A Comparison of Prerequisite and Post-requisite Microlearning Approaches with Traditional Training for Developing Professional Competence in Human Resources

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Abstract

The microlearning approach is increasingly adopted in organizational training because it delivers educational content in concise and easily digestible segments. This approach is widely viewed as both engaging and effective. However, empirical evidence regarding its effectiveness remains limited, particularly when microlearning is a prerequisite or a post-requisite to conventional training courses. To address this gap, the present study evaluated the effectiveness of prerequisite and post-requisite microlearning formats compared to traditional training methods in enhancing employees' professional competencies. This study employed a quasi-experimental post-test design with a control group. The target population comprised employees of a state-owned bank in Tehran Province. From this population, 90 individuals were selected through convenience sampling and randomly assigned to three groups: a prerequisite microlearning group (experimental), a post-requisite microlearning group (experimental), and a traditional training group (control). All groups received a training course titled Problem-Solving in the Banking Industry. For the experimental groups, the course was delivered using a blended approach that combined microlearning with face-to-face instruction. In contrast, the control group received the training exclusively through face-to-face sessions. Data collection and analysis were conducted over three weeks using the Kirkpatrick Evaluation Model. The findings revealed that the experimental groups reported

significantly higher levels of reaction (p = 0.017) and learning (p = 0.001) compared to the control group. However, no significant difference in behavioral change was observed among the groups (p = 0.115). These results suggest that while microlearning can enhance learner reactions and learning outcomes, it may not be sufficient to drive behavioral change in the workplace.

Keywords: Microlearning, E-Learning, Human Resource Development, New Educational Approaches

Introduction

Organizations must swiftly equip their employees with the essential knowledge and skills to survive and thrive in today's competitive world. One of the primary tasks of companies is to create a suitable platform that allows employees easy and uninterrupted access to the required training. (Musgrave et al., 2025). In other words, organizations must ensure that employees can acquire the necessary knowledge and skills whenever and wherever they need to learn (Morse, 2007; Tatari & Akbari, 2023). Although traditional training methods have their advantages, they face limitations in responding to the dynamic needs of today's world, especially for a new generation of employees who have grown up with advanced technologies (Belaid et al., 2025; Marquardt & Kearsley, 2024). Consequently, leading organizations have adopted new e-learning approaches (Díaz Redondo et al., 2021; Zandi et al., 2022). These approaches have fundamentally transformed organizational learning by providing capabilities such as easy access without restrictions in time and place, personalized learning tailored to each individual's pace, enhanced interaction and participation through digital tools, flexibility in the learning process, and adaptation to the needs and motivations of the new generation (Garrison & Vaughan, 2008).

One of the fundamental challenges in the adoption and practical application of e-learning is the low completion rate of training courses (Al Rawashdeh et al., 2021). This has become a significant concern for organizations and has forced them to seek solutions to increase access to content and, as a result, improve the completion rate of courses (Hebenton, 2022; Moosivand et al., 2024). Many organizations found that access to e-learning course content was limited for various reasons. One of the key challenges was that educational content was presented in large, comprehensive courses rather than in small, accessible chunks for individuals who wanted to learn specific topics or skills (Hebenton, 2022). In response to this challenge, companies sought solutions to deliver educational content in a more efficient way that was tailored to the needs of their employees. One effective solution was to use smaller e-learning programs (Silva et al., 2025). These programs were designed to be completed by learners in one session without disrupting their daily workplace activities and to fully engage them (Mostrady et al., 2025). In the wake of this challenge, we witnessed the emergence of a new approach to education called "microlearning." This method allows employees to learn training materials in shorter periods and in a more flexible manner (Taylor & Hung, 2022).

Microlearning, as a modern educational method, presents educational content in small, focused, and understandable chunks, often focusing on developing specialized skills or specific areas of knowledge (Dolasinski & Reynolds, 2020). This approach makes understanding and learning easier for individuals by dividing information into short, organized chunks. Microlearning content can include a variety of media, such as images (infographics, charts, etc.), audio (podcasts, stories), and video (flashcards, presentations, etc.) (Mohammed et al., 2018). The advantage of microlearning is that learners can access it anytime, anywhere, and on any device in a format that suits their learning style (Sankaranarayanan et al., 2023).

