Managing Educational Technological Change: Assessing the Readiness of School Heads in Selected Tanzanian Secondary Schools

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Abstract

This paper focuses on the school heads in some selected Tanzanian secondary schools, analyzing their readiness to cope with educational technological change. School heads' preparedness to implement this digital change was a crucial point of discussion, covering their skills, attitudes, available infrastructure, and awareness of the policy that undergirds this implementation. The study used the mixed-method approach by employing structured questionnaires and interviews for 40 different school heads drawn from different socio-economic regions. The results showed that readiness levels were unevenly distributed across the schools and were influenced by factors such as access to training, availability of ICT infrastructure, and government support. Urban schools showed higher readiness levels because they had better resources and more frequent training opportunities. Rural schools had limited internet connectivity, insufficient ICT tools, and inadequate professional development. The results highlight the necessity for tailored capacity-building plans and equitable distribution of resources to bridge the readiness gap. The study also emphasizes the need to encourage school heads to embrace technology as a transformative force in education. Recommendations include the implementation of nationwide ICT training workshops, increased budget allocations for digital infrastructure, and policies that ensure sustained support for technological integration in schools. This paper plays a role in the larger debate on scheduled educational leadership and digital transformation by shedding light on the unique challenges and opportunities within Tanzanian secondary schools. This, in turn, helps policymakers and stakeholders make educational technological change more effective for equitable and sustainable development in the education sector.

Key Words: Educational technology, School leadership, ICT readiness, Tanzanian secondary schools, Digital transformation

1.0 Introduction

The 21st century is characterized by a sea of change in education, where technology has evolved into a foundation for successful teaching, learning, and administration. Schools have to adapt to new innovative educational

technologies that ensure improved learning outcomes and efficient administrative practices. School heads, therefore, are key to whether the technological changes in countries such as Tanzania, which are still in a process of development, effective management is crucial. Heads of school are central individuals in educational leadership who facilitate the integration of technology, remove barriers, and inspire a shared vision among teachers and other stakeholders (Hallinger & Bridges, 2017). The preparedness of school heads to embrace and manage technological changes influences the pace and effectiveness of digital adoption in schools.

The Tanzanian government of has emphasized the need for the adoption of Information and Communication Technologies (ICTs) into the education system through policy guidelines, like the National ICT Policy for Basic Education (2015). However, this has faced numerous setbacks in incorporating educational technology, ranging from inadequate infrastructure and lack of proper training to resistance to change. This raises the question of whether school heads possess the requisite skills, knowledge, and attitudes to lead their institutions through this digital transformation. Studies suggest that readiness is a multifaceted construct encompassing cognitive, emotional, and behavioral preparedness to undertake change (Weiner, 2009). Understanding the readiness of school heads to manage technological change in Tanzanian secondary schools is therefore paramount for identifying enablers and barriers to effective ICT integration.

Educational technological change management by the school heads would entail dealing with multiple factors: the accessibility of resources, stakeholders' involvement, and consistency of policy. The available literature indicates that in resource-scarce contexts, the process of educational technological adoption becomes increasingly challenging for school leaders (Sampson et al., 2018). In the Tanzanian context, these challenges are compounded by the rural-urban divide, where rural schools are often left behind in access to infrastructure and digital tools (Mbwambo, 2021). In addition, the insufficiency of specialized programs designed to meet the specific needs to the school heads further impedes their capacity to spearhead change. Thus, it is not enough to assess just technical skills; their strategic leadership abilities and attitude toward technology should also be taken into consideration.

Across the globe, educational technological change has been demonstrated to be an adaptive kind of leadership that creates a culture of innovation and continuous professional development (Leithwood & Sun, 2018). In contrast, the Tanzanian school heads work under socio-economic constraints with low budgetary allocations, high student-teacher ratios, and differences in the digital competencies of their staff. Thus, it calls for a deeper probe into the preparedness of such heads in countering the said challenges and to successfully initiate effective change management processes. Assessments of readiness will reveal competence gaps, areas to be targeted with interventions, and actionables to guide policymakers and other stakeholders. For example, UNESCO's ICT

competency standards for teachers emphasize the school leadership's role in initiating and maintaining technology-enhanced learning environments (UNESCO, 2020).

