

STUDENTS' MOTIVATION LEVEL IN GAMIFICATION OF ACCOUNTING TEACHING AND LEARNING – A CASE OF 'ACCOUNTING ON THE BLOCK'

Junaidah Jamaluddin^{1*}, Mahathir Mahali², Norlaila Mohd Din³, Mohamad Azmi Nias Ahmad⁴, Nur Syazwani Mohamad Fadzillah⁵, Faizan Abdul Jabar⁶

^{1,3,4,5}Faculty of Accountancy, Universiti Teknologi MARA,
26400 Bandar Tun Abdul Razak Jengka, Pahang, Malaysia

^{2,6}Faculty of Business and Management, Universiti Teknologi MARA,
26400 Bandar Tun Abdul Razak Jengka, Pahang, Malaysia

*Corresponding author's e-mail: junaidah_jamal@uitm.edu.my

Received: 16 Oktober 2019

Accepted: 24 January 2020

Online First: 28 February 2020

ABSTRACT

Learning accounting can be very challenging for most students. Students are not only expected to demonstrate a proficiency in accounting process, they must also demonstrate a depth of knowledge and understanding of accounting concepts and fundamentals. In most accounting courses, educators depend on the textbook or power point slides to give lectures and illustrate all the workings on the black/whiteboard while students are listening passively or busy taking notes. Lack of attraction and engagement in the conventional way of accounting teaching and learning may lead to difficulty in understanding basic accounting concepts and overall accounting process, thereby demotivating students to learn accounting. Alternatively, gamification of teaching and learning may provide a useful technique to enhance students' engagement and motivation. For this reason, the authors have proposed a gamification technique, known as 'Accounting on the Block' (AOTB), which is an accounting board game to teach Published Financial Statements for accounting students at diploma level. While numerous studies have been conducted to evaluate students' motivation level in digital game-based learning, there are relatively few studies that address students' motivation level when using physical games,



such as board games. To shed light in this area, a case study was conducted on 50 accounting students who were experimented with the AOTB board game. The Instructional Materials Motivation Survey (IMMS) instrument was applied to measure students' motivation level. The results revealed that most students' motivation levels were positive and they were satisfied with the use of AOTB board game in their learning. However, students also expected improvements in some aspects of the game.

Keywords: *accounting, gamification, instructional materials motivation survey, published financial statements*

INTRODUCTION

Accounting subjects have long been taught using conventional methods (Jaijairam, 2012). While the business environment is vigorous and keeps on changing, teaching and learning accounting remain unchanged. Changes in accounting are more driven by the changes in accounting standards (Purnamasari & Advensia, 2014). In most classes, educators depend on the textbook or power point slides to give lectures and illustrate all the workings on the black/whiteboard while students are listening passively or busy taking notes. Learning accounting can be very challenging and complicated for students. Students are not only expected to demonstrate a proficiency in recording, reporting and analysing business events, they must also demonstrate a depth of knowledge and understanding of accounting concepts and fundamentals (Moncada & Moncada, 2014). Lack of attraction and engagement in the conventional way of accounting teaching and learning may lead to difficulty in understanding basic accounting concepts and overall accounting process (Jaijairam, 2012), thereby demotivating students to learn accounting. Alternatively, gamification of teaching and learning may provide a useful technique to enhance students' engagement and motivation (Taspinar *et al.*, 2016; Nah *et al.*, 2013). Gamification is defined as 'the practice of using game design elements, game mechanics and game thinking in non-game activities to motivate participants' (Al-Azawi *et al.*, 2016). The application of game elements to non-game settings has been given a widespread attention to increase students' engagement and motivation in the classroom.

In this study, we proposed a gamification technique, known as 'Accounting on the Block' (AOTB), which is an accounting board game to teach Published Financial Statements for accounting students at diploma level. While numerous studies have been conducted to evaluate students' motivation level in digital gamification of learning, there are relatively few studies that address students' motivation level when using physical games, such as board games.