Microlearning can be implemented in three formats: prerequisite, post-requisite, or stand-alone. Choosing the best type depends on the educational goals and needs of the organization. However, each of the three types of microlearning, i.e., before a major course, after a major course, or just implementing microlearning modules, can have advantages and disadvantages in different situations:

- Microlearning as a prerequisite for a larger course: This method helps learners gain a background on key concepts and prepares them for deeper learning. It can also be used to assess prior knowledge levels and identify learning gaps (Fidan, 2023).

- Microlearning as a post-requisite for a larger course: This method effectively consolidates acquired knowledge and sustains learning over time. It also provides ongoing support for learners to apply what they have learned in practice. For example, after a sales skills training course, presenting key points in short videos can better help apply learned knowledge in the workplace (Hebenton, 2022).

- Microlearning as a standalone course: In this method, microlearning is presented separately without the need for a larger course. This approach offers high flexibility, allowing learners to study various topics in small modules according to their needs. It is an ideal option for organizations that require extensive training at a lower cost (Kapp & Defelice, 2019).

Literature Review

In recent years, microlearning has secured a significant position in education as an innovative response to evolving lifestyles and content consumption patterns. The rise in smartphone usage, reduced concentration among individuals due to information overload, and fatigue from online interactions after the COVID-19 pandemic have all contributed to a shift in learning towards short-term and flexible formats (Sözmen et al., 2023). Now, people often prefer to receive short educational materials, such as when waiting in line, between work meetings, or during breaks (Dolasinski & Reynolds, 2020).

However, microlearning is more than just short-term training or quick training videos; it represents a philosophy of learning within the context of real life. By offering precise,

practical, and goal-oriented content, microlearning not only prevents cognitive fatigue but also fosters lifelong learning (Drakidou, 2018). In this framework, educators play a crucial role in designing learning experiences that address immediate needs while being anchored in long-term educational goals.

Research has demonstrated that the flexibility of microlearning supports continuous learning and skill development in the workplace(Govender & Madden, 2020; Richardson et al., 2022). Employees can access educational content anytime, anywhere, and update their skills and knowledge without interrupting their work schedules. This feature is important in increasing productivity, improving human resource performance, and promoting competitive advantage, especially in organizations operating in dynamic business environments (Beste, 2023).

In addition, microlearning enables employees to select their learning path according to their job needs and interests. This enhances their engagement and satisfaction with the learning process(Sung et al., 2023). Also, the use of microlearning leads to a reduction in training costs due to the need for fewer human resources, reduced time for the training course, and the ability to access digital content (Al-Bhloly et al., 2024). Additionally, microlearning—particularly within social learning platforms—promotes greater interaction and collaboration among employees (Lambelet & Cara-Nova, 2024). Employees can share their experiences in the form of short content and learn from the experiences of their colleagues (Lohman, 2024).

Previous research has confirmed the effectiveness of microlearning for improving educational outcomes. However, the application of this approach in earlier studies was mainly restricted to prerequisite, post-requisite, or stand-alone courses. The present study examines the effectiveness of a combined microlearning approach (prerequisite and post-requisite) alongside a traditional training course. This approach aims to offer a more thorough and practical model for leveraging the benefits of microlearning in different educational contexts. This study addresses the knowledge gap in this field by designing and implementing a training course based on the microlearning approach. It compares the effects of various microlearning methods (prerequisite, post-requisite) and traditional learning on employee reactions, learning outcomes, and behavior change.

To accomplish this goal, we present the following research questions:

1. What effect do microlearning methods (prerequisite and post-requisite) have on employee reaction compared to traditional learning?

2. What effect do microlearning methods (prerequisite and post-requisite) have on employee learning compared to traditional learning?

