Leaders' Preparedness for Managing Technological Changes in Teaching and Learning in the Selected Tanzanian Public Universities

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Abstract

Technological changes have seemingly become inexorable rather than the exception for academic institutions. It has been argued that an organisation's ability to adapt to a changing environment depends on its preparedness for change. This article delineates the extent of preparedness for managing technological changes in teaching and learning among mid-level academic leaders (MLALs) in higher education. The survey was administered to MLALs (n=76), undergoing changes relating to the use of innovative teaching and learning technologies (ITLTs). The rating method and Yeh Index of Perception (YIP) score were used to determine the extent of preparedness for technological changes among MLALs, and it was found to be on average. The results from the ANOVA test shows there was a significant difference in the mean scores for the dimensions of preparedness for changes ($p<0.05$). The results conclude that preparedness for changes is determined by multi-dimension indicators as suggested by diverse managerial competences and status of readiness for changes held by MLALs. The results suggest that MLALs have a relatively low competence level for motivating the adoption and implementation of technological changes in teaching and learning. Besides, the leaders had a low belief that proposed technological changes for innovative teaching and learning were beneficial to them. These results can be used further to design the training and strategies for managing technological changes in education. Therefore, the study proposes sensitisation prior to any implementation of technological changes in education.

Keywords: innovative teaching-learning technologies, preparedness for change, readiness for change, managerial competence, mid-level academic leaders

1. Introduction

The fact that global changes in technology have high impact on daily and long-term practices in various sectors including the education sector, technological innovations for teaching and learning in higher learning institutions have been recently considered as a major change. They change traditional ways of teaching and learning. The need for the adoption and implementation of technological change in teaching-learning brings about a powerful learning environment that allows for a more active, self-directed and constructive way of the teaching-learning process (Adnan & Tondeur, 2018). The integration of ITLTs increases student engagement, motivation and accelerates learning. In higher education, these changes avail in facilitating the efficient dissemination of electronic learning materials, enhance the extension of the study programme to new markets (Zhu, 2015) and brings about collaborative and social interactions for better learner academic performance (Machumu & Zhu, 2018). Scholars (Gelaidan etal., 2018) suggest that for any higher education to grow, survive and remain relevant, an attempt to adhere to teaching-learning technological changes is inevitable. However, it has been noted that still a large percent of all major changes' initiatives fails globally (Vakola, 2014 as noted in Gelaidan *et al*., 2018) more likely, the implementation of ITLTs (Scherer, 2021). The integration of ITLTs has neither been fully recognised nor systematically used in many higher education institutions, (Singh & Hardaker, 2014) and therefore remains a significant challenge (Ilechukwu, 2013; Grimmer *et al*., 2020). This is also higher in developing countries, Tanzania in particular (Lashayo and Olahraga, 2017).

In that regard, education institutions are now supposed to pay much attention to various factors that suggest the effective implementation of ITLTs. It has been argued that organisation ability to adapt to a changing environment depends on individual preparedness for changes that brings about their readiness for exerting efforts towards implementing the changes. However, referring to education technological changes, the major stress has been put on individual-teacher preparedness to technological changes (Fullan, 2011; Singh & Chan, 2014; Tifani *et al*., 2016; Wang *et al*., 2018) while the silence been observed to matters concerning preparedness for changes among leaders in relation to the management of execution for changes.

In fact, leaders are the ones who plan, prepare, populate and support the process of change in organisations (Andersen, 2008; Mashall, 2010; Griffin, 2019;) and that, organisations where leaders are not ready for changes, it is difficult for employees to change. Literature (Furnham, 2002; Karp & Helg⊘, 2008; Andersen, 2018; Griffin, 2019; Jiang, 2020) indicates that change has turned out to be a significant obstacle not only at the organisation level but also at the individual level, including leaders. Suitable preparedness for changes by meso-level leaders may have something to do with the cut-off of resistance to change and provide for likelihood to wield more efforts towards effective implementation and sustainability of teaching and learning technological changes (Andersen, 2018). Mid-level leaders (also meso level leaders) have been termed influential in encouraging ownership of the changes for successful innovation for both teacher and higher level-leadership (Bush, 2020; Lipscombe, Tindall-Ford, & Grootenboer, 2020; Wan *et al.*, 2020)since MLALs create and enforce various strategies for the integration of ITLTs.

