Effect of Gamification Approach towards Mastery of *Al-Adad wa al-Ma‘dūd* among Secondary School Students

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Effect of Gamification Approach towards Mastery of 
\textit{Al-`Adad wa al-Ma`dūd} among Secondary School 
Students

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Abstract
The issue of poor mastery of Arabic grammar among students is nothing new. Many studies have
been done by previous researchers on this matter. One of the topics that is considered difficult and
confusing is the topic of \textit{al-`Adad wa al-Ma`dūd}. Studies show that factors affecting students'
difficulty in mastering any educational topic are closely related to the techniques or approaches
to teaching. Therefore, this study aims to identify the level of \textit{al-`Adad wa al-Ma`dūd} dominance among
form six students, to analyse the effect of gamification approach and comparing the \textit{al-`Adad wa al-
Ma`dūd} level of mastery between the control and experimental groups as well as comparing \textit{al-`Adad
wa al-Ma`dūd} level of mastery between male and female students. The quasi-experimental method
was implemented using pre-and post-test questionnaires. The sample of this study was 60 students
in sixth form at Ma`ahad Ahmadi Gemencheh, Negeri Sembilan. The students were divided into two
groups, the control group (n = 30) and the experimental group (n = 30). Data were analysed
descriptively to obtain frequency, percentage and mean. A \textit{t}- test was conducted to measure
differences in the level of mastery of the two groups. The findings show that the level of mastery for
\textit{al-`Adad wa al-Ma`dūd} was low for both the control and experimental groups before treatment. After
the gamification approach was given to the experimental group, the findings showed a positive
impact on \textit{al-`Adad wa al-Ma`dūd} dominance with an improvement in the level of \textit{al-`Adad wa al-
Ma`dūd} for the experimental group was higher than that of the treatment group after the
gamification approach was used. As for the level of \textit{al-`Adad wa al-Ma`dūd} dominance between male
and female students, the findings show no significant differences by gender. It is hoped that this study
will be able to assist Arabic language educators apply a gamification approach to teaching and
learning grammar in the Arabic language, in particular the topic of \textit{al-`Adad wa al-Ma`dūd}.

Keywords: Gamification, Arabic Education, al-`Adad wa al-Ma`dud, Teaching and Learning in
Arabic.
Introduction
In the day-to-day life of man, figures in the field of calculation involving numbers play an important role. It involves all formal language learning in the world including Arabic. For example, financial field requires skills in calculation. Other disciplines such as astronomy, physics, chemistry and other fields also involve calculation and number. Apart from that, al-\textit{Adad wa al-M\textsuperscript{?}a\textsuperscript{?}d\textsuperscript{?}ud} is also important in the worship life for Muslims such as saying intention (niyyah) in prayer (Hassan, Yusof, Ghani, & Ismail, 2014). Apart from that, the number of financial institutions from the Arab countries are increasing in Malaysia in the recent years. This situation provides an opportunity for students who master Arabic language particularly those related to calculation and achieve the presumed level that should be involved in the financial institutions.

In Arabic, the topic al-\textit{Adad wa al-M\textsuperscript{?}a\textsuperscript{?}d\textsuperscript{?}ud} is a topic related to figures and numbers. It is an important topic for students to master. Almost all of the Arabic grammar books discuss the topic al-\textit{Adad wa al-M\textsuperscript{?}a\textsuperscript{?}d\textsuperscript{?}ud}. For example (Ibn Malik, 1894) has lectured a special topic named al-\textit{Adad wa al-M\textsuperscript{?}a\textsuperscript{?}d\textsuperscript{?}ud} chapter to discuss this special issue. Modern Arab grammarian such as al-Rajhi, (2008) also put this specific title in his scriptures. Among the importance of learning al-\textit{Adad wa al-M\textsuperscript{?}a\textsuperscript{?}d\textsuperscript{?}ud} is because it is often used in the daily dealings of human life such as personal identification and family, asking for prices, teaching and learning processes (Maarup & Baharudin, 2016).

Problem Statement
In teaching and learning Arabic language, the aim is to provide students with the necessary skills needed in listening, writing, reading and speaking (KPM). To achieve this goal, the learning of Arabic language must include the Arabic language grammar. However, studies in various levels whether at secondary level or higher education especially in the field of Islamic studies showed that the level of Arabic grammar mastery is weak (Samah, 2009). In fact, the issue of the weaknesses in Arabic language mastery has always been discussed by previous researchers, (Hassan, 2005) and supported by some of the recent researchers (Muhammad, Ahamd & Mat, 2013).