Physical games differ from digital games in certain aspects. According to Liu and Chen (2013) digital game offers animated graphics, audio effects and immersive stimulation that a physical game cannot offer. In addition, digital games contain common game mechanics such as leaderboards, badges and competition mechanics that are not usually provided by physical games (Hanus & Fox, 2015). On the other hand, in a classroom setting, the use of physical games could enhance direct interpersonal interaction between educators and students as well as among students to a level that is incomparable to the sound and audio effects of digital games (Liu & Chen, 2013). The board game designed in this study was used to teach Published Financial Statements for diploma students undertaking accounting programme. By handling and moving the cards themselves, students can compete and cooperate with one another through direct verbal communication while at the same time having fun during the process of learning. This situation is expected to result in higher motivation level among students in learning accounting subject.

We believed that it is important to understand students' motivation level in a gamification setting so that the educators can later adopt the necessary measures to enhance students' learning process. With the aim of filling the gap in students' motivation level in a physical game setting, we conducted a survey on students' motivation level and analysed students' motivational needs.

The purpose of this study is to assess students motivation level in a physical game setting, identify whether different student groups would have different motivation levels and propose some recommendations on enhancing motivational features for an accounting board game. The research questions of this study are:

- 1) What are students' motivation level when the AOTB board game is used in teaching and learning Published Financial Statements?
- 2) Is there any difference in motivation levels among different student groups?

LITERATURE REVIEW

Motivation is defined as 'a theoretical construct used to explain the initiation, direction, intensity, persistence and quality of behaviour' (Maehr & Meyer, 1997). Motivation plays a crucial role that stimulates and sustains students' learning behaviour (Tohidi & Jabbari, 2012; Keller, 1987). When focusing on the types of motivation, the literature often distinguishes between intrinsic and extrinsic motivation (Buckley & Doyle, 2016; Hanus & Fox, 2015; Tohidi & Jabbari, 2012). Intrinsic motivation refers to the motivation that is driven by internal rewards and arises within the individual because of the interest or enjoyment in the task itself (Lepper, 1988; Tohidi & Jabbari, 2012). Conversely, extrinsic motivation refers to the behaviour that is driven by external factors such as money, grades and threat of punishment (Buckley & Doyle, 2016).

The ARCS model that encompasses the components of attention, relevance, confidence, and satisfaction (Keller, 1987), has been broadly applied to improve learning motivation in instructional designs (Liu & Chu, 2010). ARCS model represents a motivational design structure, which incorporates 'how many of what kinds of motivational strategies to use, and how to design them into a lesson or course' (Keller, 1987). According to Keller (1987), the model is developed based on four different components: the first is obtaining and sustaining learners' attention, the second is the relevance of the material with learners' past experience or academic requirements, the third is the learners' confidence to accomplish the learning goals and the fourth focuses on learners' satisfactory feeling in relation to their effort. Keller (1987) asserts that if the first three components are met, learners' overall satisfaction will be improved accordingly. The Instructional Materials Motivation Survey (IMMS) was designed to assess whether the instructional material is consistent with the above-mentioned components and examine students' motivation level.

In the research field of digital gamification, Kaneko *et al.* (2018) reported a comparison of experiential learning using game-based educational material and non-experiential learning using e-learning-based educational material. From the perspective of learning motivation based on the ARCS model, they discovered a significant difference in attention, relevance, and satisfaction. Their results indicate that the scores of the game-based material in attention, relevance and satisfaction were significantly higher than those of e-learning. However, they found no significant difference between the game and e-learning in confidence scores.

When comparing a simulation and video game in accounting education, Carenys *et al.* (2016) demonstrated that participants generally feel more satisfaction and engagement when playing the video game compared to the simulation. They were also more interested about the topic when playing the video game. Pertaining to confidence, they felt that the rules of the video game were easier to follow than those of the simulation.

