

# **E-Learning Vs M-Learning through Gamification as a Micro Learning Tool within a Blended Learning Environment**

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## **ABSTRACT**

A game is an organized practice of playing, carried out for enjoyment or used as an educational tool for the purpose of learning, where the learner plays a game integrated with the course material for the purpose of understanding and learning; is known as gamification. Gamification raises the understanding level of a learner. Micro Learning is a practice of learning where the contents are provided to learner in small parts. This research had integrated the Micro Learning method with both E-Learning (learning through fixed locations) and M-Learning (learning through mobile devices, keeping in view the mobility of learner), through combining an online game as a Micro Learning tool; that was provided as an additional resource, and was combined with the course module, as a blended learning mode, along with face-to-face instruction. Fourteen (14) participants had participated for this study, and were divided in two groups. Group 'A' (E-Learning group) with seven (7) participants, was requested to play the online game using fixed locations through computers or laptops only, whereas Group 'B' (M-Learning group) with seven (7) participants, was requested to play the online game through their mobile or portable devices only. Comparisons have been made between E-Learning and M-Learning modes through assessing their effects on the exam results between the groups 'A' and 'B'. Moreover, the participants of both groups were provided a survey questionnaire for the stages of 'Before' and 'After' using the online gamification, for the purpose of comparison and statistical analysis between these groups, concerning their attitudes toward the newly experienced methodology. The results of this research are very interesting for the researchers, working with Gamification or Micro learning tool for instruction.

**Key words:** Blended Learning, E-Learning, Gamification, Instruction, M-Learning, Micro Learning, Participants Attitude

## **1. INTRODUCTION**

Education is an organized practice of improving the knowledge, learning, and development of skills, which is a continuous process of teaching and learning among the learners and instructors. It is a practice that helps the learners to get an understanding towards their learning areas.

During the traditional way of teaching and learning, the length of lectures ranges from 1 to 2 hours or more, and sometimes instructors and learners get engaged for the whole day, with the teaching and learning process and during these lengthy lectures or sometimes, these full day teaching and learning

activities result in mind-numbing, and it's really difficult to develop detailed concepts about the topics, and to cover the huge amount of course material in time, or sometimes learners can't even develop the basics of newly introduced ideas. Consequently, instructors attempt to revise the ideas, at advanced stages, which affects the time management of the course completion, or sometimes don't get enough time to even revise the concepts, that affects the detailed concept creation of the learner, which results in compromised learning outcomes.

The Technology-driven practice of teaching and learning, through the addition of blended-learning models or online classrooms with traditional face to face instruction has positively changed and improved the process of instruction, and the overall growth of technology in the technology-driven classrooms permits the learners to have more access and advantages as compared to the previous generations (Olson, 2017). (Noor, 2014) had stated that Face-to-Face teaching, and Technology Driven-Teaching are two renowned approaches, practiced by the educators. Some of the educational institutes are still using the traditional face-to-face method of instruction, where teacher are controlling the classrooms, using the chalk and talk method, where the importance is given on the exam preparations and results, instead of concentrating on detailed concepts creation and understanding. Emerging educational technologies are getting integrated with the traditional face to face method of teaching, which is positively effecting the process of learning (Ahmad, Al-Khanjari, 2011). The learning outcomes can be improved through the integration of Micro Learning technique with the traditional face to face instruction, within a blended learning environment (Ahmad, 2017; Ahmad, 2017). Instructors are using electronic tools in combination with traditional face to face teaching method for maximized outcomes (Auster, 2016). Blended learning is a combination of diverse learning practices, blended with traditional face-to-face method of instruction (Giarla, 2016). Skills improvement can be achieved with better learning outcomes, through blended learning environments (Joanna, 2013; Nazarenko, 2015). E-Learning is the use of computers or laptops, for the purpose of learning that can be accessible by the learner from his or her desk, whereas, M-Learning is the use of smart phones or portable devices that is portable and freely accessible from any place (Gutierrez, K. 2015). The major elements for the evaluation of any electronic tool is: it's **Friendliness, Comfortability**, consideration of e-tool towards its **importance** or **essentiality** during the process of learning, help of e-tool in **Understanding** and **Learning** the subject areas towards specific objectives (Ahmad, Al-Khanjari, 2011; Ahmad, Al-Khanjari, 2016; Ahmad, 2017; Ahmad, 2017). Therefore, it is essential for the instructors to find diverse ways of teaching, along with face to face instruction, for the maximum use of information, and better learning outcomes.