Among the mistakes that are often performed are errors in the aspects of masculine and feminine gender and its number, whether related to the similar gender and number or different gender and varying number (Hashim, 2009). The mastery of gender aspect is among the basic Arabic grammar. If a student does not master this aspect, he has not actually understood the rules of the whole Arabic grammar (Zainal & Abdullah, 2014). Mastery of the gender aspect relates to topic which is often considered to be difficult and confusing for students which is the topic al-\textit{Adad wa al-M\textsuperscript{?}a\textsuperscript{?}d\textsuperscript{?}ud}. This is because the gender determination factor of al-\textit{Adad}, which is the figure, depends on the gender of al-M\textsuperscript{?}a\textsuperscript{?}d\textsuperscript{?}ud which is the word that is counted (Hussin, 2010).

Apart from that, a study by Hussin, (2010) found that the level of students’ mastery on this topic is weak and requires its solution. Among the weaknesses, students are very confused in understanding and learning al-\textit{Adad wa al-M\textsuperscript{?}a\textsuperscript{?}d\textsuperscript{?}ud}. This confusion resulted in conceptual error for final line changes or \textit{i\textsuperscript{r}\textsuperscript{r}\textsuperscript{b}}, the determination of matching al-\textit{Adad wa al-M\textsuperscript{?}a\textsuperscript{?}d\textsuperscript{?}ud}, determination of al-M\textsuperscript{?}a\textsuperscript{?}d\textsuperscript{?}ud which matches either single word or \textit{jama\textsuperscript{?}}, and the students are also confused with the function of al-M\textsuperscript{?}a\textsuperscript{?}d\textsuperscript{?}ud either al-N\textsuperscript{?}a\textsuperscript{?}at or al-Tamyidh or mudhafun ila\textit{i}. Students are also confused with the types of al-\textit{Adad} including determining the use of al-\textit{Adad al-Asliyy} and al-\textit{Adad al-Tartibiyyi}.
In a study by Tu’aimah, (1986) it was found that among the obstacles which led to students’ weak achievement and mastery are related to the grammar curriculum itself, which is filled with unrelated grammatical terms as well as difficult and confusing grammatical terms such as \textit{al-Adad wa al-Ma’dūd}. Besides that, there are also obstacles from teachers themselves who are not using modern methods, techniques and approaches in grammar education. Arabic language teachers have more tendency and are influenced by teaching approaches of Islamic boarding schools which is using teacher-centred teaching. Teachers will be the authority who will convey their educational content from the beginning of the class until the end. As the outcome, this type of lesson makes students to become less agile and inactive in voicing their thoughts and views (Samah, 2012).

Students are also found to have difficulties to remember various facts delivered by teachers in the event of solely teacher-centred teaching. There is also possibility where students do not focus on the teaching material even though the teaching material is interesting because it is difficult for them to concentrate to the lesson over a long period of time (Tamuri & Nor, 2015). However, various efforts have been made to facilitate the learning of Arabic language grammar and this effort still continues to date.

**Research Objectives**

The objectives of this research are as follows:

1.2.1 Identify the level of \textit{al-Adad wa al-Ma’dūd} mastery for control and experimental groups before the gamification approach is implemented.

1.2.2 Compare differences of \textit{al-Adad wa al-Ma’dūd} mastery levels between control groups and experimental groups before and after gamification approaches.

1.2.3 Analyse gender differences in \textit{al-Adad wa al-Ma’dūd} mastery between control and experimental groups before and after gamification approach.

**Research Hypothesis**

The following is the null hypothesis tested at a .05 level of significance:

Ho1: There is no significant difference in the level of \textit{al-Adad wa al-Ma’dūd} mastery between the control and experimental group.

Ho2: There is no significant difference in the level of \textit{al-Adad wa al-Ma’dūd} mastery based on gender between the control and experimental group.

**Literature Review**

**Gamification Approach in Education**

Gamification is a learning approach that includes game elements in the teaching and learning process (Deterding, 2012). This student-centered approach allows students to have a more relaxed and fun learning experience. Studies on gamification approach have been conducted since the year 2012 to date. Gamification approach is closely related to motivation, interest, behavior and achievement of students (Glover, 2013; Hanus & Fox, 2015). However, there is limited number of recent studies on gamification in education especially education that is geared to Arabic language learning (Jasni, Zailani & Zainal, 2019). For the time being, studies are more focused on various other fields including science, mathematics, second language and business (Jaafar, 2018).
In addition, there are also studies that show game-based learning can make students enjoy playing while learning and can accelerate the learning process and create an interesting and entertaining learning atmosphere (Hassan & Poopak, 2012). Studies also show that game-based learning can increase cognitive level capability such as attention skill, increased memory capacity, ability of working memory for storage and manipulating space images, speed result-making, and performing tasks (Tobias, Fletcher, Bediou, Wind, & Chen, 2014).

