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From Chalks to Clicks: Examining the Interrelationships Among Traditional, Blended, and Microlearning Approaches

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Abstract: Higher education is shifting from traditional classroom teaching towards technology-driven methods, yet traditional, blended, and microlearning approaches are rarely compared together. This study examined how perceptions of the three approaches vary by age, gender, and education level, how the approaches correlate, and which benefits of microlearning students value most. A self-designed online survey was completed by 233 higher-education students in Tanzania. Data were analyzed using independent-samples t-tests, one-way analysis of variance (ANOVA), correlation and regression analysis, and the Relative Importance Index (RII). Blended learning and microlearning were strongly correlated ($r = 0.637$, $p < 0.001$), whereas traditional learning correlated only weakly with each ($r = 0.18$). Preferences did not differ significantly by gender, education level, or age. Learners rated flexibility and convenience (RII = 1.00) and time efficiency (RII = 0.85) as the main benefits of microlearning, which suggests that it is best applied within blended learning.

Keywords: blended learning; microlearning; traditional learning; higher education; Tanzania

INTRODUCTION

Continuous shifts in pedagogical strategies and instructional tools have marked the evolution of education, from the chalkboard that once symbolized traditional teaching to the rapid integration of digital platforms. Traditional face-to-face learning in formal classrooms has existed for approximately 4,000 years, with its roots firmly entrenched in early civilizations like Mesopotamia and Egypt (Teke et al., 2022). Interestingly, this type of learning continues to dominate many parts of the world to this day. Students continue to attend classes behind four walls, and instructors continue to preach like sages on stages.

However, the proliferation of digital technologies has changed the way teaching and learning are being conducted. Since the late 1990s, there has been a gradual integration of diverse instructional approaches, moving beyond traditional face-to-face methods towards more technology-mediated strategies such as blended learning, mobile learning and microlearning (Li & Wong, 2025). Blended learning (BL) has been widely recognized as an effective strategy for overcoming educational barriers. It emerged as one of the most popular pedagogical concepts in higher education at the beginning of the 2000s (Almasi, 2019). BL enhances student engagement, promotes self-paced learning, and allows teachers to provide more personalized instruction. Blended learning combines face-to-face instruction with digital learning experiences, allowing for flexible, student-centered learning.

On the one hand, because of the limitations of traditional face-to-face learning, including the requirement for physical presence, the cost of attending college, and the need to leave home

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and family, blended learning was introduced to curb such effects (Gherheș et al., 2021). This is because blended learning offers a chance for students to study while at home, anytime, anywhere, and yet attend physical classes for interactions and practical-based learning. In that sense, blended learning offers the best of both worlds, traditional face-to-face learning and online learning, by utilizing digital technologies to support learning and yet offer a chance for learners to attend classes in person (Almasi et al., 2025; Ghasia & Rutatola, 2021; Machumu et al., 2018).

On the other hand, microlearning is an instructional approach that delivers well-focused, bite-sized, digestible content that can be completed in a very short time, and it has been introduced only recently (Navarro et al., 2024). This type of learning enhances knowledge retention and engagement, particularly in environments with limited access to continuous learning. It also increases motivation, particularly among young learners who prefer interactive and engaging content (Alias & Razak, 2025). Microlearning provides an alternative learning approach that relies on shorter instruction units and activities compatible with the current learning population (Zhu et al., 2024). However, microlearning has been primarily used in corporate or short training contexts and not in conventional higher learning institutions. Although each method has supporting evidence, comparative studies that analyze the relationships and learner preferences among the three are still rare, especially in the African or Tanzanian context (Ghasia & Rutatola, 2021; Mtebe & Raphael, 2018).

Previous studies have mainly concentrated on either traditional face-to-face instruction, blended learning, or microlearning separately (Al-khresheh et al., 2025; Almas et al., 2021; Kondoro et al., 2025; Mgata et al., 2024; Mtebe & Raphael, 2018). This has led to a lack of evidence regarding whether learner preferences would change if all three approaches are studied together, a gap that this study intends to explore. For instance, Kondoro et al. (2025) investigated instructional approaches such as blended learning and the flipped classroom, while Alias (2025) investigated the microlearning approach only, and Furió et al. (2015) studied traditional learning versus mobile learning. From a practical point of view, many universities in Tanzania still use traditional classroom learning, with a few higher learning institutions adopting blended learning, while microlearning remains underutilized (Ghasia & Rutatola, 2021).