3. What effect do microlearning methods (prerequisite and post-requisite) have on employee behavior change compared to traditional learning?

Methodology

This applied research utilized a quasi-experimental method to investigate the comparative effects of various microlearning methods (prerequisite and post-requisite) and traditional learning on employee reactions, learning, and behavior.

Study group and participants

The present study's research society included all employees of a state-owned bank in Tehran province. The sample consisted of 90 employees from this bank in Tehran province, selected through convenience sampling. The participants were randomly divided into three groups of 30, each receiving different training:

1. Experimental Group 1: Receiving microlearning modules as a prerequisite for traditional training

2. Experimental Group 2: Receiving microlearning modules as a prerequisite for traditional training

3. Control Group: Receiving traditional training

Data Collection Tools and Methods

Research data were collected using the Kirkpatrick questionnaire developed by Alsalamah & Callinan (2021). This questionnaire included sections related to the demographic information of the participants and the evaluation of the effectiveness of the training modules at the three levels of the Kirkpatrick model (reaction, learning, and behavior). To ensure the validity of the questionnaire content, after making the necessary changes, it was reviewed and approved by three experts in the field of education and microlearning. The Cronbach's alpha method was also utilized to measure the reliability of the questionnaire. Cronbach's alpha value for the entire questionnaire was 0.89, indicating a desirable level of reliability.

Research Implementation Process

The ADDIE model, which comprises five stages—analysis, design, development, implementation, and evaluation—was utilized to design this training course.

Analysis

In the analysis stage, the problem-solving training needs of employees were examined. This study involved multiple meetings with members of the research team and training consultants. After reviewing existing resources and experiences, the key topics for the problem-solving course were selected as follows:

1. Problem solving and its stages

2. Critical thinking

3. Brainstorming

4. 5-Whys method

5. World Café method

6. Pareto's law

7. 6 Thinking Hats

8. Decision tree

9. SWOT analysis

Design

The research team examined the training strategies and course evaluation in the design phase. The content structure and implementation method of the face-to-face training course were designed and developed, and the design of the microlearning course was based on the principles of designing microlearning courses proposed in the studies of Jahnke et al. (2020). Then, a standard questionnaire was designed and developed to evaluate the effectiveness of the training courses based on the Kirkpatrick Model.

Table 1. Principles of microlearning design adopted from Jahnke et al (2020)

Design principles	Implementation details
Principle 1: Design Micro-Content and Micro-Activities •Provide Interaction for the Learner •Have a Single Goal - Short Lessons	The microlearning modules used in this course included lessons that allowed learners to engage with the educational content. These lessons were structured into brief, clear segments.
Principle 2: Instructional Flow •Provide learning paths •Multimedia instruction •Provide immediate feedback	The microlearning modules in this course supported various learning paths, allowing learners to choose their preferred microlesson to start with. These microlessons included a range of media, such as video, text, and images. They also provided immediate feedback during practice assessments.
Principle 3: System Design •Easily accessible content •Ability for learners to track progress •Accessibility across multiple devices	The microlearning modules in this course are designed for accessibility via Moodle LMS. Learners can track their progress using the progress bar and access these modules from any device, including a laptop, tablet, or smartphone.
Principle 4: Learner Motivation •Support learner needs and preferences •Increase learner motivation towards the content •Designed for the target learners	The microlearning modules in this course are designed to support the learners' needs and preferences through interactivity and short micro-lessons. Micro-lessons, interactive elements, and practice assessments help increase learner motivation, and the educational content is tailored specifically for the learners in this course.