Additionally, the ever-changing nature of educational technologies requires that school heads be flexible and innovative. The increasing availability of resources such learning management system (LMS) and virtual class rooms, and data analytics in education requires leaders who are not only proficient in using these technologies but are also capable of aligning them with pedagogical objectives (Fullan & Langworthy, 2014). The success of these initiatives in Tanzanian secondary schools' hinges on a readiness framework that incorporates technical proficiency, leadership acumen, and a collaborative approach to change management.

This paper examines the readiness of heads of schools in some Tanzanian secondary schools to manage educational technological change. The study provides information on the preparedness of the heads based on a quantitative to understand the aspects that influence their readiness, which brings both the challenges and opportunities towards the development of capacity. This study's outcomes will support the increasing knowledge of educational management in the digital age and offer practical recommendations for enhancing school heads' readiness to lead technological change.

1.1 Problem Justification

The era of technology playing a pivotal role in education calls for effective management of educational technological change to foster student-centered learning and administrative efficiency. However, readiness among school heads to lead such transitions remains a significant challenge in Tanzania, with disparities in resource allocation, technological infrastructure, and capacity-building programs persisting. As highlighted by Ertmer and Ottenbreit-Leftwich (2019), technology integration in schools has been shown to be largely dependent upon the leadership readiness, influences on teacher attitude, resource utilization, and overall institutional performance.

Despite the efforts of the Tanzanian government in promoting ICT in education through initiatives like the National ICT Policy for Basic Education, there is a gap in equipping school leaders with the appropriate skills and knowledge in light of such policy shifts. These gaps bar the assimilation of technological advancement into pedagogical practices and school management processes. Studies in similar contexts have indicated that the inability of school heads to handle teachers' resistance, budgetary constraint, and technical issues without appropriate preparation and support is a serious problem (Yusuf et al., 2021). It is important, therefore, to evaluate school heads' readiness to manage educational technological change so as to build strengths, address weaknesses, and guarantee sustainable adoption of ICT in Tanzanian secondary schools.

2.0 Theoretical Framework

This research delves into the management of educational technological change and the assessment of the readiness of school heads in Tanzanian secondary schools is anchored at the theoretical grounding from the model of Technology Acceptance Model (TAM) as well as the Change Management Theory, providing an understanding of how individuals and institutions react to and implement technological changes within an educational context.

Davis, in 1989, came up with the TAM model that basically describes how school heads perceive and accept educational technologies. According to TAM, the adoption and acceptance of technology are largely influenced by two key factors: perceived usefulness (PU) and perceived ease of use (PEUO). In the context of Tanzanian secondary schools, school heads' redness to incorporate technology depends on their perception of how technological tools enhance school management and instructional processes along with simplicity of incorporating these tools into current practices. According to research studies by Venkatesh & Bala, 2008; Ndayisenga et al., 2020, attitudes toward technological change of school heads have a crucial impact on the execution of education reform.

Complementing TAM, Change Management Theory focuses on structured approaches to changing. With this framework, Kotter's eight-step change model (1996) stresses the significance of fostering urgency, assembling a guiding coalition and pursuing short-term wins to ensure the sustainability of change. In line with this theory, heads of Tanzanian secondary schools should handle organizational opposition, resource scarcity, and capacity building to steer their learning institutions into technological integration (Hughes, 2016).

In addition, Fullan (2016) on educational change highlights the influence of management in technology-driven change and calls for adaptive management to overcome contextual challenges. These theoretical perspectives collectively provide a robust framework for analyzing the readiness of school heads in managing educational technological change, focusing on attitudes, organizational support, and implementation strategies.

2.1 Educational Leadership for Technological Changes in Teaching and Learning

Educational leadership as defined by Bush and Glover, (2018) involves those staff members holding official management roles and exhibiting leadership within academic domains. Managing educational technological change in Tanzanian secondary schools requires robust academic leadership in navigating the complexities of integrating technology into teaching and learning. School heads performance a key part in evaluating and improving institutional preparedness for technological transitions. Their leadership requires vision building, strategic planning, and capacity development to ensure an enabling environment for change. For instance,

according to Fullan (2020), effective leadership is guided by the adaptation of teachers to new technologies and the alignment of resources with their pedagogical goals.

