capacity building and developmental of organizational culture (Armstrong 2016).

3. Methods

3.1 Participants

This study adopted qualitative research design. Thirteen (13) academic leaders from two public universities in Tanzania were interviewed. These included heads of departments, faculty/school deans, directors, principals, , e-learning, and academic coordinators. Jing & Yao (2019) description of academic leaders as the personnel with formal managerial responsibilities who exhibit leadership in academic activities was adopted. Participants' age varied from 33-58, while the majority were male (60%). Their Leadership experience ranged from 2-15 years.

3.2 Data collection and analysis

Semi-structured interview was conducted to 13 academic leaders. In this, participants were selected from distinct levels of academic leadership based on their knowledge on integration of ITLTs. Participants' consent was sought through an invitation email sent to the selected academic leaders. Each interview lasted for 30-40 minutes and was audio recorded, then transcribed. Interviews were either conducted in Kiswahili (then translated to English) or directly in English. Further, participants were given an opportunity to go through the questions prior to the interview. The transcribed interviews were shared to the last author for reviewing and comparing the notes with those of the first author for ensuring inter-rater reliability (Miles et al., 1994). This enabled the authors to have a common understanding on the transcribed data.

The thematic-content analysis was used. Since the study adopted the Lewin's change management model to explore reinforcement measures for sustaining technological change in education based on the main four issues related to rewards, policies, capacity building and culture, a deductive approach was employed. The principal codes were guided by the four major reinforcement measures of the model. Transcribed texts extracted; sub-codes were marked while the codes frequencies for the emerged themes were quantified.

4. Results

In this part, the results are presented with respect to the main strategies of sustainability of change, based on the interviews with the academic leaders. Subsequently, we focus on the analyses regarding what reinforcement measures related to rewards, culture, policies and capacity building were used by academic leaders for the integration of ITLTs. Then, we assess the perceived importance of the strategies used.

4.1 Reinforcement measures employed for the integration of ITLTs (RQ1)

Regarding rewards, academic leaders were asked on what motivates their academic staff to integrate ITLTs under their leadership, that is whether the availability and type of rewards they use affect ITLTs-integration among academic staff. Most participants mentioned in-house training. The participants contended that the 'hands-on' in-house training are the most current critical motivator for both new and old academics. They also mentioned recognition as another rewarding factor which motivates their academics to integrate ITLTs. However, they declared that financial incentives could impress staff quite well.

Concerning culture, academic leaders were asked whether the relationship they have with academic staff, affects integration of ITLTs in teaching and learning. The majority reported to have both formal and informal relationship which influenced academic staff use of ITLTs. Formal relationship mostly occurred during meetings geared to improve the integration of ITLTs among staff. More than half of participants (n=9) reported to use various platforms such as departmental/faculty/school/college meetings, boards to inform and advocate ITLTs integration matters to their staff. Additionally, the culture of using online systems in handling either various matters was promoted due to use of ITLTs. Some participants indicated that paper-based administrative operations related to 'requesting for permission' was discouraged, if that administrative culture has changed, academic leaders hoped for the use of ITLTs could likewise change. On this aspect, one participant responded, "For now, we discourage the use of physical letters, yes we get advance to promote for instance online leaves applications …a thing that has started to develop and the people have started getting used to it. We also believe that these ed Techs will change." (Participant 4).

Relating to ITLTs policies, contradictory responses were revealed among participants. The participants were asked whether policies or/ and guidelines and their implementation supported or constrained their decisions in enhancing the integration of ITLTs. On this, only college principals and deans showed enough knowledge about what was going on regarding ITLT policies and how far they would provide them with a better way ahead. The perception was that ITLT formal policies once developed, they could more use of ITLTs in two ways. First, academic leaders could understand their roles while managing the use of ITLTs by their staff, and secondly, the use of ITLTs among staff might be higher and would further enhance the quality of delivery. One participant echoed:

> *"We have advocated also to a top university management, that these ways of teaching must be compulsory (policy), for example if a person wants to be planned to a subject, s/he must have learnt and use these ED -TECH platforms eLearning, zoom and also other ITLTs. (Participant 10).*

On the other hand, most heads of department and coordinators interviewed, kept on insisting to have only recommendation roles on matters related to the sustainability of ITLTs change through policies. On that regard, they claimed that policies on progress were not communicated to them yet. However, the majority of participants agreed that they just followed guidelines or directives from the top management. Unpredictably, some of the programme coordinators claimed not to have been actively involved in academic staff issues regarding the use of ITLTs. They reasoned that lack of involvement in decision making was due to absence of policies or guidelines or the silence of the guidelines regarding their specific roles on matters related to that.