Development

During the development phase, the process of producing and developing educational content for face-to-face and microlearning courses was put into action. In designing the microlearning courses, each learning unit was organized and created as a blend of textual explanations, educational videos, images, and practical examples to enhance learners' understanding of

concepts. The educational content for the specified topics was created using multimedia tools to increase its appeal and retention.
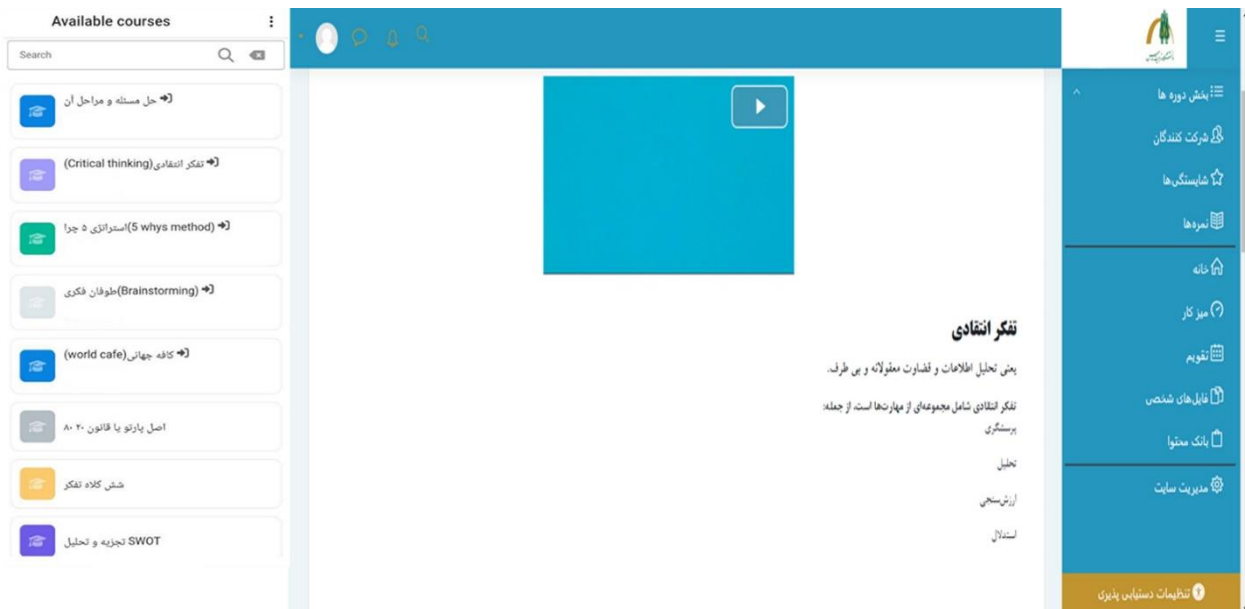

Figure 1. Content of the microlearning course

Implementation

In this stage, the training course was conducted for employees over an operational period of three weeks. The training content was delivered using a microlearning approach in small learning units through the Moodle learning management system. During the first week, the prerequisite group received the microlearning content. All groups participated in face-to-face training workshops in the second week, where they learned problem-solving skills. In the third week, the post-requisite group received the microlearning content. The training courses were designed and implemented for access via mobile devices or personal computers at any time and place to facilitate the learning process and allow practice of skills using practical examples.

Evaluation

In the evaluation stage, the effectiveness of the training course was examined based on the three stages of reaction, learning, and behavior of the Kirkpatrick Model (Kirkpatrick & Kirpatrick, 2011). The reaction stage evaluates participants' immediate responses to the training, focusing on their engagement, satisfaction, and perceived relevance. The learning phase assesses how well participants acquire the desired knowledge, skills, or attitudes from the training. The behavior stage emphasizes how participants apply learned skills in their

workplace or real-world situations, demonstrating a transfer of learning (Kirkpatrick & Kirpatrick, 2011).