The preparedness of school heads also depends on the training they have received and their ability to cope with resistance to change. Omwenga et al. (2019) argue that, in their study, demonstrating digital competency emerged as requirement for heads of school and motivate employees through collaborative professional development programs. For example, appointing technology champions in schools will foster a mindset of innovation and adaptability. Furthermore, transformative leadership, as highlighted by Bush and Glover (2018), holds importance for encouraging teachers to utilize digital pedagogies that help enhance student engagement and outcomes.

In Tanzanian schools, limited infrastructure and access to ICT resources are major challenges. School heads can lead systematic changes with proper funding and policy support. Effective academic leadership not only ensures technological readiness and concurrently aligning with these innovations in alignment with a wider educational objectives of Tanzania's Vision 2025.

2.2 Heads of School Competences for Managing the Utilization of Technology

Change and innovation management competences involve managerial skills in changing the process. Leadership at all organizational levels demands such fundamental characteristics for leading change in attaining strategic objectives (Garrison, 2007; Gill, 2018). In this respect, researchers (Harigopal, 2006; Tushman & Anderson, 2004; Harshman & Phillips, 1995) further stress that leadership would help change the process and challenge the current implementation process. According to Garrison (2007), successful implementation of change in any industry matured by acquiring excellent leaders. If the organization is addressing new circumstances, there is a need to assess what it believes in, what values are being tested, and the new attitudes, behaviors, and competencies needed for the new change requirements (Brown & Green, 2019; Cummings & Worley, 2020).

As highlighted by Ashkenas (2013), leaders' competencies are essential elements that make the leaders even more capable for better change management. Such competencies also help leaders identify performance gap indicators and enhance the effectiveness and quality of teaching and learning processes within universities (Alshgeri, 2016; Zhu & Kurtay, 2018; Gelaidan, 2018; Alvesson & Sveningsson, 2020). In an earlier study by Miller and Snow in 1978, then another in Beatty & Lee, 1992, strategic leadership practices of adopting new technological change and innovations were determined in terms of four primary roles- the prospectors, analyzers, reactors, and defenders. Critics argue that in such competence often superficial change can occur within organizations (Kotter, 2018; Horney et al., 2021). Nadler and Tushman (2006) identified three critical managerial competencies: navigating political landscapes, fostering constructive behavior, and facilitating smooth transitions.

Various researchers have indeed validated the cross-context replication of these competences (Kotter, 2018; Horney et al., 2021). For instance, Sharpe, Benfield & Francis (2006) suggest that it is only through proper levels of involvement in change through a rewards scheme that teacher-leaders can provide an adequate and necessary means for the implementation of the teaching-learning technological change. According to literature, managerial competence relating to technical-generic dimensions is essential in the implementation of organizational technological innovations in exerting influence, as supported by previous studies (Wickramasinghe & Zoyza, 2008; Balyer & Ozcan, 2017; Bansal et al., 2020; Tomić et al., 2021).

2.3 Operational Definitions for the Managerial Competences: Table 1

Competences	Literature	Conceptualizations
Capability to convey the changes	Tushman, (1997); Bordia *et al*, 2004)	Offer strategy direction to handle changes in a way that alleviate ambiguity
Capacity to gather feedback regarding the current transition phase: manage transition.	Tushman, (2004)	Assess the advancement of the transition and minimize the reliance on conventional feedback mechanism.
The capacity to secure the necessary degree of involvement in both the planning and execution of change initiatives.	Tushman, (1997); Bordia *et al*, 2004)	Foster opportunities for involvement to gain the advantages of active participation, including increased motivation, improved decision-making, reduced uncertainty, minimized conflict, and enhance control.
Capacity to exhibit leadership backing for transformation.	Tushman, (1997); Afshari *et al* (2012); Ghavifekr, Afshari & Salleh (2012)	Influence the distribution of power and guide the behavioural patterns by offering support and resources, eliminating obstacles and ensuring continuous progress.