## **2. MICRO LEARNING AND GAMIFICATION**

A Micro Learning is a process of learning where the learning contents are divided in small parts, and learning activities are divided in short intervals of time (Hug, 2005). A learning process based on tiny learning units those are suitable, and easily consumable (Fernandez, 2014). Micro learning is a process of teaching and learning where the learning is through Micro or Small size contents (Mosel, 2005). Micro Learning is a new leaning technique, where the way of learning is through the content divided in small size, and is very useful for the improvement of knowledge and enhancement of skills (Minimol, & Habil, 2012). Micro learning is a method of teaching that optimistically affects the learning process through better understanding and learning of topics, produces friendly, comfortable and positive learning outcomes (Ahmad, 2017). Micro learning provides very supportive results towards the understanding and learning of the course materials (Ahmad, 2017). Micro Learning is a supportive method of learning that

provides better learning outcomes, and highly supportive in the development and creation of ideas, and is helpful in understanding and learning the subject areas (Ahmad, Al-Khanjari, 2016).

In education, gamification is a learning technique that stimulates the interest of the learners, and upturns their engagement towards the learning of course contents, through combining the game based principles along with the contents of the course (Dichev, & Dicheva, 2017).

### **3. PURPOSE OF STUDY**

The purpose of this research was to test and introduce a novel methodology of learning, through comparison of E-Learning with M-Learning mode. The course contents were combined with an online Game (Gamification). This Game was used as a Micro Learning tool, as a supplementary support along with face-to-face mode of teaching, within a blended learning environment, and to assess the effectiveness of Gamification as a Micro Learning Tool on E-Learning and M-Learning modes, through the exam results of learners, help and support of Gamification for both E/M-Learning modes through understanding and learning the course contents, and the learners' likings.

### **4. METHODOLOGY**

This research has discovered the Gamification effects as a Micro Learning Tool, within a blended learning environment through E-Learning and M-Learning modes, where the contents of an IT course "MS Word", that was taught in computer labs, were integrated with an online MS Word Ribbons Game (PurposeGames, 2017), and were provided as an additional learning resource to the learners, along with face-to-face instruction. Fourteen (14) participants were divided in two groups of 'A' and 'B'. Group 'A' (E-Learning) was asked to play this game through their desktop computers or laptops (fixed locations), whereas Group 'B' (M-Learning) was asked to use their mobile or portable devices to play this game. The online game had total number of 51 questions, closely related with the course contents. The attempt to play this online game as a Micro Learning Tool was done through playing it in small chunks of 5 minutes only, and participants were asked to reattempt the game after a gap of at least two hours. This game had a timer, overall percentage of completion, counting of wrong and correct answers, highlighting the correct and wrong answers with different colors, and number of remaining questions. The online game was asking the questions and the participants had to use the mouse pointer for the selection of answers, among variety of available answers, from different Ribbons. Questions were appearing in a random order, at every restart. The minimum recorded time to easily attempt and reply to these questions was 5 minutes. Participants of both groups had tried their best at each try, to solve these questions within 5 minutes.