Therefore, this study delineates on preparedness for adoption and management of technological changes relating to innovative teaching-learning technologies among MLALs of higher education such as College principals, Deans, Heads of Department and Coordinators. The study findings provide useful information to policymakers, academics, researchers, and other stakeholders who design and implement ITLTs. The main research question of this study was 'What is the perceived status of preparedness for changes in teaching and learning technologies among MLALs in selected Tanzanian public universities?' This question was in terms of appropriateness for changes, changes efficacy, personal valence, and managerial competences.

1.1 Problem Justification

In any organisation, people are the most valuable resource playing a variety of roles at macro-level, meso-level or micro-level for adoption and implementation of technological changes. Research on acceptance and technology implementation, more particularly in education, has overwhelmingly been focusing at micro level on either students or teachers. In this, most of the previous studies in education concentrate more on individual-teacher preparedness for changes; yet there is still low or inconsistent implementation for changes on the use of teaching and learning technologies in Tanzania. Thus, this study prevails over assessing preparedness for changes in ITLTs among MLALs in higher education institutions. Suitable preparedness for change by MLALs is needed for breaking in the resistance to change and enhance likelihood to exert more efforts towards adoption, implementation and sustainability of teaching and learning technological changes. Since MLALs have opportunities to create and enforce various strategies for the integration of ITLTs. Leaders' attitude and competence can encourage micro level personnel to use technology. Therefore, we expect this study to accelerate the relevant capacity building on management of technological changes in education, as part of the undergoing project for transforming the culture of integrating innovative teaching and learning technologies among public universities in Tanzania.

1.2 Theoretical Framework

Implementing major changes in organisation is very difficult. People keep resist change and can take a long time for it to stick (Kotter, 2007). Lewin's change management model is the three-step model involving unfreezing, moving and refreezing which assist in managing changes effectively while getting people's support in each stage. This study determines the preparedness for managing teaching and learning-technological change through Lewin's lens of the unfreezing phase.

According to Lewin's theory of change management, the 1st stage of unfreezing provides for the necessity and preparedness for change to anyone who is concerned with a change. The logic behind is 'the more we know and ready about the change; the more motive we are to accept and implement the change' (Clarke, 1994). The unfreezing phase accounts for the preparedness for change and ensures organisation readiness to destabilise the status quo. Preparedness for change through readiness among individual termed as a key for evading unpredictable change implementation that tends to be reactive, discontinuous, ad-hoc and often triggered by a situation of organisational crisis (De Wit & Meyer, 2005). Thus, once the change has occurred, it is vital to take any steps necessary to reinforce the new system.

Adopting Lewin's unfreezing perspective may provide support relating to the management of technological changes in teaching and learning among MLALs in higher education. This study, therefore, captures the underlying tenets of the unfreezing stage which creates awareness and ensures people within the organisation understand the need for change such as appropriateness for change (Holt *et al*., 2007 & Anjani 2012), valence (Holt *et al*., 2007), and change efficacy (Adil, 2016). To add up on the model, the managerial competences dimension was also considered. On this view, studies on management of innovations (Sharma & Rai, 2003) suggest for managerial competences as a critical variable on preparedness for leaders to enhance effective implementation of technological innovations and changes in organisations.

1.3 Academic Leadership for Technological Changes in Teaching and Learning

Academic leadership refers to the personnel with formal managerial responsibilities who exhibit leadership in academic activities (Jing & Yao, 2019). In the context of teaching-learning technological change initiatives in HEIs, MLALs assume and practise change management roles in line with their normal tasks to influence the smooth implementation of (ITLTs) at the micro-level. As a matter of fact, MLALs prevail as key change agents with effective managerial techniques essential for keeping track of changes towards the use of teaching and learning technologies in the most effective way (Becker, 1993; Schelling, 2006; Will, 2015). MLALs create and enforce various strategies for effective integration of ITLTs.