To this aim, the participants were given a standard questionnaire of 11 questions based on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The results of the questionnaires were analyzed using IBM SPSS version 27 software. Data were reported as mean and standard deviation for quantitative variables and frequency and percentage for qualitative variables. Finally, the significance level for all analyses was set at 0.05.
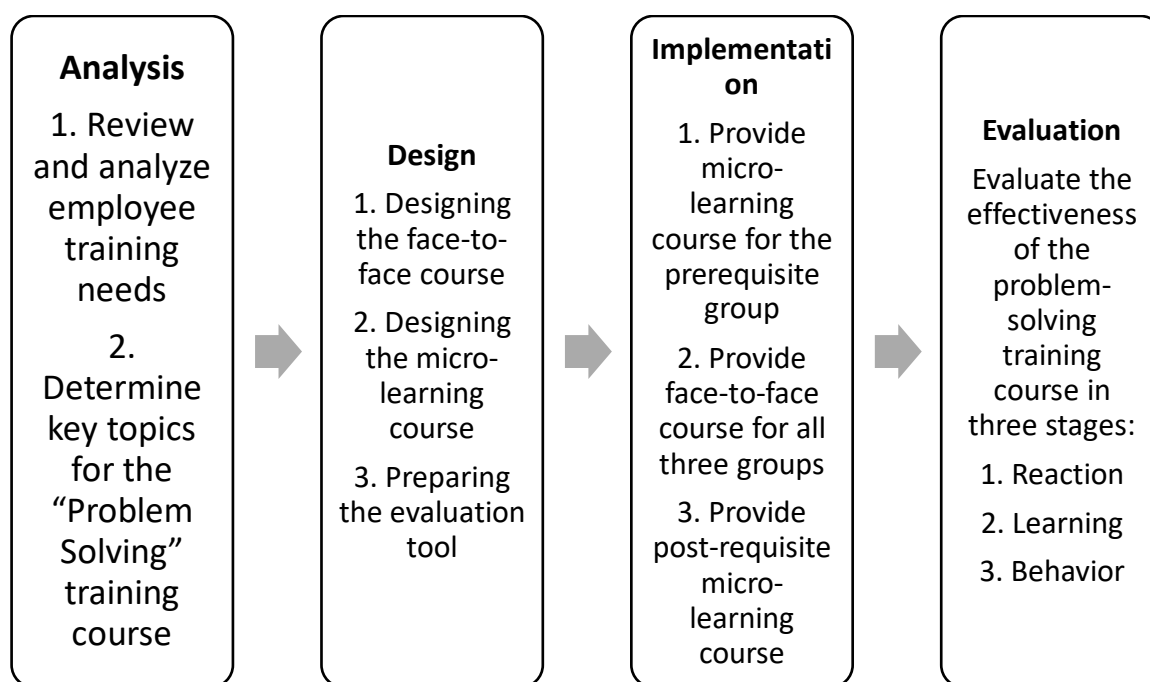
Analysis

1. Review and analyze employee training needs

2. Determine key topics for the "Problem Solving" training course

Design

1. Designing the face-to-face course

2. Designing the micro-learning course

3. Preparing the evaluation tool

Implementation

1. Provide micro-learning course for the prerequisite group

2. Provide face-to-face course for all three groups

3. Provide post-requisite micro-learning course

Evaluation

Evaluate the effectiveness of the problem-solving training course in three stages:

1. Reaction

2. Learning

3. Behavior

Figure 2. Research design and implementation diagram

Data Analysis

Statistical analysis of the data was conducted using SPSS version 27 software. In this study, descriptive statistics (including indices of central tendency such as the mean and dispersion indices such as the standard deviation) were utilized to describe the key characteristics of the data. Inferential statistical tests, including ANOVA and Kruskal-Wallis, were also used to examine the three groups' relationships and differences.

Results

Demographic information

Table 2. Demographic data

		Number	**Frequency Percentage**
Age	25 to 30 years	16	17.8%
	31 to 40 years	36	40.0%
	41 to 50 years	31	24.4%
	51 to 60 years	7	8.7%
Gender	Male	65	72.2%
	Female	25	27.8%
Education	Associate Degree	1	1.1%
	Bachelor's Degree	17	18.9%
	Master's Degree	66	73.3%
	PhD	6	6.7%
Years of Service	Less than 5 years	16	17.8%
	5 to 10 years	18	20.0%
	11 to 20 years	33	36.7%
	More than 20 years	23	25.6%

Table 2 presents the demographic information of the research participants. The results showed that most participants are in the 31- to 40-year-old range (40%) and are male (72.2%). Also, the highest level of education of the participants is a master's degree (73.3%), and the most work experience is reported in the range of 11 to 20 years (36.7%).