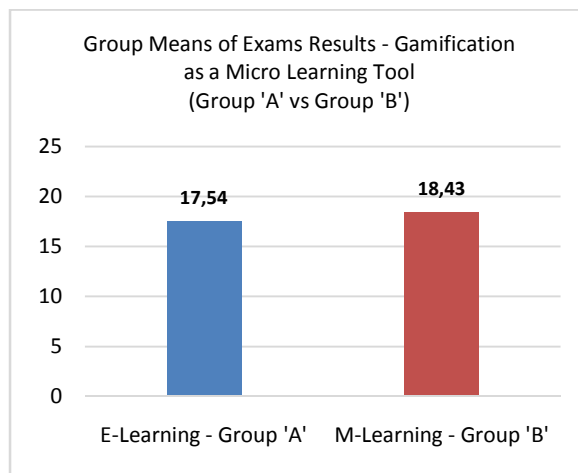
This study has evaluated the effects of gamification as a Micro Learning Tools, through these two groups, by comparing their exam results of the studied subject module. Furthermore, the participants of both groups were requested to furnish their feedback through a survey questionnaire for **Before** and **After** the use of this online game. Questionnaire was based on 5-points Likert Scale, from 1 to 5, where 1# Strongly Disagree, 2# Disagree, 3# Uncertain, 4# Agree, 5# Strongly Agree, towards the learners attitudes for Gamification as a Micro Learning Tool regarding;- **Friendly**, - **Comfortable**, -**Essential**, - **Help of e-tool in Understanding and Learning** the contents of course module, and - **Help of e-tool in examinations**. Plain statistical analysis based on the statistical means have been done on the feedback of **Before** and **After** stages.

**5. RESULTS**

**5.1. ASSESSMENT OF EXAM RESULTS(GROUP ‘A’ VS GROUP ‘B’)**

Table 1 and Fig1 show the exam results of both groups, ‘A’ and ‘B’. Comparison shows that group ‘A’ that was supported with E-Learning mode has attained a group mean of 17.54 (out of 25 marks), whereas, group mean of ‘B’ has scored 18.43, and the difference is 0.89 that is equivalent to 3.56%. These results show that overall Gamification as a Micro Learning Tool has left positive effects on both E-Learning and M-Learning modes, and elevated slightly higher score and percentage to the M-Learning mode.

| <b>Table 1: Comparison of Exam Results – Group Means (Group ‘A’ Vs Group ‘B’)</b>  |  |
|--|--|
| <i>Exam Results (Total Marks of the Exam Module: 25)</i>   |  |
| <b><u>Group A (Gamification through E-Learning):</u></b>   | <b><u>Group B (Gamification through M-Learning):</u></b> |
| <b>Group Mean – Group ‘A’</b>  | <b>Group Mean - (Group ‘B’)</b>                          |
| <b>17.54</b>   | <b>18.43</b>   |
| Mean difference = results of Group ‘B’ – results of Group ‘A’<br>Mean difference = 18.43 - 17.54 = 0.89<br>Conversion of Mean difference in Percentage=>0.89 (out of 25) = 3.56% |  |



*Fig. 1. Group Means of Exam Results, using Gamification as a Micro Learning Tool – Group ‘A’ Vs Group ‘B’*

**5.2. ATTITUDE TOWARDSTHE UES OF GAMIFICATION AS A MICRO LEARNING TOOL(GROUP ‘A’ VS ‘B’)**

The group Means of both the groups ‘A’ and ‘B’, regarding the feedback of the participants, for Before and After stages, towards the dependent variables ‘Friendly’, ‘Comfortable’ and ‘Essential’ are available

in Table 2 and Figures 2 and 3. Results reveal that the size of change for M-Learning is higher than E-Learning mode, (having the values for size of change with 1.86, 2.00, 2.43, and 2.29, 2.14, 2.86 for E-Learning and M-Learning respectively, towards the variables ‘Friendly’, ‘Comfortable’ and ‘Essential’).

| Table2: Attitude towards Gamification as a Micro Learning Tool |            |              |       |                |
|--|------------|--------------|-------|----------------|
| Dependent Variables  | Mode       | Groups Means |       | Size of Change |
|  |            | Before       | After | After-Before   |
| Friendly   | E-LEARNING | 2.57         | 4.43  | 1.86           |
|  | M-LEARNING | 2.57         | 4.86  | 2.29           |
| Comfortable  | E-LEARNING | 2.29         | 4.29  | 2.00           |
|  | M-LEARNING | 2.43         | 4.57  | 2.14           |
| Essential  | E-LEARNING | 2.00         | 4.43  | 2.43           |
|  | M-LEARNING | 2.00         | 4.86  | 2.86           |

