

# An Empirical Analysis of Micro-Learning Models and Their Contribution to Workforce Upskilling in IT Sector at Coimbatore District

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## Abstract

The rapid growth of the Information Technology (IT) sector has increased the need for continuous learning and skill development among employees. Micro-learning has emerged as an effective training approach that delivers content in short, focused modules, enabling employees to learn at their own pace. This study titled “An Empirical Analysis of Micro Learning Models and Their Contribution to Workforce Upskilling in IT Sector at Coimbatore District” aims to examine the effectiveness of micro-learning models in enhancing the skills and productivity of IT professionals.

**Keywords:** Micro-learning, Workforce Upskilling, IT Sector, Employee Skill Development, Coimbatore District, Training and Development, Digital Learning, Organizational Performance

## Introduction:

Micro-learning refers to a learning approach that delivers content in small, focused, and easily digestible units, typically designed to achieve a specific learning objective within a short period. These learning units may take the form of short videos, quizzes, infographics, podcasts, simulations, or interactive modules, often accessible through digital platforms such as mobile applications and learning management systems. The core philosophy of micro-learning lies in its learner-centric nature, emphasizing just-in-time learning, flexibility, and personalization. This approach aligns well with the working style of IT professionals, who often face time constraints and prefer on-demand learning that can be integrated seamlessly into their daily work routines.

The growing adoption of micro-learning models in the IT sector is largely driven by the need for continuous upskilling and reskilling. Upskilling refers to the process of enhancing existing skills or acquiring advanced competencies to perform current job roles more effectively, while reskilling involves learning entirely new skills to adapt to changing job requirements. In the IT industry, both processes are crucial due to factors such as automation, artificial intelligence, cloud computing, cybersecurity threats, and digital transformation initiatives across industries. Organizations increasingly recognize that their long-term success depends on the capability of their workforce to adapt to these changes, making effective learning strategies a strategic priority.

## OBJECTIVES:

- To assess the impact of micro-learning on employee retention of knowledge over time.
- To analyse the relationship between micro-learning frequency and employee performance improvement.

## REVIEW OF LITERATURE:

**Zhao and Kim (2025)** conducted an empirical study on AI-driven microlearning platforms in global IT firms. The research examined how adaptive micro-modules improved coding and cybersecurity skills among employees. A sample of 420 IT professionals participated in a six-month experimental program. The study used pre- and post-training competency assessments to measure improvement. Results showed significant enhancement in technical skill acquisition and retention rates. Employees reported higher engagement due to personalized learning paths. Productivity metrics also improved after implementation. The authors found AI integration to be a major factor in learning efficiency. They suggest organizations invest in intelligent microlearning systems for sustainable upskilling.

**Ahmed and Farooq (2024)** analysed the effectiveness of mobile-based microlearning for software engineers. The study focused on workforce reskilling in cloud computing technologies. Data were collected from 300 IT employees across multinational companies. Quantitative surveys and performance analytics were used for evaluation. Findings indicated faster skill acquisition compared to traditional workshops. Participants appreciated the flexibility and accessibility of short modules. The study showed a direct link between microlearning and job performance improvement. However, some complex topics required supplemental training. The authors suggest blending microlearning with mentorship programs.

**Singh and Rao (2024)** examined microlearning adoption in Indian IT service companies. The research explored its contribution to digital transformation initiatives. A mixed-method approach was applied using interviews and surveys. The findings revealed improved learner

motivation and self-directed learning behaviours. Employees completed more training modules within shorter timeframes. Performance appraisals showed moderate improvement in technical competencies. Organizational support was identified as a critical success factor. Resistance was observed among senior employees unfamiliar with digital tools. The authors suggest structured onboarding to encourage adoption.

**Lee and Park (2023)** investigated microlearning's role in cybersecurity workforce development. The study involved 250 IT security professionals in South Korea. Experimental groups received micro-lessons while control groups attended seminars. Results demonstrated higher retention in the microlearning group. Learners reported improved confidence in threat detection skills. Engagement analytics showed consistent usage patterns. The research emphasized cognitive load reduction benefits. Limitations included short-term evaluation duration. The authors recommend long-term studies to assess sustained skill transfer.

## DATA ANALYSIS AND INTERPRETATION:

To assess the impact of micro-learning on employee retention of knowledge over time.