Descriptive and inferential findings of the research variables

Table 3. Mean and standard deviation of research variables in the three groups

Group	Number	Employee Reaction (Mean ± SD)	Employee Learning (Mean ± SD)	Behavior Change (Mean ± SD)
Control Group	30	3.541 ± 0.614	3.458 ± 0.651	3.550 ± 0.551
Prerequisite Microlearning Group (Experimental Group 1)	30	3.955 ± 0.241	3.964 ± 0.537	3.816 ± 0.393
Post-requisite Microlearning Group (Experimental Group 2)	30	3.816 ± 0.559	4.019 ± 0.486	3.716 ± 0.498

Table 3 presents the descriptive findings of the study. The Kolmogorov-Smirnov test assessed the assumption of normality in the data distribution. The results indicated that the normality assumption was met for the employee reaction variable at the 95% confidence level ($p > 0.05$). However, this assumption was not met for the employee learning and behavior change variables ($p < 0.05$), suggesting non-normal distributions for these two variables. Additionally, Levene's test was employed to examine the assumption of homogeneity of error variances. The test results confirmed the homogeneity of variances for the reaction variable (p

> 0.05), supporting the use of parametric methods for its analysis. Based on these preliminary findings, the research questions will be addressed in the subsequent sections.

Considering the normal or non-normal distribution of the variable data, appropriate statistical tests were used to analyze the data:

1. Reaction variable: Since the reaction variable data had a normal distribution, one-way analysis of variance (ANOVA) was used to examine significant differences between the group means.

2. Learning and behavior variables: Due to the non-normal data distribution for the learning and behavior variables, the Kruskal-Wallis test was used to examine the significant differences between the group means.

Question 1: What effect do microlearning methods (prerequisite and post-requisite) have on employee reaction compared to traditional learning?

Table 5 shows the results of one-way analysis of variance (ANOVA) to compare the mean reaction scores of employees in three different groups (control, prerequisite microlearning, and post-requisite microlearning). In Table 4, the results of the ANOVA test show a significant difference between the mean reaction in different training groups (F = 4.270, p = 0.017). Since the significance level (p = 0.017) is less than the desired alpha level (0.05), the null hypothesis that the mean reaction is equal in all groups is rejected. These findings indicated a significant difference between the mean reaction in at least one of the microlearning groups (prerequisite or post-requisite) and the control group (traditional training). In other words, microlearning approaches affect employee reaction differently from the traditional method. Tukey's post hoc test examined the difference in group means more closely and showed a significant difference at the 0.05 level between the control and post-requisite groups and between the control and prerequisite groups (p = 0.014). This finding indicated that the mean reaction in the prerequisite and post-requisite groups was significantly higher than in the control group. However, there was no significant difference between the prerequisite and post-requisite groups (p > 0.05).

Table 4. Employee reaction scores for the training course

Group	Number	Mean	Standard Deviation	F	Significance Level
Control	30	3.541	0.614		
Prerequisite microlearning	30	3.955	0.241	4.270	0.017
Post-requisite microlearning	30	3.816	0.559		

Question 2: What effect do microlearning methods (prerequisite and post-requisite) have on employee learning compared to traditional learning?

As shown in Table 5, the post-requisite microlearning group has the highest mean (4.019), while the traditional group has the lowest mean (3.458). The Kruskal-Wallis test showed that the difference in means is significant (p = 0.001), so the assumption of equal means for all groups was rejected. The mean ranks also showed that the post-requisite microlearning group performed better in learning than the other groups, while the control group (traditional training) showed the weakest performance.

Table 5. Employee learning scores in the training course

Group	Number	Mean	Standard Deviation	Mean Rank	Kruskal-Wallis statistic	Degrees of Freedom	Significance Level
Control	30	3.458	0.651	30.82			
Prerequisite microlearning	30	3.946	0.537	51.43	14.517	2	0.001
Post-requisite microlearning	30	4.019	0.486	54.25			

Question 3: What effect do microlearning methods (prerequisite and post-requisite) have on employee behavior change compared to traditional learning?