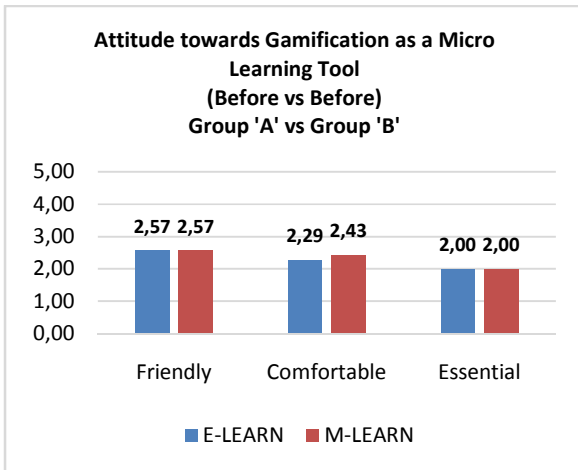


Fig. 2

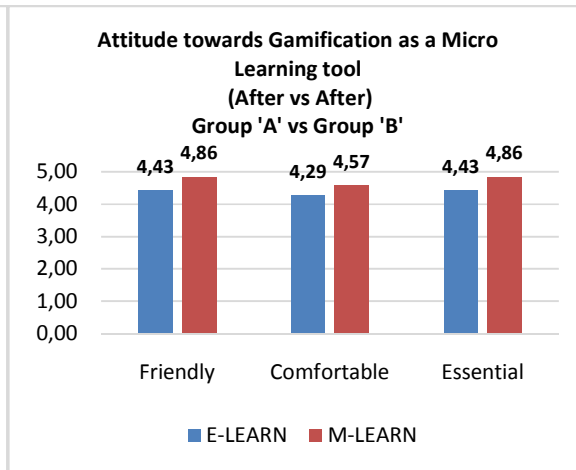


Fig. 3

Fig. 2, 3. Attitudes towards the use of Gamification as a Micro Learning Tool – (Group ‘A’ vs Group ‘B’)-Before-vs-Before and After-vs-After

**5.3. UNDERSTANDING, LEARNING, HELP IN EXAM PREPERATION, USING GAMIFICATION AS A MICRO LEARNING TOOL (GROUP ‘A’ VS ‘B’)**

Results of Table 3 and Figures 4 and 5 indicate that the Means rating of both the groups was very low at the beginning, before using the Gamification as a Micro Learning Tool, towards the areas ‘Understanding’, ‘Learning’ and ‘Help in Exam Preparation’, whereas, after using the Gamification Tool, both the groups had rated it higher. The size of change for M-Learning is little higher than E-Learning mode (having the values for size of change with 2.43, 2.00, 1.86, and 2.71, 2.29, 2.43 for E-Learning and M-Learning respectively, towards the variables ‘Understanding’, ‘Learning’ and ‘Help in Exam preparation’)

| Table 3: Help of Gamification as a Micro Learning Tool |                   |              |       |                |
|--|-------------------|--------------|-------|----------------|
| Dependent Variables                                    | Mode              | Groups Means |       | Size of Change |
|  |                   | Before       | After | After-Before   |
| Understanding Course Material                          | <i>E-LEARNING</i> | 2.14         | 4.57  | 2.43           |
|  | <i>M-LEARNING</i> | 2.00         | 4.71  | 2.71           |
| Learning Course Material                               | <i>E-LEARNING</i> | 2.43         | 4.43  | 2.00           |
|  | <i>M-LEARNING</i> | 2.43         | 4.71  | 2.29           |
| Help in Exams Preparation                              | <i>E-LEARNING</i> | 2.43         | 4.29  | 1.86           |
|  | <i>M-LEARNING</i> | 2.29         | 4.71  | 2.43           |