In Tanzania, the implementation of technological change in education seems crucial and grows fast however, it is evident that the implementation of ITLTs in higher education in Tanzania is relatively low (Lashayo & Olahraga, 2017). This further suggest on the preparedness for change role among academic leaders towards management of the integration of ITLTs. Sufficient preparedness status will establish them with relevant competence needed for eliminating barriers on implementing change and allow suitable sustainability decisions of ITLTs use among teaching staff.

1.4 Leadership Competences for Managing the Execution of ITLTs

Change and innovation management competences entail managerial abilities for influencing the change process. Leadership at any level in the organisation require such essential attribute for driving change to achieve strategic goals (Garrison, 2007). In this, scholars (Harigopal, 2006; Tushman & Anderson, 2004; Harshman & Phillips, 1995) emphasise that leadership, could facilitate the process of change and questioning of the existing implementation practices. According to Garrison (2007), proper execution of changes in any sector evolves on securing great leadership. When the organisation is coping with new realities, it must look at what it stands for, the values being challenged and the new attitude, behaviours and competences required for new change needs.

According to Ashkenas (2013), leaders' competences seize the opportunity to strengthen the ability to manage changes. Competence allows leaders to spot indicators that lead to performance deficiency whilst speeding up and aestheting the teaching-learning delivery in universities (Alshgeri, 2016; Zhu & Kurtay, 2018; Gelaidan, 2018).

Early studies (Miller & Snow, 1978; Beatty & Lee, 1992) identify basic leadership strategic competences relating to adoption of general technological changes and innovations. Their emphasis based on prospectors, analyser, reactor and defender, though some scholars argued that their competences could only be accomplished by superficial changes in the organisation. Nadler & Tushman (2006) put forward three critical managerial competences involving shaping political dynamics, motivating constructive behaviour and managing transition. Numerous scholars determine the replication of these competences in a different context. For example, Sharpe, Benfield & Francis (2006) insist on obtaining the appropriate levels of participation in implementing changes by using rewards system as a necessary strategy for teacher-leader to enhance implementation of teaching-learning technological change. Based on the previous studies, literature suggests that managerial competence relating to technical- generic dimensions is vital in exerting influence in the implementation of organisation technological innovations (Wickramasinghe & Zoyza, 2008; Balyer & Ozcan, 2017).

1.5 Operational Definitions for the Managerial Competences

Table 1.

Competences	Literature	Conceptualisation
Ability to communicate the change	Tushman, (1997); Bordia *et al*, 2004;	Provide direction for management of transition for reducing ambiguity
Ability to obtain feedback about the transition state: manage transition.	Tushman (1997)	Determine the progress of the transition, and reduce dependence on traditional feedback processes.
Ability to reward desired behaviour in transition to future state	Tushman, (1997); Haas, (2016)	Use rewards system to shape behaviour to support the future state. Encourage the heart.
Ability to obtain the appropriate levels of participation in planning or implementing change.	Tushman, (1997); Bordia *et al*, (2004);	Create opportunities for participation to obtain the benefits of participation such as motivation, better decision, reduce ambiguity, conflict, and enhance better control.
Ability to demonstrate leadership support for changes	Tushman, (1997); Afshari *et al* (2012); Ghavifekr, Afshari & Salleh (2012)	Shape the power distribution and influence the patterns of behaviour through providing support or resources -remove roadblocks and maintain momentum.

Thus, there is no doubt that there is a need to enhance effective implementation of ITLTs through managerial-leadership facets. In this study, the degree to which MLALs possess skills for required tasks relating to management of teaching and learning of technological change (efficacy); the degree they will potentially benefit (or not) with the change as it is implemented (personal valence); the extent of relevance, need and legitimacy of the teaching-learning technological changes (appropriateness) and leadership abilities for managing innovations in teaching and learning (managerial competences) were assessed to examine the status of preparedness for executing ITLTs among MLALs in the selected Tanzanian public universities.