As can be seen in Table 6, the mean behavior change in the prerequisite microlearning group (3.816) is higher than the post-requisite microlearning group (3.716) and the control group (3.550). The mean ranks also showed that the prerequisite microlearning group has the highest scores and the control group has the lowest scores. The Kruskal-Wallis test shows a value of 4.327, but since the significance level (p = 0.115) is greater than 0.05, the difference between the groups is not statistically significant. Therefore, it cannot be concluded that the microlearning approach has significantly affected employee behavior.

Table 6. Employee Behavior Change Scores after the Training Course

Group	Number	Mean	Standard Deviation	Mean Rank	Kruskal-Wallis Statistic	Degrees of freedom	Significance Level
Control	30	3.550	0.551	37.95			
Prerequisite microlearning	30	3.816	0.393	51.60	4.327	2	0.115
Post-requisite microlearning	30	3.716	0.498	46.95			

Discussion

In this study, the effectiveness of prerequisite and post-requisite microlearning on the reaction, learning, and behavior of employees of a state-owned bank was examined. The results showed that prerequisite and post-requisite microlearning significantly affect the reaction and learning of employees. In other words, learners exposed to microlearning reacted more positively to the educational content and experienced deeper learning. However, no significant difference was observed between the prerequisite, post-requisite, and control groups in the behavior variable. This finding indicates that microlearning does not directly affect the behavior of learners and that other factors are also involved in this regard.

Research question 1: What effect do microlearning methods (prerequisite and post-requisite) have on employee reaction compared to traditional learning?

The results of the present study showed that prerequisite microlearning and post-requisite microlearning elicited more positive reactions from employees than the traditional method. Among them, prerequisite microlearning performed relatively better in eliciting positive reactions. These findings are important because they indicate that complementary microlearning can make the learning experience more interactive and satisfying for learners. The results also implicitly support the hypothesis of dividing content into smaller, more manageable units, which allows learners to engage with the material at their own pace. Such an approach is considered particularly beneficial in maintaining learners' motivation, attention, and focus, key factors in effective learning. This result is consistent with previous studies examining the effectiveness of the microlearning approach, such as research results by Dixit et al. (2021), Hegerius et al. (2020), and Tolstikh et al. (2021) showed that microlearning can help improve learners' motivation and attention. Also, Gorham et al. (2023) stated that the microlearning approach increased learner satisfaction by presenting content in small, digestible formats and could lead to deeper and more sustainable learning.

Research question 2: What effect do microlearning methods (prerequisite and post-requisite) have on employee learning compared to traditional learning?

The study results showed that the prerequisite group performed better in learning than the control group. This indicates that providing training content as a prerequisite can help learners learn the material more deeply and sustainably. The results also showed that the post-requisite group performed better in learning than the control group. Providing content as a prerequisite helps learners build a solid foundation, while reviewing the material after the session helps to consolidate and maintain it long-term. This highlights the effectiveness of microlearning in enhancing comprehensive and lasting understanding.

The findings of this study are consistent with the results of other studies examining the effects of microlearning as an independent variable. For example, a study by Govender and Madden (2020)found that microlearning can help improve learning. Also, Mohammed et al. (2018) stated that the microlearning approach can lead to deeper and more sustainable learning by presenting content in small, digestible formats.

The findings of this study are not in line with the findings of Philippens (2023). In Philippens's study, microlearning was ineffective in increasing knowledge related to security information due to the high prior knowledge of the learners and the easy questions. Rof Bertrans et al. (2024) also investigated the reasons for enrolling in a marketing management program and examined the learning outcomes delivered through microlearning. In their study, students who enrolled to gain knowledge achieved better learning outcomes, such as acquiring new skills or updating existing skills. Curious people had less significant learning experiences, but some found the program entertaining or learned unexpected material.