TABLE 1.1

MICRO-LEARNING IMPACT ON CONCEPT RECALL

| S.No | Micro-learning impact on recall | Number of the respondents | Percentage (%) |
|------|---------------------------------|---------------------------|----------------|
| 1    | Strongly agree                  | 33                        | 30             |
| 2    | Agree                           | 48                        | 44             |
| 3    | Neutral                         | 28                        | 25             |
| 4    | Disagree                        | 1                         | 1              |
|      | <b>TOTAL</b>                    | 110                       | 100            |

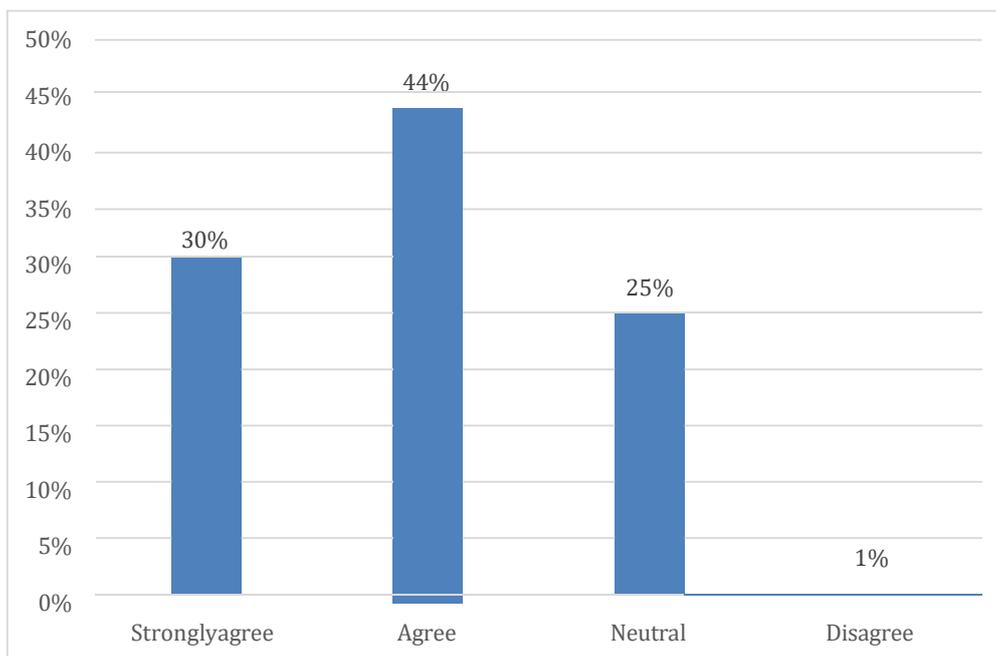
## INTERPRETATION

From the above table we found that 30% of the respondents were Strongly agree that micro learning impact on concept recall,44% of the respondents were Agree,25% of the respondents were Neutral, and 1% of the respondents were Disagree.

## INFERENCE

The majority of 44% respondents were Agree that micro learning impact on concept recall.

## MICRO-LEARNING IMPACT ON CONCEPT RECALL



To analyze the relationship between micro-learning frequency and employee performance improvement

**TABLE NO 1.2**

### JOB PERFORMANCE OVERCOMES

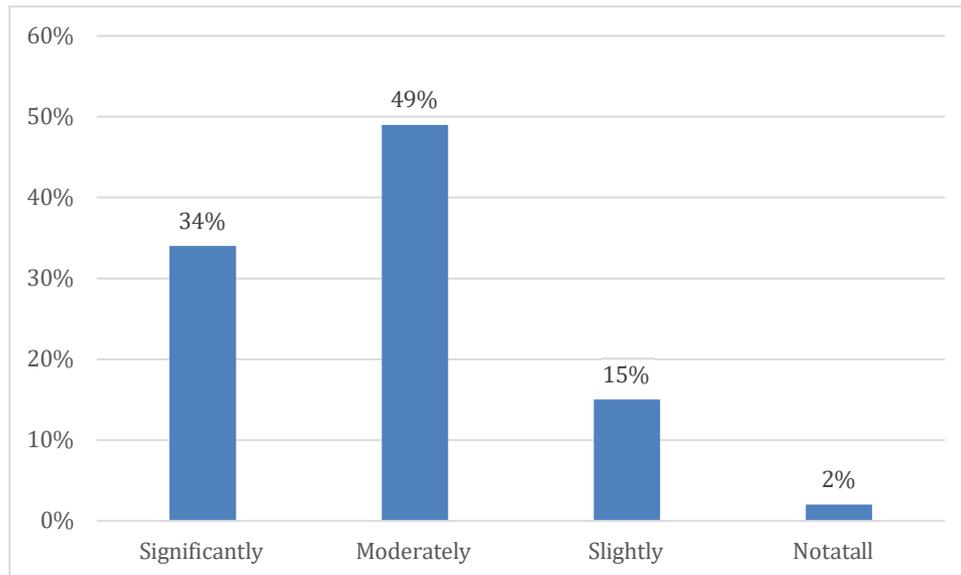
| S.No | Job performance overcomes | Number of respondents | Percentage(%) |
|------|---------------------------|-----------------------|---------------|
| 1    | Significantly             | 37                    | 34            |
| 2    | Moderately                | 54                    | 49            |
| 3    | Slightly                  | 17                    | 15            |
| 4    | Not at all                | 2                     | 2             |
|      | <b>TOTAL</b>              | 110                   | 100           |

### INTERPRETATION

From the above table we found that 34% of the respondents reported that job performance Significantly overcomes, 49% of the respondents reported Moderately overcomes, 15% of the respondents reported Slightly overcomes, and 2% of the respondents reported not at all overcomes.