However, if the gamification process is not planned and developed by observing cognitive development as well as learning goals and objectives, these game-based learning methods will not achieve learning objectives and might bring negative effects such as waste of time. Consequently the objectives and syllabus would fail to be conducted according to the prescribed curriculum.

Among the basic elements of gamification are having mechanical, dynamic and aesthetic values (Deterding, Sicart, Nacke, O’Hara, & Dixon, 2011). The mechanics consist of game components that function as points, challenges, stages, charts, badges, gifts and virtual goods. The dynamics describes the behavior during mechanics acts upon player inputs and other outputs from time to time (Zichermann & Cunningham, 2011). For example, dynamic of games are reward, status, achievement and competition. Meanwhile aesthetic is related to the player’s emotional reaction when interacting with game rules. That is often associated with satisfaction, pleasure, envy, respect, and relationships.

Effective gamification in education has several features, i.e., (a) has a clear educational objective, (b) provides challenges and satisfaction through victory, (c) has interesting colors, (d) has clear organisation, (e) contains clear and concise instructions, and (f) promotes player engagement interactively (Moncada & Moncada, 2014).

Hence, a solution which can be implemented to improve students’ mastery in the topic al-‘Adad wa al-Ma‘dūd would be by using the gamification approach. The gamification approach is identified as an alternative to the effective use of teaching materials. This study would like to observe the effectiveness of gamification and traditional teaching and learning approaches to the mastery of al-‘Adad wa al-Ma‘dūd among students.

**Methodology**

**Research Design**

This is a quantitative study with quasi-experimental design involving students in an existing classroom (Cresswell, 1994). This study involves two groups of students. Respondents in this study are divided into one experimental group and one control group; in which the experimental group was using gamification approach and the control group was using traditional approach. The quasi-experimental research design utilised in this study is pre- and post- imbalanced group test. In actual experiments, samples must be randomly selected from the population and distributed to groups so that each group is balanced from all aspects. However, in this study, the balance between these groups could not be fully controlled. In the field of education, equilibrium is usually unable to be controlled (Campbell & Stanley, 1966). This quasi-experimental research design is conducted to view the effectiveness of an intervention programme or teaching method. The research design is as seen in Table 1.
TABLE 1: Quasi Experimental Design (Source: Campbell, D. T., 1973)

<table>
<thead>
<tr>
<th>Experimental Group</th>
<th>Pre Test</th>
<th>X*</th>
<th>Post Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Gamification Approach)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Group</td>
<td>Pre Test</td>
<td>Y*</td>
<td>Post Test</td>
</tr>
<tr>
<td>(Traditional Approach)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

X*: Teaching using gamification approach
Y*: Teaching using traditional approach

Research Sample
The researchers utilised purposive sampling in order to select Form 6 students in the school involved in this study. The number of respondents for experiments such as this study were not less than 30 persons per group (Aguinis & Bradley, 2014). Therefore, this research involves 60 students in Maahad Ahmadi Gemencheh. Two classes of Form 6 students were treated as respondents in the study. There are 30 students in each group. The experimental group consists of 10 male students and 20 female students. Meanwhile the control group consists of nine male students and 21 female students. Both groups are of equal competencies and have similar results in the examination.

Research Instrument
To obtain the research data, the researchers used two types of instruments to achieve the objectives of this study. The instrument are a set of Pre- and Post-test questions and gamification of al-ṣAdad wa al-Maʿdūd.

Test question
The researchers have developed test questions related to al-ṣAdad wa al-Maʿdūd which consists of 50 questions. Pre-test and post-test questions were given to the respondents of the experimental group and control group before and after the learning session. All questions include five (5) constructs surveyed by the researchers which are al-ṣAdad al-Mufrad, al-ṣAdad al-Murakkab, al-ṣAdad al-Maʿtuf, ʿAdad al-ṣUqūd dan al-Maʿdūd as shown in Table 2 as below:

<table>
<thead>
<tr>
<th>Question</th>
<th>Construct Name</th>
<th>Answer Type</th>
<th>Number of Item</th>
<th>Total marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 1-10</td>
<td>Al-ṣAdad al-Mufrad</td>
<td>Multiple choice</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Question 11-20</td>
<td>Al-ṣAdad al-Murakkab</td>
<td>Multiple choice and structure</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Question 21-30</td>
<td>al-ṣAdad al-Maʿtuf</td>
<td>Multiple choice and structure</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Question 31-40</td>
<td>ʿAdad al-ṣUqūd</td>
<td>Multiple choice and structure</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Question 41-50</td>
<td>al-Maʿdūd</td>
<td>Multiple choice and structure</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>50</td>
<td>100%</td>
</tr>
</tbody>
</table>