Furthermore, studying the three instructional approaches together enables researchers to understand whether the three learning approaches can be used together and how they relate to one another. Consequently, this study examines the interrelationship among traditional face-to-face, blended learning, and microlearning instructional approaches among higher learning students in Tanzania. The study further examines whether and how learners' demographic factors, such as gender, age, and level of education, shape their preferred learning approaches across traditional, blended, and microlearning instructional approaches.

In addition, this study provides empirical evidence on how traditional face-to-face learning, blended learning, and microlearning are associated and whether blended and microlearning can be combined for effective learning. For research questions one to three, this study is guided by constructivist learning theory, which proposes that students construct learning (meaning) differently across the three different learning modes based on the perceived effectiveness of the learning approach. Depending on what effects traditional, blended, or microlearning would have on the student, the preference for learning effectiveness would differ. The theory also suggests that the social environment has an impact on perception towards learning approaches. As such, students from different social environments, such as different demographics, would approach learning differently. The theory helps to explain how students engage, regulate, and interact across the traditional, blended, and microlearning settings.

Concerning research question four, the study is guided by Ebbinghaus's (1913) forgetting curve, which suggests that people forget up to 70% of new information within a day, and nearly 90% within a week, unless the material is reviewed. The theory further postulates that learning is affected by information overload, which mostly tends to occur in traditional face-to-face classrooms, resulting in failure to remember much of what is learned. Microlearning combats the forgetting curve by using short, focused learning sessions combined with spaced repetition, retrieval

practice, and just-in-time learning. Therefore, learning materials need to be presented in meaningful chunks (microlearning), and that microlearning enhances student learning more than traditional instruction does (Sirwan Mohammed et al., 2018).

The following research objectives and research questions guided the study.

1. How do perceptions of learning approaches (traditional, blended, and microlearning) vary across demographic groups (e.g., age, gender, education level)?
2. What are the correlations among traditional face-to-face learning, blended learning, and microlearning?
3. What are the most perceived benefits of microlearning among students?
4. To what extent do blended learning and traditional learning influence microlearning?

METHOD

This study was conducted among higher learning students in Tanzania. The study involved graduates and current students. Data were collected from 233 higher learning students from various institutions in Tanzania. A survey designed to measure learning preferences was used. The survey had two main sections. First, participants' demographic characteristics, including gender, education level, and age, were obtained. Then, students' experiences with traditional face-to-face learning and perceptions of the effectiveness of blended and microlearning instructional approaches were sought.

The survey was administered online through Google Forms. Learning-preference items were rated on a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The majority of participants (141) were male (61%), while 90 were female (39%). The majority of participants (52.2%) were ongoing undergraduate students, 40.1% were graduates, and 6.0% were diploma holders.

To assess reliability, Cronbach's alpha was computed for each subscale and for the whole questionnaire. The Cronbach alpha for traditional learning was 0.514. Deleting item 6 (Traditional classes with large class sizes make it hard to learn effectively) and item 2 (Travel time or distance makes it hard for me to attend in-person classes), increased the alpha to 0.684. Regarding the reliability of the scale, the Cronbach alpha for microlearning was 0.796, which is acceptable. The Cronbach alpha for blended learning was 0.768, which is acceptable. The overall alpha was 0.815, which is good. Data analysis involved correlation analysis, the Relative Importance Index (RII), independent-samples t-tests, regression analysis, and one-way analysis of variance (ANOVA).

RESULTS

Variations in Perceptions of Traditional, Blended, and Microlearning Approaches Across Demographics

The first objective of the study was to examine how students' perceptions differed regarding the three learning approaches. Regarding variations in perceptions of the three learning approaches in relation to demographics, an independent-samples t-test was conducted to compare male and female students' perceptions of the learning approaches. The findings showed no significant gender difference between males and females in preferred learning approaches of traditional learning, blended learning, and microlearning. This suggests that both male and female higher learning students in the studied institutions tend to have similar preferences with regard to the three learning approaches.