Overall, the program seems effective for those looking to learn new material, but less so for those simply reviewing.

Although the overall trend of results is consistent with the hypothesis, the magnitude of improvement in learning was similar between the prerequisite and post-requisite groups. This suggests that both approaches are equally effective in increasing learning outcomes. This equality suggests that the scheduling of microlearning (prerequisite and post-requisite) may be less important than previously thought, provided the content is well-structured and purposeful. This study provides new insights by demonstrating that both prerequisite and post-requisite microlearning approaches can increase learning outcomes to the same extent. These findings indicate flexibility in microlearning, allowing instructors to choose the scheduling based on contextual needs with no risk for learning effectiveness.

Research question 3: What effect do microlearning methods (prerequisite and post-requisite) have on employee behavior change compared to traditional learning?

The study's findings indicate that the microlearning approach does not positively and definitively affect behavior change. This result suggests that, within the scope of this study, microlearning may not be sufficient to change behavior significantly compared to traditional learning methods. These findings are important because they challenge the hypothesis of the effectiveness of microlearning in behavior change. Although microlearning is considered helpful for transferring and consolidating knowledge, it does not necessarily lead to a change in occupational behavior. This distinction is important for educators and instructional designers seeking specific behavioral outcomes through educational interventions. These findings are consistent with the results of Reynolds and Dolasinski's (2020) study, which showed that microlearning did not significantly affect behavior change. It supports the idea that some behaviors may resist change through microlearning interventions alone.

In contrast, studies by Fidan (2023), Kannan (2024), and Khan (2019) have shown positive effects of microlearning on behavior change. These inconsistencies emphasize the complex and context-dependent nature of behavior change and suggest that different behaviors, learner groups, or educational contexts may influence the effectiveness of microlearning.

One notable finding of this research was the consistency in the lack of behavior change across groups. This consistency suggests that factors other than the learning approach, such as the inherent nature of the behavior or external influences, play a more fundamental role in determining behavior change. One reason for this is the complexity of the behavior change process, which requires social interactions, constant repetition, and organizational support (Bandura, 1997; Gigliotti et al., 2019; Porras & Hoffer, 1986; Prochaska & DiClemente, 1983). Due to its short-term and self-contained nature, microlearning usually does not cover these factors. In addition, factors such as individual differences in readiness for change, the complexity of the skills required, and the lack of appropriate motivation and rewards can

affect the success of behavior change (Mathur et al., 2023; Vakola, 2014). Sustainable change usually requires combining microlearning with mentoring (Kurian, 2024), continuous feedback, and incentive systems (Warin & Darmawan, 2024). Therefore, to enhance the impact of microlearning on behavior change, organizations should provide a supportive environment and enhance opportunities for practice and follow-up.

Conclusion

In conclusion, this study's findings offer theoretical and practical implications for corporate training and human resource development. This research contributes to the literature on organizational learning and instructional design by examining the effects of prerequisite and post-requisite microlearning approaches within the framework of the Kirkpatrick evaluation model. The results enhance our understanding of how microlearning formats influence employee reaction and learning while highlighting the limitations of such approaches in producing behavioral change. These insights can assist training professionals and organizational leaders in designing more effective learning strategies that integrate microlearning with broader support systems to optimize training outcomes in dynamic work environments.

The findings of this study should be interpreted in light of certain limitations. First, the research was conducted within a single state-owned bank in Tehran Province, which may limit the generalizability of the results to other organizational contexts or industries. Second, the study relied solely on quantitative data collected through post-test questionnaires, without incorporating qualitative methods such as interviews or focus groups that could provide deeper insights into learners' experiences and perceptions. Additionally, the short duration of the intervention may have limited the ability to assess long-term behavioral change resulting from the training. Future research could explore the impact of microlearning across diverse sectors and cultural contexts and examine how individual differences, such as motivation and prior knowledge, influence its effectiveness. Comparative studies between different employee roles or departments may also yield valuable insights into how microlearning is perceived and utilized across organizational hierarchies.

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Conflict of interest

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