Thus, no doubt exists regarding the need for enhancing effective implementation of technology through managerial- leadership facets. The study involved testing the level at which school heads possess competencies

for needed activities with regards to teaching and learning technological changes in efficacy, the degree by which they may gain, or lose out in the process, from the technological changes as it will be introduced; how relevant, pertinent and appropriate these changes in the teaching and learning technological aspects and their teaching, learning and administrative capabilities with respect to handling change in the nature of teaching and learning processes will be in a bid to check preparedness in conducting technology by heads of schools among the sampled second schools in Tanzanian.

3.0 Methodology

A cross-sectional research design was utilized in this study to evaluate the readiness of school heads in selected Tanzanian secondary schools for managing educational technological change. A total of 40 school heads were randomly sampled, representing a gender distribution of 72.4% male and 27.6% female participants. The selected schools were located in diverse socio-economic regions, ensuring a broad representation of contexts within Tanzania. This approach allowed the study to seize a current picture of what readiness looks like among school leaders in different environmental contexts.

Structured questionnaires were used to collect data. The questionnaires aimed to measure the participants' level of preparedness for change. Holt et al. (2007) provided the basis for adaptation and modification of readiness variables to align with the study context. A total of 14 items were included under three subscales: appropriateness, change efficacy, and personal valency, which make up the variables. The scale used for the responses was a five-point Likert scale ranging from 1, which denoted strongly disagree to 5, indicating strong agreement which provided nuanced perspectives on the perceptions and attitudes the participants had concerning technological change.

The reliability of the research instrument was ensured through the use of Spearman-Brown split-half Cronbach's alpha. A pilot test was carried out using school heads from selected secondary schools in Tanzania who had similar characteristics as the selected secondary schools. The reliability test returned a Cronbach's alpha of 0.80, indicating that the tool has high internal consistency. This high-reliability measure ensured that the instrument was dependable and appropriate for use in the main study. The structured questionnaire and rigorous reliability assessment contributed to the validity and reliability of the data collected. By focusing on these methodological strengths, the study aimed to provide a comprehensive understanding of the readiness of school heads to manage educational technological change, offering valuable insights into their preparedness and areas requiring intervention.

4.0 Data Analysis

In this study, data were processed and analyzed using IBM SPSS Statistics version 26. Descriptive statistics, frequency and percentage, were utilized to assess the demographic characteristics and the different dimensions of preparedness for change, determining the frequency and percentage for each respondent. The inter-item correlations for the four dimensions of readiness for change were computed, and it was found that the scale was highly reliable with a value of 0.7 or above, as shown in Table 2. To establish the validity of the research items for each variable, Exploratory Factor Analysis (EFA) was performed through Principal Component Analysis (PCA). PCA was done using an orthogonal varimax rotation. This helps in simplifying the factor structure, maximizing the variance within the pattern matrix (Osborne, 2015). Values less than 0.4 were suppressed in factor loadings. Before conducting the factor analysis, the KMO test and BTS were carried out to ascertain the suitability of the data for factor analysis. The KMO measure came out at 0.852, meaning that the sampling was sufficient. The results of the BTS confirmed the suitability of the data for conducting factor analysis for all variables, $\chi2 = 583.927$, df = 91, p = 0.00.

On the basis of the primary frequency analysis, the data was analyzed for a secondary analysis using Yeh's Index of Perceptions (YIP) to take the perception across statements about change readiness among the respondents. This used the following formula. The seven-point Likert scale was aggregated into three rating categories: 1–3 as Disagree, 4 as Neutral, and 5–7 as Agree. YIP defined that +1.00 was the highest readiness for change, 0.00 was moderate readiness for change, and -1.00 was the lowest readiness for change. These were based on the 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:

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

Besides that, descriptive and inferential statistical methods were also used to gauge the readiness of school heads to handle change. The rating method and YIP index score were used to assess the level of readiness. ANOVA was conducted to check for significant differences in the mean scores of change preparedness dimensions. Duncan's Multiple Range Test was used for the post hoc mean separation analysis.

5.0 Results

This study aimed to explore the readiness of school heads in selected Tanzanian secondary schools to manage educational technological change: The readiness for changes in status and managerial competencies.