Mostly 49% of the respondents reported that job performance Moderately overcomes.

### JOB PERFORMANCE OVERCOMES



**TABLE 1.3**

**One Way Anova Analysis Difference Between Educational Qualification of the Respondents and Micro Learning Modules Helps You to Upskilling in IT Sector**

**Null Hypothesis (H<sub>0</sub>):**

There is no significant difference between educational qualification of the respondents and micro learning modules in helping them to upskill in the IT sector.

**Alternative Hypothesis (H<sub>1</sub>):**

There is a significant difference between educational qualification of the respondents and micro learning modules in helping them to upskill in the IT sector.

**Significance Level ( $\alpha$ ) = 0.05**

|                                       |                | <b>Sum of Squares</b> | <b>df</b> | <b>Mean Square</b> | <b>F</b> | <b>Sig.</b> |
|---------------------------------------|----------------|-----------------------|-----------|--------------------|----------|-------------|
| <b>Video based micro learning</b>     | Between Groups | 5.042                 | 3         | 1.681              | .808     | .492        |
|                                       | Within Groups  | 220.422               | 106       | 2.079              |          |             |
|                                       | Total          | 225.464               | 109       |                    |          |             |
| <b>Mobile learning micro learning</b> | Between Groups | 6.884                 | 3         | 2.295              | 1.579    | .199        |
|                                       | Within Groups  | 153.989               | 106       | 1.453              |          |             |
|                                       | Total          | 160.873               | 109       |                    |          |             |
| <b>Gamified micro learning</b>        | Between Groups | 5.304                 | 3         | 1.768              | 1.275    | .287        |
|                                       | Within Groups  | 146.960               | 106       | 1.386              |          |             |
|                                       | Total          | 152.264               | 109       |                    |          |             |

|   |                |         |     |       |       |      |
|---|----------------|---------|-----|-------|-------|------|
| <b>Assessment and Quiz based micro learning</b> | Between Groups | 11.785  | 3   | 3.928 | 2.126 | .101 |
|   | Within Groups  | 195.815 | 106 | 1.847 |       |      |
|   | Total          | 207.600 | 109 |       |       |      |
| <b>Social and collaborative micro learning</b>  | Between Groups | 8.336   | 3   | 2.779 | 2.111 | .103 |
|   | Within Groups  | 139.519 | 106 | 1.316 |       |      |
|   | Total          | 147.855 | 109 |       |       |      |

## INTERPRETATION

A One-Way Anova test was conducted to examine whether there is a significant difference between educational qualification of the respondents and micro learning modules in helping them to upskill in the IT sector. The results reveal that for video-based micro learning, the F value is 0.808 with a significance value of 0.492, which is greater than the 0.05 level of significance. For mobile learning micro learning, the F value is 1.579 with a significance value of 0.199, which is also greater than 0.05. In the case of gamified micro learning, the F value is

1.275 with a significance value of 0.287, indicating no statistical significance. Similarly, assessment and quiz-based micro learning show an F value of 2.126 with a significance value of 0.101, and social and collaborative micro learning records an F value of 2.111 with a significance value of 0.103. Since all the p-values are greater than 0.05, the null hypothesis is accepted for all five micro learning modules. Therefore, it can be concluded that there is no statistically significant difference between educational qualification of the respondents and micro learning modules in helping them to upskill in the IT sector.

## FINDINGS:

- The majority of 44% respondents were Agree that micro learning impact on concept recall.
- The One-Way ANOVA results show that there is no significant difference between educational qualification and micro-learning modules in IT upskilling.
- All p-values are greater than 0.05, so the null hypothesis is accepted.
- Micro-learning methods such as video-based, mobile learning, gamified, quiz-based, and

collaborative learning show similar effectiveness across qualifications.

- Majority of respondents agree that micro-learning improves concept recall and skill development.
- Micro-learning positively supports workforce upskilling in the IT sector.

## SUGGESTIONS:

1. IT companies should integrate structured micro-learning modules into regular training programs.
2. Organizations can adopt mobile-based and gamified learning to improve employee engagement.
3. Periodic assessments should be conducted to measure learning outcomes.
4. Companies should provide accessible digital platforms for continuous learning.
5. Customized micro-learning content can be developed based on employee skill requirements.

## CONCLUSION

The study concludes that micro-learning models significantly contribute to workforce upskilling in the IT sector of Coimbatore district. Although no significant difference was found based on educational qualification, micro-learning methods are widely accepted and effective among employees. Flexible, accessible, and short learning modules enhance knowledge retention, technical skills, and overall job performance. Therefore, micro-learning can be considered a valuable strategy for continuous professional development in the IT industry.

## REFERENCE

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