On the issue of capacity building, participants expressed various effort they employ to capacitate academic staff towards the integration of ITLTs. Most academic leaders reported that academic staff were encouraged to attend both offline and online training programmes. Additionally, sharing experiences among staff who have ITLT prior knowledge was another way used to capacitate staff. ITLTs training was more emphasised and is currently among the strategic priority to their departments and faculties. They further insisted that training on technical side of the ITLTs is much crucial to their staff. However, the collective results show that training on both technical and pedagogical use of ITLTs was perceived as highly needed by their staff and need to supported by academic leaders. One participant mentioned: "These things if you don't have their ABCD, it is tough for you to follow them up and also to convince for others." Academic leaders should be ICT-literate… (Participant 5).

Nevertheless, most participants reported that, due to some barriers such as workload, lack of incentives, transport issues among others, some staff could not attend the training effectively.

4.2 The perceived level of importance regarding the reinforcement measures for effective integration of ITLTs (RQ2)

Regarding the second research question, academic leaders were questioned to provide the sustainability strategies that they thought were specifically attributed to the effective integration of ITLTs and how those strategies facilitated effective integration of ITLTs at their leadership level. Four dimensions referring to capacity building, rewards, policies and culture were given out for discussion during the interview. The results indicated that, the majority of participants (n= 11) mentioned capacity building as a highly needed strategy that could simplify leadership of ITLTs integration. Indeed, most emphasis was put on training, that is, 10 out of 13 participants mentioned it as a big factor leading to use of ITLTs. Firstly, through capacitating staff that their transformation could be easier e.g. one leader expressed her idea by saying that:

> *… "Skills on ITLTs are important because all of these depend on a person's ability and understanding of ICT Someone with such skills does not need us to use so much time and effort to transform him/her".*

Secondly, it was suggested that academic leaders should have their respective courses to promote their understanding of the teaching and learning technologies probably even more than academic staff. Academic leaders' competence seems most essential in accelerating confidence, while facilitating the use of ITLTs among their staff. They argued that academic leaders should be competent and knowledgeable, for them to lead others. With this regard, investment on ITLT capacity building is essential. One participant stressed that "if you are a leader, you can't direct something you don't know, I must promote something I understand". ITLTs training programmes were mostly perceived important to academic leaders to, a) have sufficient competence that creates awareness on the use, b) influence others to use them too, c) influence the budget related to the use of ITLTs, d) influence attitudinal change.

Next to capacity building through training, participants (n=10) mentioned ITLT policies as the second strategy that led to effective integration of ITLTs at meso level. Likewise, almost all (n=9 out of 10 participants above) explicitly suggested that institutional ITLT policies should have their back-up at macro or national level. These participants put forward two reasons for that. Apparently, it could accelerate the leaders' confidence in managing the integration of ITLTs and second, it could sharpen the transition into the new implementation of technological change in public universities to facilitate an effective use of ITLTs. Policies have been seen as influential in avoiding both staff and students' claims. "We can't allow our staff to even record and upload their voice in classroom because the policy does not allow…here I mean we have no policy of that kind because if a teacher uploads it there, students will complain." (Participant 3).

In connection to this, the results further indicate that having policies would show a clear directive and mandates among academic leaders. It was revealed that, only ICT policy [at national level] is not enough for the implementation of ITLTs. It was also reported that policies would help to avoid harassment to teachers against the use of ITLTs compared to the use of guidelines or directives only:

> *"… there are some teachers who are scammers. In some cases, a teacher may take what is recorded this side and give it to students without checking the content very well…" (Participant 9)*

Based on the analysis explained in this category, it is evident that policies and capacity building can influence each other. It was noted that leaders mostly establish a certain training depending on the focus or vision of the institutions:

> *"Administrations can drive their workshop … To run training to people let's say five or twenty. …But all in all capacity building corresponds with policy that is there for the university i.e. the focus… (Participant Pos. 427-430)*

Although majority agreed that rewards are crucial for effective integration of ITLTs. However, they stressed that with the urgency vis a vis infant stage of using ITLTs in their universities, financial rewards should only slightly come along with the implementation of such changes. No need to put many efforts on that for the time being.

5. Discussion and conclusion

The current study presents academic leaders' views and experiences on the reinforcement measures for enhancing effective integration of ITLTs in public universities in Tanzania. The measures have been conceived within four broad strategies related to policies, capacity building, rewards and culture. Overall, the results confirm that all participants were familiar with the referred sustainability strategies. However, a number of challenges have been noted.