Woo (2014) explored the effectiveness an online game known as 'Operating a Small Factory in Computer-Aided Manufacturing' to support learning motivation using ARCS model. The students' responses indicate that the highest mean (6.37) was of the relevance subscale and the lowest mean (5.77) was of the attention subscale. The means of the confidence and satisfaction subscales were 5.90 and 6.05 respectively. The mean of overall learning motivation was 6.02, implying that the game stimulated learners' learning motivation. He also concluded that even though certain game characteristics can attract learners' attention, such as fun, fantasy and curiosity, they are not necessarily relevant to learning.

To assess the effectiveness of digital games in learning mathematics, Hung *et al.* (2014) discovered that the students in the gamified learning group displayed significantly higher learning motivation when compared to those in the traditional instruction group. Based on the experimental results and the students' interview feedback, they concluded that the use of digital games was able to attract students' attention and engage them in learning mathematics. This could be the reason why the students in the gamified learning group outperformed others in mathematics significantly.

In contrast, Hanus and Fox (2015) found that some common mechanics used in the gamified course, such as leaderboards, badges and competition mechanics could harm students' motivation. Students in the gamified course showed less motivation overtime and in turn earned lower exam scores than those in the non-gamified course. Their results imply that some concern should be taken into account when employing certain gamification mechanics in education.

DATA AND METHODOLOGY

To evaluate students motivation level in a physical game setting, the AOTB board game was experimented in a financial accounting course, namely, Financial Accounting 2 (FAR160) offered at Universiti Teknologi MARA, Pahang branch. The experiment was conducted for two weeks during class hours (three hours per week) during the academic session of March to July 2018. The participants consisted of 51 students who were in their second semester of Diploma in Accountancy programme.

Before the game activity began, the students were first introduced with the main concepts of AOTB board game. The board game used is an advanced level and specially design to facilitate students to learn the topic of Published Financial Statements, that is the last topic taught in FAR160 course. The board game comprises the template and items of published financial statements' in the form of small cards. The items are colour coded to imply the double-entry rule to be used in the preparation of the financial statements. The yellow colour represents 'debit' and pink colour stands for 'credit'. Then, the students were split into groups of four or five students. Each group was guided by a facilitator who was in charge of monitoring the group's activities. The facilitators consisted of the researchers and students who were previously trained by the researchers.

Each student in the group had to take turn to construct the published financial statements by placing the cards on the template appropriately. The hilarious penalty cards were also provided to create elements of fun in the game. Any students who failed to arrange the card correctly were

given penalties. The penalties were also intended to encourage students competing with each other and educate them to learn from their mistakes. The mistakes were corrected immediately and learned by other students in the group as well. The winner of the game is the one who obtained the least number of penalties at the end of the game.

After a two-week period, students were given a test on the published financial statements to assess their understanding on the topic learnt through the board game. In addition, the modified IMMS were also distributed to all 51 students. However, only 50 questionnaires were returned. We used the IMMS questionnaires derived from the ARCS model (Keller, 1987). The IMMS consists of 36 questions and four subscales. The four subscales are attention (12 items), relevance (nine items), confidence (nine items) and satisfaction (six items). The students were required to rate all items on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). There are ten reverse items in the IMMS instruments (e.g. item 8 of the attention subscale). For the reverse items, the lower score the students give to the reverse item represents higher students' motivational score. The scores of the reverse items should be manually reversed when using this instrument.

To accommodate the gamification setting, some expressions and words were changed in the IMMS questionnaires. The first part contained some general demographic questions, such as gender and previous semester's Grade Point Average (GPA). In the second part, the 36 IMMS survey questions were raised. The third part comprised one open-ended question for students to make further comments and recommendations.

A scale reliability test was performed to evaluate the IMMS result. Subsequently, some basic statistics about motivation level were analysed. An independent t-test and an ANOVA test were conducted to examine whether there was any difference in different student groups' motivation levels.

RESULTS

Scale reliability

The overall reliability of all the scales on standardised Cronbach Alpha was 0.94 ($n = 50$ on 36 items), hence the instrument is appropriate for use in this study (Field, 2009; Hair, 2006). See Table 1 for the tabulated information.