Furthermore, one-way ANOVA was conducted to examine differences in learning preferences by education level and by age group. The findings showed no significant difference in learning preference by education level and age group between traditional, blended, and microlearning. This implies that learners at all three levels of education and at different ages have similar learning preferences.

Correlations among Traditional Face-to-Face Learning, Blended Learning, and Microlearning

In the second objective, the study examined the correlation among the three learning modalities. The findings of the study showed a significant, strong, positive correlation between

blended learning and microlearning (r = 0.637, p < 0.001). This is understandable because the online learning component of blended learning can utilize microlearning in the teaching and learning process.

Furthermore, the correlation between blended learning and traditional learning was positive and significant (r = 0.183, p = 0.006). The correlation between traditional learning and microlearning was also positive and significant (r = 0.184, p = 0.006). However, both correlations were weak, even though they were significant. The significance level can entail the use of microlearning in traditional learning, such as videos, audio presentations, and other forms of microlearning. Table 1 shows the correlations among the three learning approaches.

Table 1. Correlations among traditional (TL), blended (BL), and microlearning (ML) approaches

		BL	ML	TL
BL	Pearson Correlation	1	.637**	.183**
	Sig. (2-tailed)		< .001	.006
	N	227	227	227
ML	Pearson Correlation	.637**	1	.184**
	Sig. (2-tailed)	< .001		.006
	N	227	227	227
TL	Pearson Correlation	.183**	.184**	1
	Sig. (2-tailed)	.006	.006	
	N	227	227	227
**. Correlation is significant at the 0.01 level (2-tailed).				

The Perceived Benefits of Microlearning

The study also examined the most important perceived benefits of microlearning. The findings showed that flexibility and convenience, RII = 1.00, time saving and time management, RII = 0.85, easy to repeat/review lessons, RII = 0.69, improved understanding / easy to understand, RII = 0.67, were the benefits listed most often. Other benefits, such as cost reduction, engagement and motivation, and memory retention, among others, showed low RII scores as indicated in Table 2. These findings support the strength of microlearning in personalized, flexible, and efficient learning experiences, especially relevant for adult learners. Table 2 provides more details on the perceived benefits of microlearning.

Table 2. Perceived benefits of microlearning

Benefit Theme	Frequency (W)	RII
Flexibility and Convenience	78	1.00
Time Saving / Time Management	66	0.85
Easy to Repeat / Review Lessons	54	0.69
Improved Understanding / Easy to Understand	52	0.67
Cost Reduction / No Travel	36	0.46
Engagement and Motivation	34	0.44
Memory Retention / Knowledge Retention	32	0.41
Accessibility	29	0.37
Independent / Self-Paced Learning	24	0.31
Technology Use / Digital Skills	18	0.23
Critical Thinking / Performance	12	0.15

The Extent to Which Traditional and Blended Learning Influence Microlearning

For the fourth objective, the study examined the extent to which blended learning and traditional learning influence microlearning. To establish the influence, a regression analysis was conducted. The findings showed that blended learning significantly influenced learning through

microlearning (r = 0.637, p < 0.001). Traditional learning had an insignificant influence on learning through microlearning (r = 0.186, p < 0.001). This means that microlearning can be well utilized through blended learning rather than traditional learning.

DISCUSSION

Variations in Perceptions of Traditional, Blended, and Microlearning Approaches Across Demographics

Regarding variations in perception in relation to demographics, the findings showed no significant gender, age, or educational differences in preferred learning approaches of traditional, blended learning, and microlearning among the participants. This finding suggests that gender, age, and educational experience were not related to learning mode preference in this sample. Both male and female participants of different ages and educational levels tend to have similar learning preferences. Factors other than demographics may therefore play a role. This suggests that educators could design their courses without needing to heavily tailor approaches to specific demographic groups, focusing instead on quality, accessibility, and engagement for all learners.

While the current study showed no gender, age, and educational differences in preferred learning approaches of traditional, blended learning, and microlearning among the participants, El Refae et al. (2021) found a positive and significant correlation between gender and face-to-face learning. The authors also found that gender, college, and status of students explained less than 8% of the variation of students' academic performance in both traditional learning and distance learning. Similarly, Hu et al. (2024) conducted a comparative analysis of traditional face-to-face learning, blended learning, and online learning and found significant gender differences in the efficiency of online and blended learning, but not face-to-face learning. Kintu et al. (2017) found significant age differences in the performance of blended courses in a sub-Saharan African country. Differences in the findings could be explained by various factors such as context, culture, and the nature of education (Zhu & Justice Mugenyi, 2015).