2. Methodology

This study is a cross-sectional research design, involving a total of n=76 MLALs who were randomly sampled comprising male (72.4%) and female (27.6%) staff from two public universities in Tanzania. To illustrate, MLALs who are College Principals, School or Faculty Deans, Heads of Departments and Programme Coordinators filled in the survey. Table 1 presents a descriptive summary of the demographic characteristics of the respondents.

The measurement, i.e., readiness for change variables were adopted (modified) from Holt *et al*., (2007) with three sub-scales of appropriateness, change efficacy and personal valence with 14 items, whose questions were responded to by using seven-point scoring scales anchored by ratings of strongly disagree (1), slightly disagree (2), disagree (3), neutral (4), agree (5), slightly agree (6) and strongly agree (7).

We employ technical-generic competences based on the study of Cummings and Worley (2003) termed as managerial competences for leading technological innovations cf. motivating change (MOTI), creating a vision (VISION), communicate the change (COMM), managing transition (TRANSI) and sustaining momentum (SUSTAIN). All items were scored on a five-point frequency rating scale ranging from ‘1’ (low) to ‘5’ (high). For each technical- generic competence, the required and current level of MLALs’ competences was explored.

The Spearman-Brown split-half Cronbach’s alpha was used to assess the reliability of the research instrument by MLALs to the selected public university of similar qualities prior to the main data collection and it was found to be reliable at 0.80.

Table 2. Demographic information of the sample (n=76)

Parameter	Category	F	Percent
Age (years)	26-35	7	9.2
	36-45	43	56.6
	46-55	22	28.9
	56+	4	5.3
Gender	Female	21	27.6
	Male	55	72.4
Experience (years)	4-10	38	50
	11-18	31	40.8
	19-32	7	9.2
Academic position	Assistant lecturer	15	19.7
	Lecturer	49	64.5
	Senior lecturer	10	14.2
	Associate professor	2	1.5

2.1 Data Analysis

In this study, data were coded and analysed by using IBM SPSS statistics version 26. Descriptive statistics particularly frequency and percentages were used to analyse demographic characteristics and preparedness for change dimensions; thus, computing the frequency and percent of each respondent.

Inter-item correlation of the four dimensions of readiness for changes was computed and indicated highly reliable scale of 0.7 or greater as depicted in Table 2. The exploratory factor analysis (EFA) was used to determine the validity of research items for each variable through principal component analysis (PCA). With this regard, PCA was carried out using an orthogonal rotation (varimax rotation), which simplifies the factor structure by maximising the variance of a column in the pattern matrix (Osborne, 2015). The data were suppressed at 0.4 factor loading. Before proceeding with factor analysis, the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test (BTS) were conducted to determine whether it was appropriate to conduct factor analysis. The results show that KMO was 0.852, implying that the sampling procedure was adequate and for (BTS; $\chi 2$= 583.927; df=91, p=0.00) it shows that the data for all variables were appropriate for factor analysis.

After the primary-frequency analysis, the data were subjected to secondary analysis by using Yeh's index of perceptions (YIP) to compare the readiness for change status within statements among respondents per the formula below. The seven Likert scale was translated into three rating levels of 1-3 (disagree), 4 (neutral) and 5-7 (Agree) whilst YIP shown through +1.00 stood for the highest readiness for change status, 0.00 stood for somewhat readiness for change status and -1.000 stood for the lowest readiness for change status in accordance with studies of Anwar *et al.,* (2008) and Abdu (2014).

Formula: $\frac{better-worse}{Total\ no.of\ respondents}$

To reflect on the context of this study, the above formula was translated into:

$YIP=\frac{Agree-disagree}{Total\ no.of\ respondents}$

Furthermore, descriptive and inferential statistics were used to obtain the preparedness status for managing change among MLALs. The rating method and YIP index score were used to determine the extent of readiness among MLALs. One-way Analysis of Variance (ANOVA) was used to determine the statistically significant difference of

the means of preparedness for change dimensions using Duncan's Multiple range test for post hoc analysis of mean separation.

3. Results

This current study examines the preparedness for managing the technological change in teaching and learning (ITLTs) among MLALs through two main categories: The readiness for changes status and managerial competences.