Firstly, in view of research question one, the study revealed that capacity building was the mostly used strategy on enhancing the integration of ITLTs. In line with Al-Zahrani (2015) findings, respondents acknowledged that training was a vital measure to be considered, thus capacity building programmes have to morally and financially supported to accelerate the integration of ITLTs. This implies that to sustain integration of ITLTs, academic leaders need continued training for obtaining skills and building confidence to support others. Previous studies show that training is a critical managerial determinant of successful sustainable implementation of ITLTs (Palvia et al., 2018). Also, training could facilitate the creation of good environment for staff to learn and use ITLTs, something that is also supported by the study by Elly (2014).

Next to the training is policy. Bansal (2017) and Palvia (2018) mentioned ITLT-friendly policies as the major driver for online and blended education. The current study reported no formal policies to guide the integration of ITLTs, rather guidelines or directives influenced ITLT managerial operations. This was a crucial barrier for supporting effective integration of ITLTs by academic leaders. Contrary, to the study by Tondeur (2008) reported that explicit policies which include guidelines, stress shared goals influenced the use of ICT more regularly in classroom. Perhaps, the contradiction is due to the context and culture of organisations studied. Most public university leaders in Tanzania have normally been guided by implicit policies that are later supported by the explicit ones. However, in February, 2022, Tanzania introduced formal guidelines for guiding the integration of ITLTs in HEIs (TCU, 2022).

Nevertheless, the participants put forward lack of communication within the meso-level leadership when it comes to the initiatives of ITLT policy making process. In particular, most coordinators seemed overlooked during the development of ITLT- related decisions. The results pointed out lack of awareness and inclusion among most coordinators on the ongoing initiatives of ITLTs policy development in universities. These practices do not comply with policy making models which normally reinforce the inclusion of every stakeholder during the process. Porter etal (2016) asserts that e-learning policies development has to exist in respective education institutions whereas awareness and compliance with the policies prevail among stakeholders. Similarly, Katundu (1998) and Savelyeva & Lee (2012) emphasise that having a voice of all stakeholders in decisions and resolutions influence success of educational innovative technologies. Thus, adds up to the three indicators of discretionary behaviour related to the empowerment of participants (Lincoln & Guba 1985) on the relevance of involvement of all participants and not capturing only the opinions of the superior leaders and most experienced participants.

Responses to the second research question highlight the perceived level of importance regarding the reinforcements used by academic leaders for sustaining integration of ITLTs. The findings revealed that sustainability measures which consisted of capacity building and policies were identified as the most vital attributes in which academic leaders perceived as useful in enhancing effective ITLTs integration. On the one hand, this finding concurs with the study of Ryan et al, (2014) in which the authors reaffirm that capacitating staff through training of different kinds is important for leaders to manage the transformation of their academic staff in using ITLTs. On the other hand, regarding policies, the results are highly correlated with previous research in which policies were found to be an important factor for improving ITLTs decision making. (Ciabocchi et al., 2016; Anthony 2016). Future studies should assess the sustainability measures associated with effective ITLTs integration where the ITLTs use is high.

6. Significance, implications and limitations

This study was guided by Lewin's Change Management Model to explore reinforcement measures for sustaining technological change in education based on the main four strategies related to rewards, policies, capacity building and culture. This model envisions that sustainability measures ensure solidification of new behaviour as a norm. The model has provided a solid foundation in explaining the results that academic leaders found new behaviours such as the use of internet as a communication tool as a normal strategy on enhancing use of ITLTs. Furthermore, strategies such as training as a form of capacity building, policies and rewards were confirmed to have an impact on the use of ITLTs. On a practical level, the findings of this study provide empirical evidence that capacity building and policies are key when it comes to influencing use of ITLTs in higher education. This means, higher education institutions have to set good policies and continue training their staff for sustainability of ITLTs. Overall, the study implies that policies, training, rewards and culture, are important strategies though have varying levels of significance to academic leaders.

Regarding limitations of the current study, only mid-level academic leaders were involved, thus limiting the understanding to this particular group leaving out other academic leaders in the meso-level. Lastly, determination of what constitutes important strategies about the reinforcements used by academic leaders for sustaining integration of ITLTs was based on leaders' perceptions. This limits the study in the sense that only what was perceived as important, has been listed. This tends to neglect the fact perceptions are influenced by a number of other factors, which may have influenced the results.

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