On the other hand, similar to the findings of the current study, Kintu et al. (2017) found no gender differences in learning outcomes among participants of blended courses, and Almasi et al. (2018) found no significant gender and age differences in the perceived social, cognitive, and teaching presences in BL courses in Tanzania. Concerning demographics and microlearning, Javorcik et al. (2023) found that men studied significantly longer compared to women in completing microlearning courses; however, course choice was not influenced by gender. Iqbal et al. (2021) investigated perceptions of residents regarding the microlearning environment in postgraduate clinical training and found that female students and those aged 25–30 reported higher satisfaction.

Overall, the influence of demographic factors on learning varies by context and outcome, with gender or age in blended and traditional face-to-face learning having less pronounced effects compared to other factors such as ICT skills, prior experience, and study level (Almasi et al., 2018; Almasi, 2019). Conversely, in microlearning, factors such as age, work experience, and technological understanding seem to shape learners' preferences.

Interrelations among Traditional Face-to-Face Learning, Blended Learning, and Microlearning

The findings of the study showed a significant, strong, positive correlation between blended learning and microlearning (r = 0.637, p < 0.001). This suggests that students who show a preference for blended learning also tend to show a preference for microlearning. This implies that microlearning should be integrated into blended learning delivery.

Furthermore, there were positive and significant correlations between blended and traditional learning (r = 0.183, p = 0.006) as well as between traditional learning and microlearning (r = 0.184, p = 0.006). These learning modes may complement each other, meaning that traditional learning can utilize a blended learning approach and even integrate short, focused microlearning units to enhance overall learning outcomes. This is encouraging given that such approaches can be used to supplement traditional learning experiences. The findings of the current study are consistent with those of Fidan (2023), who investigated the effects of microlearning-

supported flipped classroom on pre-service teachers' learning performance, motivation, and engagement. The findings of Fidan (2023) showed that the microlearning-supported flipped classroom model (blended learning) and the traditional flipped classroom model had positive effects on the learning performance, motivation, and engagement of the participants. In another study in Russia, Nazarenko (2015) found that the majority of students in the study appreciated the blended learning format for its user-friendly interface, easy access to materials, and interactive learning environment. They valued blended learning as enhancing flexibility and engagement. Meanwhile, Díaz Redondo et al. (2021) studied the possibility of integrating microlearning content in traditional e-learning platforms and found that microlearning modules can be effectively embedded within existing e-learning platforms. The authors also found that integrating microlearning into traditional e-learning systems significantly increases learner engagement, knowledge retention, and motivation. This emphasizes the connection between microlearning and traditional learning systems.

The Perceived Benefits of Microlearning

Regarding the perceived benefits of microlearning, the findings indicate that flexibility and convenience (RII = 1.00) were the most highly rated benefits of microlearning, followed by time saving and effective time management (RII = 0.85). Other notable advantages included the ease of repeating or reviewing lessons (RII = 0.69) and improved understanding and clarity of content (RII = 0.67).

In general, students seem to perceive microlearning as being flexible, convenient, time-saving, easy to revise, and enhancing understanding. All these benefits seem to be an integral part of microlearning. These results suggest that microlearning can be introduced to assist learning among higher education students. The findings of this study seem to concur with Ebbinghaus's (1913) forgetting curve theory, which suggests the need to have learning materials presented in chunks that are easy to review and revise.

Furthermore, studies such as Monib et al. (2024) mention various benefits attributed to microlearning including knowledge acquisition, retention, improvement, recall, transfer, critical thinking, and problem-solving. Some scholars argue that microlearning aligns with the limitations of human working memory by delivering content in small, manageable segments. This approach helps prevent boredom and disengagement while enhancing retention by minimizing the cognitive overload often associated with lengthy, traditional lessons (Díaz Redondo et al., 2021). Such findings have been confirmed in other studies, such as Fidan (2023), who found that the microlearning flipped classroom learning better improved learning motivation than both the traditional flipped classroom instruction and traditional instruction.