Students of the treatment group were exposed to gamification approach. Meanwhile the students of the control group used traditional approach that are often used in the teaching and learning process. Pre-test tests were conducted on students to test and measure their level of mastery. Then students
were taught and exposed with the learning content within six learning sessions and it was ended with post-test. The post test items are the same as carried out in pre-test, however positions of some items were changed to avoid recognition and bias. In this study, the gamification and traditional approach utilised were the independent variable, while the level of student mastery as the dependent variable.

Gamification of *al-Adad wa al-Ma‘dūd*

Gamification approach proposed in this study is conducted in order to incorporate the basic element of gamification in the process of teaching and learning which are mechanical, dynamic and aesthetic. The element was applied and adapted from a game of snake and ladder which is very popular among students (Nazari et al., 2012). The procedures of the snake and ladder game adapted are the same as the original snake and ladder game. Game elements found in *al-Adad wa al-Ma‘dūd* gamification are as found in Figure 1 as below:

<table>
<thead>
<tr>
<th>Gamification Element</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mechanic</strong></td>
<td>Snake and Ladder (virtual item), Flashcards</td>
</tr>
<tr>
<td><strong>Dynamic</strong></td>
<td>Reward</td>
</tr>
<tr>
<td></td>
<td>Ladder: symbolises goodness and the reward is the ability to reach higher number.</td>
</tr>
<tr>
<td></td>
<td>Snake: symbolises negativity and as punishment, player will go to lower number.</td>
</tr>
<tr>
<td><strong>Esthetic</strong></td>
<td>Persistence, desire to end the game (competition), respect, satisfaction.</td>
</tr>
</tbody>
</table>

![Game Element in *al-Adad wa al-Ma‘dūd* Gamification](image)

**Figure 1: Game Element in *al-Adad wa al-Ma‘dūd* Gamification**

The following are the steps and adaptation of *al-Adad wa al-Ma‘dūd* gamification development:

**Step 1  Determine aim and objective**

Establish the objective of the game to meet the topics of *al-Adad wa al-Ma‘dūd* in which students understand the topic *al-Adad wa al-Ma‘dūd* in relation to al-cAdad al-Mufrad, al-cAdad al-Murakkab, al-cAdad al-Mactuf and cAdad al-cUqūd in gender determination as well as the determination of *Ma‘dūd* single-word or *jama‘* word. The assessment of *al-Adad wa al-Ma‘dūd* mastery is based on pre- and post-test questions given before and after the teaching and learning of *al-Adad wa al-Ma‘dūd* conducted.

**Step 2  Game space**

This gamification is adapted from the original snake and ladder game which is very popular among students. The grid space on the figure is used as the basis and space for the game.
After the grid space to be used is identified, the researchers change the colour of the grid area. The colour of grid space is changed to purple, green, yellow and pink. These colors represent the objective of \textit{al-\c{c}Adad wa al-M\c{a}d\d{u}d} learning which are to enable students to determine \textit{al-M\c{a}d\d{u}d} to be either a single word or \textit{jama\textsuperscript{a}} word.

I. Purple is \textit{al-M\c{a}d\d{u}d} to follow \textit{al-\c{c}Adad} either single or dual word.
II. Green is for \textit{al-M\c{a}d\d{u}d} (\textit{jama\textsuperscript{c} majr\textsuperscript{a}})
III. Yellow is for \textit{al-M\c{a}d\d{u}d} (\textit{mufrad mansu\textsuperscript{u}b})
IV. Pink is for \textit{al-M\c{a}d\d{u}d} (\textit{mufrad majr\textsuperscript{a}}).

The game starts at the top right, which is in line with the Arabic language writing that begins from the right. After the colour of the grid area are set, researchers include colour elements in the number spaces for masculine and feminine gender determination. Small circles which are blue and pink in colour are placed in the number spaces. Blue represents the masculine and pink represents the feminine gender. Through these colours, students can determine the gender for \textit{al-\c{c}Adad al-Mufrad}, \textit{al-\c{c}Adad al-Murakkab}, \textit{al-\c{c}Adad al-Mactuf} and \textit{\c{c}Adad al-cUq\d{u}d}.