Table 1: Reliability of the IMMS Result

Scale	Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items	N
Attention	0.83	0.84	12	50
Relevance	0.82	0.82	9	50
Confidence	0.76	0.77	9	50
Satisfaction	0.89	0.90	6	50
Total Scale	0.94	0.94	36	50

Students' motivation level

Among all of the 50 respondents, the minimum overall motivation level was 2.11, while the maximum overall motivation level was 4.92. The mean overall motivation level score was 3.63, which was rather positive. Around nine (18%) of the 50 respondents had high motivation level, 26 (52%) had upper-moderate motivation level, 11 (22%) had moderate motivation level and 4 (8%) had low motivation level. The result demonstrated that students were mostly satisfied with the game, with 18% of the respondents had high motivation level and 52% had upper-moderate motivation level. There were also differences among students' motivation level, as the minimum mean score for overall satisfaction was 2.11 and the maximum mean score was 4.92. See Table 2 and Table 3 for the tabulated information.

Table 2: Motivation Level Scores (N = 50)

Item	Minimum	Maximum	Mean
Attention (12 items)	1.58	5	3.68
Relevance (nine items)	2	5	3.81
Confidence (nine items)	1.67	4.67	3.14
Satisfaction (six items)	2	5	3.97
Overall (36 items)	2.11	4.92	3.63

Table 3: Range of Motivation Level

Motivation Level	Scores	Total N=50	Percentage
High level	4.00 – 5.00	9	18%
Upper-moderate level	3.50 – 3.99	26	52%
Moderate level	3.00 – 3.49	11	22%
Low level	<3.00	4	8%

Comparison of different student groups' motivation level

Table 4 shows the demographic data of 50 respondents of this study. There were 16 male and 34 female respondents who were in their second semester of Diploma in Accountancy programme. Among them, 19 respondents had previous semester's Grade Point Averages (GPAs) of 3.50 – 4.00, 16 respondents had previous GPAs of 3.00 – 3.49 and 15 respondents had previous GPAs below 3.00.

Table 4: Demographic Data and Test Scores

Characteristics	Respondents	Percentage
Males	16	32%
Females	34	68%
Previous GPA		
3.50 – 4.00	19	38%
3.00 – 3.49	16	32%
<3.00	15	30%
Test Scores		
90 – 100 marks	20	40%
80 – 89 marks	16	32%
< 80 marks	14	28%

To determine if there was any difference in the motivation levels among different student groups, a comparison on different gender groups' motivation level was conducted. An independent *t*-test was conducted to compare motivation levels of the male group (N = 16) and female group (N = 34). The result showed that there was no significant difference in scores for the two groups ($p = 0.85$, two-tailed).

An ANOVA test was performed to compare the motivation levels of three student groups based on their previous semester's GPAs. The students were divided into three groups: Group 1 consisted of students with previous GPAs from 3.50 – 4.00 (N = 19), Group 2 consisted of those with previous GPAs from 3.00 – 3.49 (N = 16) and Group 3 consisted of those with GPAs below 3 (N = 15). The result showed that there was no significant difference among the three groups ($p = 0.29$).

The ANOVA test was also conducted to identify whether there was any difference in the motivation levels among three student groups based on their test scores. The students were divided into three groups: Group 1 consisted of students with the test scores from 90 to 100 marks (N = 20), Group 2 comprised those with the test scores from 80 to 89 marks (N = 16) and Group 3 consisted of those who scored below 80 marks (N = 14). The result revealed no significant difference among the three groups ($p = 0.85$).

Furthermore, a comparison of students' motivational scores for each single item of IMMS was performed. According to the ANOVA test results, there were significant differences on the scores of item 1 'It is clear to me that the content of the game is related to things I already know' of the relevance dimension. There were significant differences at the $p < 0.05$ level for the three groups divided according to their test scores. The results indicated that the mean score for group '90 – 100 marks' ($M = 3.85$, $SD = 0.81$) was significantly different from group '< 80 marks' ($M = 3.14$, $SD = 0.87$). The mean score for group '80 – 89 marks' ($M = 3.88$, $SD = 0.81$) was also significantly different from group '< 80 marks' ($M = 3.14$, $SD = 0.87$). The mean score for group '90 – 100 marks' did not differ significantly from group '80 – 89 marks'. The results suggested that the students who scored below 80 marks thought the game was less relevant to what they already knew or learned before. This could be the reason that hinders them from getting higher test results.