3.1 Status of Readiness for Technological Changes Among Mid-Level Leaders

The mean score of dimensions of readiness for changes were appropriateness (4.5), change efficacy (4.4), and personal valence (2.0) as presented in Table 3. The results from ANOVA test shows there was a statistically significant difference in the mean score for dimension of readiness for change (p=0.05). The results show that appropriateness and change efficacy did not differ significantly.

Furthermore, Personal valence owned a significant lower mean score (M=2.0, SD=0.4), as suggested by both results through ANOVA and YIP analyses (Appendix 2). This means that, MLALs perceive ITLTs as not relatively beneficial to them; rather they are only for organisational purposes.

Table 3. Mean, SD, reliability coefficient, ANOVA and post hoc analysis results for readiness for changes among MLALs

Variables	Mean	SD	Reliability coefficient (α)
Appropriateness	4.5 [a]	0.6	0.88
Change efficacy	4.4 [a]	0.7	0.81
Personal Valence	2.0 [b]	0.4	0.83

Note: Values bearing different superscripts imply statistically significant differences between the respective dimensions (P<0.05).

3.2 Perceived Managerial Competences for Managing the Implementation of Technological Change in Teaching and Learning.

To figure out on the required managerial competences for effectively managing the integration of ITLTs, MLALs were asked to rate their current competence level (CL) alongside the desired competence level (RL). The results show that the mean scores for the five sub-dimensions for managerial competences are significant different among MLALs. The mean scores for MLALs-managerial competence for enhancing the integration of ITLTs was depicted in Table 4. The results reveal that the current level of competence in communicating ITLTs change was found to have significant higher mean score of 3.3 (SD,0.1) $\rho<0.05$ compared to the motivation of ITLTs change with the lowest mean score of 2.1 (SD,0.1). Generally, the results suggest for low level of competence relating to motivation of technological change in teaching-learning among MLALs.

In addition, the results reveal higher mean scores for the desired managerial competences in all dimensions compared to the current managerial competence level. More specifically, the results show that MLALs require more competences for motivating the implementation of technological changes in teaching and learning. All in all, when calculating the overall mean score for both CL and RL, the results from Table 4 further reveal that the current managerial competence level was relatively low with mean score of (2.9) among MLALs while the required competence level was found quite higher with an average of (4.26). Thus, the results revealed the difference average of 2.17 competence level required by MLALs for managing the integration of ITLTs in the selected public universities.

Table 4. Descriptive statistics for the variables among ITLTs change management competences sub-scales

Current level	Mean	SD	Required level	M	SD
Motivating ITLTs change	2.1	0.1	Motivating ITLTs change	4.3	0.3
Managing the ITLTs transition	3.2	0.09	Managing the ITLTs transition	4.2	0.09
Sustaining momentum	3.2	0.1	Sustaining momentum	4.1	0.09
Creating vision for ITLTs	3.05	0.1	Creating vision for ITLTs	4.2	0.09
Communicating ITLTs change	3.3	0.1	Communicating ITLTs change	4.5	0.1

Means are significant at p<0.05. SD=Standard Deviation

4. Discussion

This study examines the preparedness for managing the implementation of the technological change in teaching and learning among MLALs in the selected Tanzanian public universities. Firstly, it assesses the readiness for change status through the dimensions of appropriateness for change, personal valence and change efficacy. Then, managerial competence need was assessed to establish the competence need gap for suggesting developmental programme among MLALs in order to transform the culture of ITLTs use among teaching staff in Tanzania.

The study results on the status of readiness for change indicate a low perceived benefit to individual (personal valence) with respect to ITLTs among MLALs. This signifies that MLALs do perceive those technological changes relating to teaching and learning are not relatively for their benefits but rather for organisations. In other words, most MLALs do not see technological changes in teaching and learning are beneficial to them, but rather to their organisations. Studies which found similar findings with this study results are mostly based on teachers' valence and propose intrinsic motives campaign to eliminate the circumstance barriers (Gelaidan *et al.*, 2018; Ilyas, 2018). Their suggestion could also be adopted by MLALs since it has been shown that managing technological innovations requires positive personal valence. This adds up to the previous study by Adil (2016) who argued that if individuals in organisations see changes benefit them, they would exert behaviours towards change initiatives and vice versa.