Figure 4 shows blue and pink coloured flashcards which acts as \textit{al-M\c{a}d\d{u}d}. Blue represents \textit{al-M\c{a}d\d{u}d} for masculine gender and pink represents \textit{al-M\c{a}d\d{u}d} for feminine. When the player arrives at any
number, he will take a flashcard that represents al-Ma’rūd. If the player takes a blue or pink card, he must select the correct al-cAdad to be written.

Figure 4: al-cAdad wa al-Ma’rūd Gamification

Result and Discussion
Analysis of al-cAdad wa al-Ma’rūd Mastery Level

Objective 1: Identify the level of al-cAdad wa al-Ma’rūd mastery for control and experimental groups before the gamification approach was conducted.

To answer the objectives of this study, researchers have analysed the students’ achievement score based on pre-test. Researchers have conducted a descriptive test to determine the frequency, percentage and mean, in order to analyse the test achievement score and consecutively determine the level of al-cAdad wa al-Ma’rūd mastery.

The mastery of al-cAdad wa al-Ma’rūd among the respondents in control group is at low level based on pre-test score with total mean value for al-cAdad al-Mufrad pre-test score at 7.47, al-cAdad al-Murakkab 7.60, al-cAdad al-Ma’tuf 8.13, c-adad al-Uqūd 9.13, al-Ma’rūd 6.20 and the total score for al-cAdad wa al-Ma’rūd pre-test score is 38.47. Pre-test score for each al-cAdad wa al-Ma’rūd section is as stipulated in Table 3 as follow:

<table>
<thead>
<tr>
<th>Control Group Respondent</th>
<th>Score Al-cAdad al-Mufrad (20M)</th>
<th>Score Al-cAdad al-Murakkab (20M)</th>
<th>Score Al-cAdad al-Ma’tuf (20M)</th>
<th>Score c-adad al-Uqūd (20M)</th>
<th>Score al-Ma’rūd (20M)</th>
<th>Total Score (100M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=30</td>
<td>7.47</td>
<td>7.60</td>
<td>8.13</td>
<td>9.13</td>
<td>6.20</td>
<td>38.47</td>
</tr>
</tbody>
</table>

Overall, the mastery of al-cAdad wa al-Ma’rūd among respondents in experimental group is at low level based on the pre-test score in which the total mean score obtained for pre-test of al-cAdad al-
Mufrad is 7.33, ʻAdad al-Murakkab 8.53, ʻAdad al-Maʿtuf 9.27, ʻadad al-ʻUqūd 8.13, al-Maʿdūd 6.40 and overall score for pre-test of ʻAdad wa al-Maʿdūd is 39.67. Pre-test and distribution score are as stipulated in Table 4 below.

<table>
<thead>
<tr>
<th>Experimental Group Respondent</th>
<th>Score ʻAdad al-Mufrad (20M)</th>
<th>Score ʻAdad al-Murakkab (20M)</th>
<th>Score ʻAdad al-Maʿtuf (20M)</th>
<th>Score ʻadad al-ʻUqūd (20M)</th>
<th>Score al-Maʿdūd (20M)</th>
<th>Total Score (100M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=30</td>
<td>220</td>
<td>256</td>
<td>278</td>
<td>244</td>
<td>192</td>
<td>1190</td>
</tr>
<tr>
<td>Mean</td>
<td>7.33</td>
<td>8.53</td>
<td>9.27</td>
<td>8.13</td>
<td>6.40</td>
<td>39.67</td>
</tr>
</tbody>
</table>

Overall, Table 3 and Table 4 have shown the total pre-test score for respondents in control and experimental groups. Mean score for the overall pre-test of control group is 38.47 and for experimental group is 39.67. This shows that the achievement of ʻAdad wa al-Maʿdūd for experimental group is at a low level. Hence, the finding of the mean scores between control and experimental group proves that the level of mastery of ʻAdad wa al-Maʿdūd is at low level. The score 38.47 and 39.67 are in the range of less satisfying group (KPM, 2010). This means that the ability and capability of respondents of both groups is equal prior to the teaching and learning of ʻAdad wa al-Maʿdūd through gamification implementation. The frequency distribution and percentage of ʻAdad wa al-Maʿdūd for both groups are as below.

Analysis of Difference in ʻAdad wa al-Maʿdūd Mastery between Control and Experimental Groups

Objective 2: Comparing the differences of ʻAdad wa al-Maʿdūd mastery level between control and experimental groups before and after the gamification approach.

The table below shows the distribution of ʻAdad wa al-Maʿdūd mastery level of control and experimental groups after treatment was given.