Further analysis of students' motivation level

In this section, students' motivation level was analysed based on four subscales, namely attention, relevance, confidence and satisfaction. As above-mentioned, each scale has some reverse items. For the reverse items, the lower score represents higher students' motivational score. To make it easier to interpret, we have reversed the score manually. See Table 5 for the tabulated information.

In the attention subscale, the total mean score was 3.68 and the highest score was item 2 ($M = 4.16$) and the lowest score was item 4 ($M = 2.80$). According to the results, students mostly thought that the game was eye-catching ($M = 4.16$). However, the game was not able to keep students' attention as the content was so abstract ($M = 2.80$).

In the relevance subscale, the total mean score was 3.81. The highest score was item 7 ($M = 4.02$) and the lowest score was item 8 ($M = 3.38$). The results suggested that students thought the game was quite relevant to their interest or needs.

In the confidence subscale, the total mean score was 3.14. The highest score was item 9 ($M = 3.72$) and the lowest score was item 4 ($M = 2.46$).

It indicated that even though students might not be quite confident when playing the game as it had so much information, but the good organisation of the game helped them to grow their confidence positively.

In the satisfaction subscale, the total mean score was 3.97. The highest score was item 5 ($M = 4.24$) and the lowest score was item 3 ($M = 3.70$). It showed that the students were overall satisfied with the game and their feeling of satisfaction would be very high if they could complete the whole game successfully.

Table 5: Students' Motivation Level from Four Dimensions

Attention	Mean
Q1. There was something interesting at the beginning of the game that got my attention.	3.94
Q2. The design of the game is eye-catching.	4.16
Q3. The quality of writing in the game helped to hold my attention.	3.96
Q4. The content of the game is so abstract that it was hard to keep my attention on it. (Reverse)	2.80
Q5. The design of the game looks dry and unappealing. (Reverse)	3.54
Q6. The way the information is arranged in the game helped keep my attention.	3.76
Q7. The game has things that stimulated my curiosity.	3.70
Q8. The amount of repetition in the game caused me to get bored sometimes. (Reverse)	3.24
Q9. I learned some things that were surprising or unexpected with the game.	3.94
Q10. The variety of reading passages, activities, illustration, etc., helped keep my attention on the game.	3.74
Q11. The style of writing in the game is boring. (Reverse)	3.76
Q12. There are so many words used in the game that is irritating. (Reverse)	3.66
Relevance	Mean
Q1. It is clear to me how the content of the game is related to things I already know.	3.66

Q2. There were examples that showed me how the game could be important to some people in the learning setting.	3.96
Q3. Completing activities in the game successfully was important to me.	3.96
Q4. The content of the game is relevant to my interests.	3.68
Q5. There are explanations or examples of how people use the knowledge in the game.	3.84
Q6. The content and style of writing in the game convey the impression that its content is worth knowing.	3.80
Q7. The game was not relevant to my needs because I already knew most of it. (Reverse)	4.02
Q8. I could relate the content of the game to things I have seen, done, or thought about in my own life.	3.38
Q9. The content in the gamewill be useful to me.	3.96
Confidence	Mean
Q1. When I first looked at the game, I had the impression that it would be easy for me.	2.98
Q2. The game was more difficult to understand than I would like for it to be. (Reverse)	2.52
Q3. After knowing the introductory information, I felt confident that I knew what I was supposed to learn from the game.	3.64
Q4. The game had so much information that it was hard to pick out and remember the important points. (Reverse)	2.46
Q5. As I worked on the game, I was confident that I could learn the content.	3.58
Q6. The activities in the game were too difficult. (Reverse)	3.36
Q7. After working on the game for a while, I was confident that I would be able to pass a test on the content.	3.26
Q8. I could not really understand quite a bit of the material in the game. (Reverse)	2.74
Q9. The good organisation of the content in the game helped me be confident that I would learn this material.	3.72
Satisfaction	Mean
Q1. Completing the exercises in the game gave me a satisfying feeling of accomplishment.	4.08
Q2. I enjoyed the game so much that I would like to know more about this topic.	3.82