The results further show that the overall mean score for readiness for changes was 3.5 with the SD of 0.83 which implies that readiness for managing changes among MLALs was at average. Again, the overall YIP- mean (YIP=0.6) suggests to somewhat moderate readiness status among MLALs for adopting and managing changes in ITLTs. Perhaps this kind of perception results, provide more justification for the low implementation of teaching & learning technological changes among the studied institutions.

Moreover, with regard to the second category of preparedness for changes, the general results indicate moderate managerial competences level for enhancing the integration of technological changes in teaching and learning. Specifically, MLALs were found to have relatively low competence in motivating technological changes relating to the integration of innovative teaching and learning technologies by academic staff. Research on education technology emphasised on the presence for motivation among teachers to enhance their integration of innovative teaching and learning technologies (Noskova *et al.*, 2016). If that is the case, this suggests for MLALs to be imparted with the desired competence in motivating the implementation process relating to the use of ITLTs in order to enhance its effectiveness.

5. Conclusion

The results conclude that preparedness for technological changes in teaching and learning is determined by multi dimension indicators as suggested by diverse readiness for change status and managerial competences held by MLALs. The leaders had a low belief that proposed change is beneficial to them and the majority lack competences

in motivating the implementation of technological changes in teaching and learning. Therefore, the study proposes continuous sensitisation prior to or during the implementation of ITLTs. That could explore academic leaders' understanding of the basic change management competences and readiness.

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Appendices

Appendix 1. A table of factor loadings of readiness for change dimensions

Statements	APPR	CE	PV
I think my university will benefit from these educational changes. (A1)	.659		
Use of technological change for ITLTs makes teaching practices easier. (A2)	.803		
In the long run, I feel it will be worthwhile for me if I start preparing now for implementing these changes* (A3)	.833		
I think there are several rational reasons for these changes* to be made. (A4)	.780		
I think these changes* matches the priorities of our organisation. (A5)	.748		
I do not anticipate any problem adjusting to management of changes relating to the implementation of teaching technologies while doing my normal teaching practices. (E6)		.612	
I feel I can handle it with ease the implementation of these changes*. (E7)		.780	
I have the skills that are needed to make these changes* work. (E8)		.799	
When I set my mind to changes relating to the implementation of teaching technologies, I can learn everything that is required for managing these changes*. (E9)		.600	
My past experiences make me confident that I am able to perform and manage successfully these changes*. (E10)		.585	
These changes* will also benefit me. (V11)			.671
With these changes* in teaching practices, I will experience more self-fulfilment. (V12)			.842
Integrating teaching and learning technologies in teaching assignments will increase my teachers feeling of accomplishment. (V13)			.857
I can do well to some tasks that are required for managing the transition when we go for this educational change. (V14)			.535

**These changes= technological changes in teaching and learning*

Appendix 2. YIP analysis output table

Items	Disagree		Neutral		Agree		YIP	Rank
	F	%	F	%	F	%	values	
A1	2	2.6	5	6.6	69	90.8	0.88157	1
A2	5	6.6	6	7.9	65	85.5	0.78947	5
A3	2	2.6	8	10.5	66	86.8	0.84210	2
A4	2	2.6	9	11.8	65	85.5	0.82894	3
A5	4	5.3	5	6.6	67	88.2	0.82894	3
E6	13	17.1	15	19.7	48	63.2	0.46052	10
E7	2	2.6	8	10.5	66	86.8	0.84210	2
E8	7	9.2	12	15.8	57	75	0.65789	8
E9	6	7.9	13	17.1	57	75	0.67103	7
E10	4	5.3	6	7.9	66	86.8	0.81578	4
V11	7	9.2	6	7.9	63	82.9	0.34210	12
V12	11	14.5	12	15.8	53	69.7	0.55263	9
V13	14	18.4	17	22.4	45	59.2	0.40789	11
V14	17	22.4	16	21.1	43	56.6	0.73684	6
YIP-mean							0.68985	

Notes: *A=Appropriateness; E=Change efficacy; V=Personal valence*