<table>
<thead>
<tr>
<th>Group/score</th>
<th>Score 0-39 (%)</th>
<th>Score 40-55 (%)</th>
<th>Score 56-70 (%)</th>
<th>Score 71-84 (%)</th>
<th>Score 85-100 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>16 (53.3%)</td>
<td>14 (46.7%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Experimental</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>23 (23.3%)</td>
</tr>
</tbody>
</table>

Table 5 shows the ʻAdad wa al-Maʿdūd overall mastery distribution for control and experimental group in the form of frequency and percentage after treatment was given. Based on the schedule, it is evident that majority of the students in control group is weak level at the score of 0-39% with a total of 16 students (53.35). Meanwhile, 14 students (46.7%) are at the score between 40-55%. In the experimental group, majority of the students scored high with 23 students (76.7%) scoring between 85-100%, whilst 7 students (23.3%) scored between 71-84%. This explains that the mastery of ʻAdad wa al-Maʿdūd in the experimental group is higher than the control group. The following shows the differences in the mastery of ʻAdad wa al-Maʿdūd among respondents of the control and experimental groups.
Subsequently, the researcher analysed the findings in order to answer hypothesis (Ho1) formulated. To answer Hypothesis 1:

(Ho1): There is no significant difference in the mean score of al-\(^{c}\)Adad wa al-Ma\'\(d\)\(d\) Mastery between experimental and control group.

Data analysis uses independent sample \(t\)-test, mean score of pre- and post-test of al-\(^{c}\)Adad wa al-Ma\'\(d\)\(d\) among students in experimental group that utilises gamification approach and control group that do not utilise the gamification approach as follows:

**Table 6: Mean score, Standard deviation and Independent Sample \(t\)-test Total Score in Pre- and Post-Test of Control and Experimental Group**

<table>
<thead>
<tr>
<th>Mastery of al-(^{c})Adad wa al-Ma'(d)(d)</th>
<th>Group</th>
<th>N=30</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Mean diff</th>
<th>(t) value</th>
<th>Df</th>
<th>Sig. P&lt;.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td>Control</td>
<td>38.47</td>
<td>10.342</td>
<td></td>
<td></td>
<td>(.449)</td>
<td>58</td>
<td>.655</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>39.67</td>
<td>7.902</td>
<td>1.067</td>
<td></td>
<td>(.449)</td>
<td>58</td>
<td>.655</td>
</tr>
<tr>
<td>Post test</td>
<td>Control</td>
<td>56.07</td>
<td>9.105</td>
<td>33.33</td>
<td></td>
<td>(.17588)</td>
<td>58</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>89.40</td>
<td>4.987</td>
<td></td>
<td></td>
<td>(.17588)</td>
<td>58</td>
<td>.000</td>
</tr>
</tbody>
</table>

*\(t\)-critical= 2.009, df=58,2-end, p<.05

Based on Table 6 above, al-\(^{c}\)Adad wa al-Ma\'\(d\)\(d\) Mastery level for control group is based on the pre-test finding mean score and standard deviation 38.47 and 10.342. Meanwhile the mean score and standard deviation for the experimental group were 39.67 and 7.902. Statistical results show the \(t\)-value is \(.449\), with a freedom rate of 58 and a significant \(p\) value greater than .05. Due to the \(t\)-value \(.449\) is smaller than \(t\)-critical 2.009 and its significant value .655 is greater than the significant level .05, hence the statistical finding showed no significant difference in the pre-test mean score of al-\(^{c}\)Adad wa al-Ma\'\(d\)\(d\) between control group and experimental group.

For the post-test of al-\(^{c}\)Adad wa al-Ma\'\(d\)\(d\), mean score and standard deviation for control group is 56.07 and 9.105. Meanwhile the mean score and standard deviation for the experimental group were 89.40 and 4.987. Statistical results show the \(t\)-value is \(17.588\) with a freedom rate of 58 and a
significant p value greater than .05. Due to the t-value 17.588 is greater than t-critical 2.009 and its significant value .000 is smaller than the significant level.05, hence the statistical finding showed a significant difference in the post-test mean score of al-_SEND_ADAD_ wa al-SEND_Ma’amudd_ between control group and experimental group. This means that null hypothesis (H_01) is rejected.

In conclusion, the analysis findings proved that the level of al-SEND_ADAD_ wa al-SEND_Ma’amudd_ mastery among the respondents in experimental group who utilised the gamification approach in learning al-SEND_ADAD_ wa al-SEND_Ma’amudd_ showed a significant increase than the control group that did not use the gamification approach in learning al-SEND_ADAD_ wa al-SEND_Ma’amudd_.