Q3. I really enjoyed learning with the game.	3.70
Q4. The wording of feedback after the exercises, or of other comments in the game, helped me feel rewarded for my effort.	3.78
Q5. It felt good to successfully complete the game.	4.24
Q6. It was a pleasure to work on such a well-designed game.	4.22

DISCUSSION AND CONCLUSION

Based on the responses from 50 students, their average motivation level was 3.63. The positive motivation levels revealed that average students were satisfied with the AOTB board game. Item 5 of the satisfaction dimension ‘it felt good to successfully complete the game’ achieved the highest mean score of 4.24. This indicated that average students would feel highly satisfied if they could successfully complete the game. However, item 4 of confidence dimension ‘the game had so much information that it was hard to pick out and remember the important points’ received the lowest mean score of 2.46. Moreover, it cannot be disregarded that item 2 of confidence dimension ‘the game was more difficult to understand than I would like for it to be’ obtained the second lowest mean score. This implied that students felt less confident to learn about the published financial statements through this game since it had too much information and difficult to understand. Due to the complexity of this topic, it might be a huge challenge for the authors to provide uncomplicated or minimal information for this game. As mentioned above, the game was designed to meet the requirements of Financial Accounting 2 (FAR160) course where students were required to prepare a full set of published financial statements.

It is suggested that the board game is developed in a few sets based on different levels of difficulty. For example, set 1 is for low level of difficulty, set 2 is for moderate level and set 3 is for high level of difficulty. Extra items or information can be added as the level of difficulty increases. The facilitators may also consider presenting a demonstration of the game in order to show how the game is worked out. The demonstration of the game may help the students to understand the game better.

According to the independent *t*-test result, there was no significant difference among male and female groups' motivation level. Regarding the ANOVA test results, there was also no significant difference in the motivation level among different student groups divided based on their previous GPA and test scores. When a comparison of students' motivational scores for each single item of IMMS was performed, the ANOVA test results indicated significant differences on the scores of item 1 'It is clear to me that the content of the game is related to things I already know' of the relevance dimension among the three groups of students divided according to their test scores. The results suggested that the students who scored below 80 marks found the game was less relevant to what they already knew, compared to the students who scored higher marks. This might be the factor that hinders them from getting higher test scores.

The practical implication drawn from this study is that accounting educators can find support for adopting a gamification technique in delivering their courses. Accounting educators considering this technique may find guidance from this study regarding what they may expect from the use of physical games, such as board games as a supplementary teaching tool. Particularly, educators delivering accounting courses may find the inclusion of board games useful in enhancing students' learning motivation and coping with students who are diverse in terms of their gender, prior academic achievement and motivation.

Despite these contributions, this study has some limitations. The generalisability of the results is subject to a small sample size. Hence, future studies with a larger scale of investigations could be conducted. In addition, this study has focussed on investigating the differences in the motivation levels among different student groups according to their gender, prior academic achievement and test results. However, it is reasonable to suggest that other variables such as students' learning styles and personalities are also likely to have significant effects on students' motivation in a gamification setting.

ACKNOWLEDGEMENT

This work was supported in part by IRMI under Grant Nos. 600-IRMI/DANA 5/3/ARAS (0158/2016), 600-IRMI/DANA 5/3/ARAS (0041/2016).