However, microlearning has been primarily utilized in business enterprises and not in the mainstream higher learning institutions (Ghasia & Rutatola, 2021). The findings of the current study suggest that combining microlearning in either traditional or blended learning approaches would have positive impacts on students' learning. Other studies support this view. In nursing, Fuladvandi et al. (2025) showed that a blended approach incorporating microlearning significantly improved clinical competence, indicating its effectiveness as an innovative nursing education strategy. Al-khresheh et al. (2025) found that familiarity with microlearning significantly enhanced perceived benefit.

The Extent to Which Traditional and Blended Learning Influence Microlearning

The study further explored the extent to which traditional and blended learning influence microlearning. Conceptually, in traditional face-to-face learning, the instructor and student have an opportunity to meet face-to-face and share space and time in real time. The relationship between traditional learning and learning through microlearning was statistically significant (r = 0.186, $p < 0.001$), but the effect size was minimal. This implies that traditional face-to-face learning is not a strong predictor of microlearning success. Hein (2013) reported no significant differences in achievement or interest between the blended class and the traditional class with students learning special education and English language.

Conceptually, blended learning involves a combination of traditional face-to-face learning with online instruction. Since it involves a part of learning occurring online, microlearning content can be created to support such learning. The study findings showed that blended learning significantly influenced learning through microlearning ($r = 0.637$, $p < 0.001$). This implies that blended learning is a strong predictor of microlearning preference. This suggests that microlearning works well in blended learning settings rather than traditional face-to-face learning. This would mean that instructors could use microlearning approaches to design and structure their BL programs to enhance effective learning. Not many studies have investigated the link between blended and microlearning. However, both blended and microlearning have been advantageous in terms of improving learner satisfaction, achievement, and engagement (Al-Qahtani & Higgins, 2013; Vallée et al., 2020; Vernadakis et al., 2012).

CONCLUSION

This study provided a comparative analysis of three learning approaches—traditional face-to-face, blended, and microlearning—investigating how they are perceived by students, their interrelations, the perceived benefits of microlearning, and the extent to which blended learning influences microlearning. Based on the findings, it can be concluded that there were no significant variations in perceptions of the three approaches across variables such as gender, age, and educational level. This suggests that other important variables may need to be considered when designing these approaches beyond gender, age, and educational level. Therefore, instructors may develop courses without extensively customizing them for specific demographic groups, instead prioritizing overall quality, accessibility, and engagement for all learners.

Additionally, a strong link between blended learning and microlearning exists because the online component of blended learning easily incorporates microlearning techniques such as bite-sized videos, short quizzes, and modular content. Furthermore, traditional face-to-face classroom instruction can also utilize a microlearning approach, as the two methods are closely related. This means that instructors can design microlearning-based content for such classes. This alignment is supported by cognitive load theory, which emphasizes reducing the learning burden by presenting information in manageable chunks.

In practical terms, instructors can use microlearning to address challenges such as limited study time, poor internet bandwidth, and students' need for flexibility. Furthermore, combining blended learning with microlearning can maximize impact, as the findings indicate that these approaches strongly complement each other. It is essential to provide flexible access through mobile-friendly platforms, given that flexibility is the most significant benefit attributed to microlearning according to the findings.

This study is limited in its focus on microlearning within the context of learning management systems (LMS), which are not specifically designed for this purpose. Microlearning requires both activity and content to be aligned with its principles, a feature that is often limited in courses delivered through LMS, which primarily support blended learning and traditional instructional methods. Another limitation concerns the sample size, which is relatively small given the population of higher education students in Tanzania. There is a need for broader studies encompassing a wider geographical area of the country. Additionally, the survey relied on self-reporting, which may have led participants to underreport or overreport certain aspects. Future research should consider combining surveys with methods such as interviews, observations, and focus group discussions to validate and enrich the findings.

DECLARATIONS

Author Contributions. Conceptualization, M.A. and F.Y.M.; methodology, M.A. and F.Y.M.; investigation, M.A. and F.Y.M.; formal analysis, M.A.; data curation, F.Y.M.; writing—original draft, M.A.; writing—review and editing, M.A. and F.Y.M.; supervision, F.Y.M.; project administration, M.A.

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Declaration of AI Use. The authors did not use generative AI or AI-assisted tools in the preparation of this manuscript.

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