**Analysis of Gamification Approach based on Gender**

Objective 3: Analyse the difference of al-SEND_ADAD_ wa al-SEND_Ma’amudd_ mastery level based on gender between control group and experimental group before and after the gamification approach.

(Ho2) There is no significant difference in the level of al-SEND_ADAD_ wa al-SEND_Ma’amudd_ mastery based on gender between control group and experimental group.

Data analysis utilising independent sample t-test, the mean score of pre- and post-test of al-SEND_ADAD_ wa al-SEND_Ma’amudd_ among students in control group based on gender as shown in Table 7.

<table>
<thead>
<tr>
<th>Mastery of al-SEND_ADAD_ wa al-SEND_Ma’amudd_</th>
<th>Gender</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-value</th>
<th>Df</th>
<th>Sig. P&lt;.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>Male</td>
<td>37.56</td>
<td>9.262</td>
<td>.243</td>
<td>28</td>
<td>.810</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>38.57</td>
<td>10.975</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>Male</td>
<td>56.00</td>
<td>7.348</td>
<td>.026</td>
<td>28</td>
<td>.977</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>56.10</td>
<td>9.929</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*t-critical= 2.045 , df= 28, 2-end, p<.05

According to Table 7, the level of al-SEND_ADAD_ wa al-SEND_Ma’amudd_ mastery of for male student in control group based on pre-test findings, mean score and standard deviation is 37.56 and 9.262, while the mean score and standard deviation of pre-test for female students is 38.57 and 10.975. The statistical results show the t-count value is .243 with a degree of freedom 28 and a significant p-value to be greater than .05. Due to the t-count value .243 smaller than t-critical 2.045 and its significant value .810 greater than a significant level of .05. Hence the results of statistics show that there is no significant difference in the mean score for the pre-test of al-SEND_ADAD_ wa al-SEND_Ma’amudd_ between male students and female students of the control group.

For post-test, the level of al-SEND_ADAD_ wa al-SEND_Ma’amudd_ mastery for male students was 56.00 and a standard level of 7.348. Meanwhile the mean score and standard deviation for female students were 56.10 and 9.929. Statistical results show the t-count is .026. The value is smaller than the t-critical value of 2.045 with a significant value .977, greater than a significant level of .05. Based on the statistics, there is no significant difference in the mean score of al-SEND_ADAD_ wa al-SEND_Ma’amudd_ post-test between male students with female students of the control group.
Table 8: Mean score, Standard deviation and Independent-Sample T-Test of Experimental Group in Pre- and Post-Test based on Gender

<table>
<thead>
<tr>
<th>Master of al-Adad wa al-Ma‘dūd Gender</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t-value</th>
<th>Df</th>
<th>Sig. P&lt;.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>41.40</td>
<td>10.157</td>
<td>1.013</td>
<td>28</td>
<td>.320</td>
</tr>
<tr>
<td>Female</td>
<td>38.30</td>
<td>6.562</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>88.00</td>
<td>4.714</td>
<td>-1.091</td>
<td>28</td>
<td>.285</td>
</tr>
<tr>
<td>Female</td>
<td>90.10</td>
<td>5.088</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*t-critical= 2.045, df= 28, 2-end, p<.05

Table 8 shows that the level of al-Adad wa al-Ma‘dūd mastery for male students in the experimental group based on pre-test findings, mean score and standard deviation obtained is 41.40 and 10.157. Meanwhile, the mean score and standard deviation of the pre-test for female students is 38.30 and 6.562. The statistical result shows the t-count value is 1.013 with a degree of freedom 28 and a significant p-value to be greater than .05. Due to the t-count of 1.013 smaller than t-critical 2.045 and its significant value .320 greater than the significant level of .05, hence the statistical analysis showed that there was no significant difference in the mean score of al-Adad wa al-Ma‘dūd pre-test between male students and female students of the experimental group.

For post-test, the level of al-Adad wa al-Ma‘dūd mastery for male students is a mean score of 88.00 and standard deviation 4.714, while the mean and standard deviation score for female students is 90.10 and 5.088. Statistical results show the t-value is -1.091. Due to the t-count of -1.091 is smaller than t-critical 2.045 and significant value of .285 is greater than the significant level of .05, hence the analysis of the statistics shows that there is no significant difference of al-Adad wa al-Ma‘dūd post-test mean score between male and female students of the experimental group. Therefore, the null hypothesis (Ho2) is accepted.

Discussion
Based on study conducted on Form 6 students in learning al-Adad wa al-Ma‘dūd through gamification and traditional approach, both of these approaches have differences on effectiveness. Based on the results of pre-test findings, both groups have almost the same level of mastery and experience. This is proven based on the findings of the study showing that there is no significant difference in the mean score of pre-test conducted between experimental groups and control group.