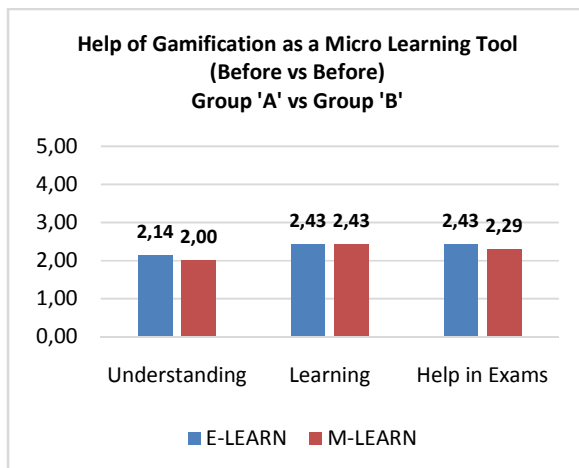


Fig. 4

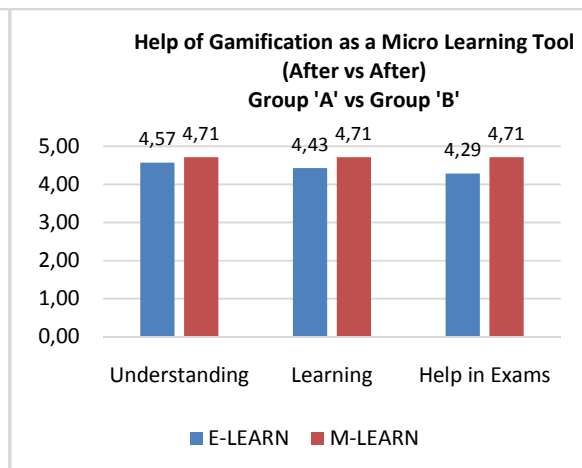


Fig. 5

Fig. 4, 5. Help of Gamification as a Micro Learning Tool– (Group ‘A’ vs Group ‘B’)-Before-vs-Before and After-vs-After

#### 5.4. LIKING OF PARTICIPANTS (METHOD OF INSTRUCTION)

Table 4, and Figures 6 & 7 show the results for Before and After stages, towards the dependent variable. The group means of both the groups ‘A’ and ‘B’ towards their likings for the dependent variable “Instruction through Instructor & supported with Gamification” were lower in the beginning of the study, before using the Gamification as a Micro Learning Tool, however, both the groups had rated the dependent variable with higher group mean values. Size of change for both the groups was same (with a value of 2.29 and 2.29 towards the E-Learning and M-Learning mode), which indicates, both the groups had equally liked the mode of instruction supported with Gamification as a Micro Learning Tool.

| Table 4: Liking of Participants (Method of Instruction)                               |                   |              |       |                |
|---|-------------------|--------------|-------|----------------|
| Dependent Variables   | Mode              | Groups Means |       | Size of Change |
|   |                   | Before       | After |                |
| Instruction through Instructor & supported with Gamification as a Micro Learning Tool | <i>E-LEARNING</i> | 2.14         | 4.43  | 2.29           |
|   | <i>M-LEARNING</i> | 2.29         | 4.57  | 2.29           |