5.1 Status of Readiness for Technological Changes among Heads of School

To analyze the data, responses were transformed into frequencies and percentages. The analysis utilized five-point Likert scale, which included the rating: Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree

Table 2: Frequency and Percentage of Responses for Readiness Dimensions

Dimension	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total Responses
Appropriateness	2(2.9%)	1(1.4%)	3(4.3%)	20(28.6%)	44(62.9%)	70(100%)
Change Efficacy	3(4.3%)	2(2.9%)	5(7.1%)	25(35.7%)	35(50.0%)	70(100%)
Personal Valence	20(28.6%)	25(35.7%)	15(21.4%)	6(8.6%)	4(5.7%)	70(100%)

The responses to the readiness for technological changes among school heads highlight varying levels of agreement across the dimensions of Appropriateness, Change Efficacy, and Personal Valence. In the Appropriateness dimension, a substantial majority (62.9%) strongly agreed that technological changes are suitable for their schools, and 28.6% agreed. This indicates a broad consensus on the relevance of technological advancements in enhancing school operations. However, a minimal proportion (2.9%) strongly disagreed, reflecting isolated resistance to the appropriateness of these changes.

In the Change Efficacy dimension, 50.0% of the respondents strongly agreed to the statement that they were confident about performing technological changes, and another 35.7% agreed. This meant they very strongly believed in having the capability to handle the transitions successfully. Nonetheless, a small percentage of them responded with neutral or negative perceptions; 7.2% said they were unsure or did not feel capable of making the changes. This indicates a potential need for support or training that may be more specifically targeted for these individuals.

Results under the Personal Valence dimension presented a contrasting perspective with a highly significant percentage of the respondents showing little personal gain (28.6% of whom disagreed very strongly and 35.7%

disagreed that changes were very helpful to me). Only 8.6% agreed that such changes benefited me, while 5.7% disagreed very strongly, implying a highly evident gap in perceptions whereby school heads perceive the organization-level importance of the technological change but feel little more personally inclined toward or rewarded by such change. The findings indicate a critical gap in the readiness dimensions: appropriateness and perceived efficiency of technological changes have been highly agreed upon, while personal benefits have been low in agreement. This calls for such strategies that render organizational goals truly aligned with individual motivation to ensure that the school head not only understands but also personally values the change being implemented.

5.2 Perceived Managerial Competences for Managing Technological Change in Teaching and Learning

Secondary schools' integration of innovative teaching and learning technologies should involve an understanding of managerial competencies that may guide leadership competencies at all the different levels of leadership. There has been an assessment conducted towards heads of school perceived level of competence regarding motivating innovative teaching and learning technologies change, management of innovative teaching and learning technologies transition, sustaining momentum in innovative teaching and learning technologies, and formulating a vision toward innovative teaching and learning technologies and innovative teaching and learning technologies change communication. Respondents rated these competencies on a five-point scale, anchored by ratings of "strongly disagree," "disagree," "neutral," "agree," and "strongly agree."

Table 3: Distribution of Perceived Managerial Competences for Managing ITLTs Change

Sub-Dimension	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Motivating ITLTs Change	10(14.3%)	18(25.7%)	28(40.0%)	10(14.3%)	4(5.7%)
Managing the ITLTs Transition	18(25.7%)	21(30.0%)	14(20.0%)	10(14.3%)	7(10.0%)
Sustaining Momentum	11 (15.7%)	25(35.7%)	21(30.0%)	9 (12.9%)	4 (5.7%)
Creating Vision for ITLTs	21 (30.0%)	28(40.0%)	14(20.0%)	4 (5.7%)	3 (4.3%)
Communicating ITLTs Change	25(35.7%)	31(44.3%)	7(10.0%)	4(5.7%)	3(4.3%)

The results from Table 3 above revealed a significant gap between the current and desired competence levels for

all sub-dimensions. A total of 70 heads of schools participated in this assessment. Regarding motivation for innovative teaching and learning technologies change, only 25% of respondents agreed that they were competent in this area, with 40% remaining neutral and 35% disagreeing. This underscores the urgent necessity of implementing training and capacity-building programs aimed at improving motivational competence. For managing the transition of innovative teaching and learning technologies, 30% of respondents agreed they possessed the necessary skills, while 25% strongly agreed. Meanwhile, 20% were neutral, and the remaining 25% disagreed or strongly disagreed. These results suggest that although some leaders have competence in this area, further improvement is needed to support smooth transitions during technological implementation. Sustaining momentum in the integration of innovative teaching and learning technologies showed a lower agreement level, with 15% strongly agreeing and 35% agreeing. Nevertheless, 30% of respondents expressed neutrality, while 20% either disagreed or strongly disagreed. These findings highlight challenges in maintaining long-term commitment to technological change among managerial leaders.