After six teaching and learning sessions, all students in the experimental and control group were assessed through post exams. Study findings have shown that the level of mastery among students in the experimental group using the gamification approach had highly increased compared to the control group which was using the traditional approach.

This clearly suggests that gamification approach brings advantages in comparison to the traditional approach practiced previously. This study is in line with the findings of the study on "Gamification approach in Teaching and Learning towards Form Two Students for the Topic Algebra" which found
that gamification approach is effective in enhancing students’ mastery in the topic algebra because this approach can help students to become more active, self-confident and improve thinking skills (De Sousa, Durelli, Reis, & Isotani, 2014). The findings of this study is in line with studies that find learning through gamification approach has successfully increased achievements in learning various fields (Putih & Ali, 2011).

The gamification approach also makes students understand the learning content better. Students will try their best to understand the concept or content of the lesson in order to answer questions and match their friends who have points in the snake and ladder game. When students can understand the concept of \( al-\text{Adad wa al-Ma'\text{d}d\text{u}d} \) and repeatedly answer questions related to gender determination of \( al-\text{Adad} \) and the determination of \( al-\text{Ma'\text{d}d\text{u}d} \), this will indirectly increase their level of understanding regarding the topics learnt. In line with the findings of other studies, students can understand the concept of \( al-\text{Adad wa al-Ma'\text{d}d\text{u}d} \) more easily. Parallel with previous study (Putih & Ali, 2011) the students who were actively involved had better mastery and understanding of the topics.

For differences in the mastery of \( al-\text{Adad wa al-Ma'\text{d}d\text{u}d} \) based on gender between respondents in control group and experimental group before and after the gamification approach, the findings showed that there were no significant difference in the mastery of \( al-\text{Adad wa al-Ma'\text{d}d\text{u}d} \) between male and female students before and after the learning of \( al-\text{Adad wa al-Ma'\text{d}d\text{u}d} \) was conducted.

Students’ intelligence is difficult to be identified based on biological factors such as gender. This is because every individual has different intelligence level. In order to overcome the imbalance in the level of achievement among male and female students, teachers play important roles in making obvious changes to the teaching and learning process so that it is more effective (Jelas et al., 2014).

Considering the study objectives on the differences of mastery level based on gender for both groups, the study findings showed that there were no significant differences in the mastery of \( al-\text{Adad wa al-Ma'\text{d}d\text{u}d} \) in the pre- and post-tests between male and female students. This finding supports the statement by Yusof and Azman, (2018) which stated that the role of learning support is important to actively engage students in the teaching and learning process. This will indirectly be able to reduce the imbalance of the achievement level between male and female students. From the theoretical aspect, this study clearly supports the learning theory by Vygotsky (1978) which emphasises that the students’ knowledge is built on experience, active learning and the use of teaching materials as teaching aid tool for more effective learning. The findings also showed that the gamification approach is suitable for students of different academic and personality abilities.

**Conclusion and Recommendations Required**

Based on the overall findings, the studyformulates that students who learn by using gamification approach will have a positive impact on the learning. This situation can be seen as there is an increase in \( al-\text{Adad wa al-Ma'\text{d}d\text{u}d} \) mastery score for students who learn through gamification approach in comparison to the traditional approach learning. This study also shows that this approach is more effective than traditional teaching and learning. If this gamification approach is expanded it will be able to produce creative, innovative and competitive students and further improve the achievement.
in Arabic language. Therefore, with this approach, teachers can change the teaching and learning approach by making it more effective.

The findings of the study have shown that the gamification approach is practically suitable for use in the topic of al-'Adad wa al-Ma'bud. Student mastery analysis for gamification approach showed that student achievement score has increased positively. Therefore, this study found that learning outcomes are better and suitable for use in learning difficult and confusing topics in Arabic. However, this gamification of al-'Adad wa al-Ma'bud is more effective for determining the gender of al-'Adad wa al-Ma'bud and less helpful for al-Ma'bud mastery.

From a theoretical aspect, this study clearly supports Vygotsky's (1978) theory of learning, which emphasizes that students' knowledge is built on experience, active learning and the use of teaching materials as teaching aids for teachers to learn more effectively. The findings also show that this gamification approach is suitable for students with different academic abilities and personalities. Therefore, it is hoped that this study will be able to increase teachers' confidence in learning methods using gamification approach and the role of teachers as facilitators and best facilitators for students. This study is expected to benefit various parties, especially Arabic language teachers and students who are learning Arabic itself.

References