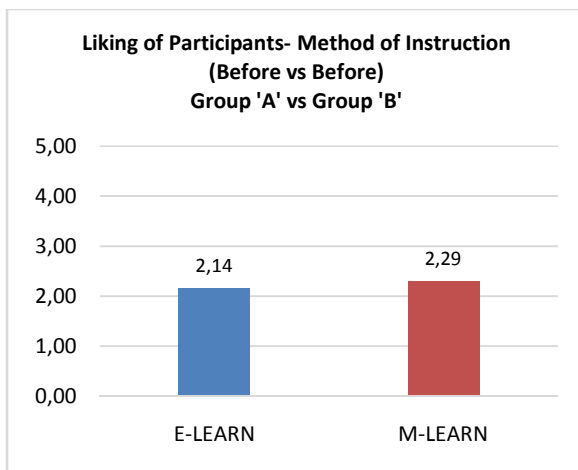


Fig. 6

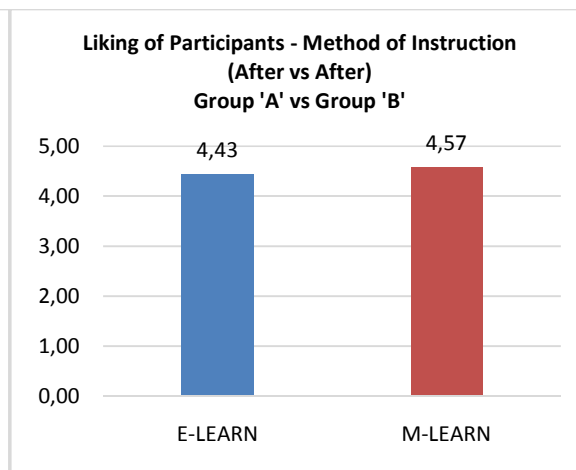


Fig. 7

Fig.6, 7. Liking of Participants – Method of Instruction– (Group ‘A’ vs Group ‘B’)-Before-vs-Before and After-vs-After

The exam results of both the groups ‘A’ (E-Learning) and ‘B’ (M-Learning) were good after using the Gamification as a Micro Learning Tool within a blended learning environment (Gamification Tool as an additional support, along with face-to-face instruction), and both the groups had recognized the Gamification, used as a Micro Learning Tool, as Friendly, Comfortable while using, Essential for the course module with huge size of change, with the values of 1.86, 2.00, 2.43, and 2.29, 2.14, 2.86 towards the E-Learning and M-Learning modes, respectively, concerning the variables ‘Friendly’, ‘Comfortable’ and ‘Essential’, and size of change with values 2.43, 2.00, 1.86, and 2.71, 2.29, & 2.43 for E-Learning and M-Learning modes, respectively, regarding the dependent variables ‘Understanding’, ‘Learning’ and ‘Help in Exam preparation’, whereas, the value for size of change towards participants likings was same for both the E-Learning and M-Learning modes, with a value of 2.29.

## 6. SUMMARY AND CONCLUSION

Results of this study indicates that both E-Learning mode and M-Learning modes are useful when used through Gamification as Micro Learning and produced encouraging results, as their overall effects on the outcomes are **Friendly** and **Comfortable** while using. Furthermore, participants had recognized Gamification as a Micro Learning Tool, an essential part of the course Module for **Understanding** the contents of the course module and **Learning** the contents of the course module. It had been proved to be very helpful for the **preparation of the exams**, and Gamification as a Micro Learning Tool within a Blended Learning environment had been **favoured** as an ideal mode of instruction, by the participants of both E-Learning and M-Learning groups. Moreover, Gamification as a Micro Learning Tool had helped the learners of both modes in gaining high scores in the exams, with 17.54, and 18.43 (out of 25 marks) for E-Learning and M-Learning modes, respectively. Overall, M-Learning mode has produced a little higher results (3.56%) as compared to E-Learning mode.

Therefore, it has been proved that Micro Learning is a process of learning where the learning contents are divided in tiny parts, and used in small steps, for the process of learning, which helps the learner in understanding and learning the topics, that creates in depth concepts through small steps. Micro Learning is a friendly and comfortable process, and an essential part of learning. When Micro Learning is integrated with Gamification within a Blended learning environment, it leaves excellent results on the overall learning outcomes.

Therefore, the addition of Gamification as a Micro Learning Tool along with face-to-face instruction for E-Learning and M-Learning modes or both, within a blended learning environment makes a constructive change, and the process of instruction attains overall improved results. Dear teachers, don't wait any more, start using this new methodology through Gamification as a Micro Learning Tool, with E-Learning or M-Learning mode, or both; to generate in depth ideas of the course materials, and to increase the understanding level of learners for better learning outcomes.

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