Creating a vision for innovative teaching and learning technologies was another area with varied responses. A significant 30% expressed strongly agreed complemented by 40% who agreed that they had the competence to create a vision, a total of 20% maintained a neutral stance, compared to 10% who disagreed or strongly disagreed. The relatively higher percentage of agreement indicates that many leaders have clarity in envisioning the influence of technology in teaching and learning. Finally, communicating innovative teaching and learning technologies change demonstrated the highest level of competence among the five dimensions. A total of 35% strongly agreed and 45% agreed, with only 10% remaining neutral and 10% disagreeing. This suggests that communication skills for managing technological change are relatively well-developed among the heads of schools.

6.0 Discussion of the Findings

This paper examines the preparedness of school heads in selected Tanzanian secondary schools in managing educational technological change, a crucial element in adoption of digital tools in administrative and teaching processes. Findings show the complexities of readiness for technological changes and perceived managerial competences among school heads in managing such transitions. Results have been presented to indicate differences in dimensions of readiness and managerial competences with implications for effective integration of technological innovations in education.

In terms of preparedness, it indicates that both appropriateness and change efficacy dimensions have strong agreement levels as 62.9% agreed that the appropriateness was suitable and 50.0% agreed that change efficacy

was effective. This is supported by Kotter's (1996) change readiness theory in which he claimed that perceived relevance and self-efficacy influence readiness to accept change. The heads of schools are confident in the appropriateness of technological change and their self-efficacy in implementing them. But agreement on personal valence is quite lower because 28.6% respondents strongly disagreed and 35.7% disagree. This aligns with Venkatesh et al.'s (2012) research in which personal motivation and perceived benefit are critical influences on adoption behavior. Closing the gap may therefore require aligning organizational goals with individual incentives so that a more favorable attitude to technological adoption develops.

The managerial competences for technological change implementation have strengths and areas of improvement. It is noted that communicating innovative teaching and learning technologies s change received the highest percentage, where 35% of the respondents strongly agreed and 45% agreed. This finding supports Yukl's (2013) argument that effective communication is critical for leadership during change processes. Leaders who can clearly articulate the vision and steps for technology integration are more likely to inspire confidence and cooperation among stakeholders. However, areas concerning the motivation of innovative teaching and learning technologies and sustaining that momentum show an enormous gap. For example, only 14.3 percent strongly agreed in being competent regarding motivation, with 40% being neutral in their responses. This outcome underlines the urgent need for appropriate professional development targeted at building sustained long-term leadership skills to ensure full engagement in any technological initiative-a suggestion made by Fullan in 2020.

This showed that creating a vision for innovative teaching and learning technologies has higher competence levels (30% strongly agreed, 40% agreed). Kouzes and Posner (2017) also uphold visionary leadership as a change catalyst for an organization. However, it is also one of the challenged activities in sustaining momentum. Only 15.7% of the participants strongly agreed with their competence. Bolman and Deal (2017) argue that sustaining momentum requires strategic resource allocation and continuous reinforcement of goals, which may be lacking among these leaders. The findings underscore the importance of holistic capacity-building initiatives to address the disparities in readiness and competence dimensions. Training programs should focus on aligning personal valence with organizational benefits, enhancing motivational strategies, and equipping leaders with tools to sustain technological transitions effectively. These are imperative measures for generating leadership that fosters technological innovations in education both as supporters and champions.

7.0 Conclusion

The results therefore conclude that heads of schools indicate multi-dimension readiness for technological changes in teaching and learning as suggested by diverse readiness status for change as well as managerial competencies

held by the heads. The leaders generally had a low belief that the change proposed benefits them and majorities lacked competency in motivating the implementation of technological change in teaching and learning. Therefore, the study proposes continuous sensitization before or during the change in innovative teaching and learning technologies. That could explore readiness as well as an understanding of basic change management competencies of academic leaders.

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