REFERENCES

- Al-Azawi, R., Al-Faliti, F., & Al-Blushi, M. (2016). Educational gamification vs. game based learning: Comparative study. *International Journal of Innovation, Management and Technology*, 7(4), 132-136.
- Buckley, P., & Doyle, E. (2016). Gamification and student motivation. *Interactive Learning Environments*, 24(6), 1162-1175. DOI: 10.1080/10494820.2014.964263
- Carenys, J., Moya, S., Perramon, J. (2016). Is it worth it to consider video games in accounting education? A comparison of a simulation and a video game in attributes, motivation and learning outcomes. *Revista De Contabilidad*, 20(2), 118-130. <https://doi.org/10.1016/j.rcsar.2016.07.003>
- Field, A. P. (2009). *Discovering Statistics using SPSS*. London: SAGE.
- Hair, J. F. (2006). *Multivariate Data Analysis*. Upper Saddle River, N.J: Pearson Prentice Hall.
- Hanus, M.D., & Fox, J. (2015). Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort, and academic performance. *Computers & Education*, 80, 152-161. <https://doi.org/10.1016/j.compedu.2014.08.019>
- Hung, C.M., Huang, I., & Hwang, G.J. (2014). Effects of digital game-based learning on students' self-efficacy, motivation, anxiety, and achievements in learning mathematics. *Journal of Computers in Education*, 1(2-3), 151-166. <https://doi.org/10.1007/s40692-014-0008-8>
- Jaijairam, P. (2012). Engaging accounting students: how to teach principles of accounting in creative and exciting ways. *American Journal of Business Education*, 5(1), 75-78.
- Kaneko, K., Saito, Y., Nohara, Y., Kudo, E., & Yamada, M. (2018). Does physical activity enhance learning performance?: Learning effectiveness

- of game-based experiential learning for university library instruction. *The Journal of Academic Librarianship*, 44(5), 569-58. DOI: 10.1016/j.acalib.2018.06.002.
- Keller, J.M. (1987). Strategies for stimulation the motivation to learn. *Performance and Instruction*, 26(8), 1-7. <https://doi.org/10.1002/pfi.4160260802>
- Lepper, M.R. (1988). Motivational considerations in the study of instruction. *Cognition and Instruction*, 5(4), 289-309. DOI: 10.1207/s1532690xci0504_3
- Liu, E.Z.F. & Chen, P.K. (2013). The effect of game-based learning on students' learning performance in Science learning – a case of “conveyance go”. *Procedia – Social and Behavioral Sciences*, 103, 1044-1051. <https://doi.org/10.1016/j.sbspro.2013.10.430>
- Liu, T. Y., & Chu, Y. L. (2010). Using ubiquitous games in an English listening and speaking course: Impact on learning outcomes and motivation. *Computers & Education*, 55(2), 630-643. <https://doi.org/10.1016/j.compedu.2010.02.023>
- Maehr, M.L., & Meyer, H.A. (1997). Understanding motivation and schooling: Where we've been, where we are and where we need to go. *Educational Psychology Review*, 9(4), 371-409. <http://dx.doi.org/10.1023/A:1024750807365>
- Moncada, S.M. & Moncada T.P. (2014). Gamification of learning in accounting education. *Journal of Higher Education Theory and Practice*, 14(3), 9-19.
- Nah, F.F., Telaprolu, V.R., & Rallapali, S. (2013). Gamification of education using computer games background. In Yamamoto, Sakae (Ed.), *Human Interface and the Management of Information*. Berlin Heidelberg:Springer-Verlag. DOI: 10.1007/978-3-642-39226-9
- Purnamasari, V., & Advensia, A. (2014). Factor influencing of usage accounting game: Study of learning by game and theory acceptance model. *International Journal of Business, Economics and Law*, 5(1), 18-27.

- Taspinar, B., Schmidt, W., & Schuhbauer, H. (2016). Gamification in education: A board game approach to knowledge acquisition. *Procedia Computer Science*, 99, 101-116. <https://doi.org/10.1016/j.procs.2016.09.104>
- Tohidi, H., & Jabbari, M.M. (2012). The effects of motivation in education. *Procedia – Social and Behavioral Sciences*, 31, 820-824. <https://doi.org/10.1016/j.sbspro.2011.12.148>
- Woo, J.C. (2014). Digital game-based learning supports student motivation, cognitive success, and performance outcomes. *Educational Technology & Society*, 17(3), 291–307.