

Smart Costing Kit: Game Based Learning for Cost and Management Accounting

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ABSTRACT

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Cost and management accounting courses are incorporated in the accounting syllabus for both accounting and non-accounting students. One of the challenges in teaching cost and management accounting to the non-accounting students is the general fear of accounting subject. Notwithstanding, most of the students still viewed accounting as an interesting subject. Hence, the learning problem faced by students needs to be addressed in a fun yet beneficial way. As such, the objective of this study is to assess the effectiveness of using the "Smart Costing Game" as a learning method to overcome this problem. The Smart Costing Game Kit was developed as a learning tool to enable students to correctly classify costs according to certain criteria and subsequently used the cost figures to compute total costs, profit and selling price. Four business settings are chosen consisting of bakery, restaurant, laundry and clinic. At the end of the game activities, the students are required to complete an online survey. Results from the survey demonstrated that the majority of the students agreed that the games were found to be more effective, motivating and engaging than traditional teaching. This implies that students have strong preferences in the use of educational games that added value to the costing subject. These results support the inclusion of Smart Costing Game as a successful learning strategy in cost and management accounting courses for the non-accounting students.

Keywords: *cost accounting; costs classification; cost determination; education games; learning methodology.*

1. INTRODUCTION

Game-based learning has been acknowledged as an effective tool to enhance the teaching and learning process in academic institutions [1]. While game-based learning is widely adopted in courses such as language and business courses, limited evidence supports the usefulness of using games in learning accounting courses. Prior studies suggest that the use of games in the teaching and learning process for accounting courses are beneficial due to motivational factors to maintain student's interest in the course consistently [2]. More recently, Smalt [3] who examines the usefulness of using accounting games as specialized teaching devices, found that accounting games were effective in improving student performance as measured by improvement in their examination scores. Similarly, Fratto [4] found that technological tools enable students to become active participants and can improve student learning by giving students convenient access to review material with immediate feedback.

In Universiti Teknologi MARA, cost and management accounting course is incorporated in the accounting syllabus for both accounting and non-accounting students. One of the challenges in teaching cost accounting to the non-accounting students is the general fear of accounting subject even though most of the students viewed accounting as an interesting subject. Hence, the learning problem faced by students needs to be addressed in a fun yet beneficial way. Lázaro [5] stated that proper learning from the very beginning of basic accounting concepts and terminology and their relationship is critical for students. They suggested that the students must master the mechanisms of accounting to be able to fully understand the principles and measurement standards behind the transaction encompassing the framework of the discipline. Thus, students will acquire the tools needed to build their knowledge in a critical way, and not just struggle with the double-entry method as often happens, even with students taking advanced courses in Financial Accounting. Despite the potential benefits of the use of games in teaching and learning accounting courses, the application of game-based learning for cost and management accounting is still limited [6].

In response to this problem, the researchers have invented the “Smart Costing Game” for the purpose of teaching and learning Cost and Management Accounting course. This invention is targeted particularly to the non-accounting students who study cost and management accounting course during their study program. The invention utilizes a game-based approach developed specifically for Cost and Management Accounting course which aims at introducing the basic elements of costs through a game of cost classification and preparation of cost statement.

The expected benefits of the game are threefold: (1) It provides opportunity for students to be familiar with cost accounting terms and terminology through games, (2) students will have a better understanding on how to classify costs, and finally, (3) students will be able to compute costs, profit and selling price more accurately. Notwithstanding the anticipated benefits of the game, the value derived from the game needs to be assessed by examining the effectiveness of using the game in the teaching and learning process. Therefore, the aim of this study is to evaluate the effectiveness of using a game-based approach in teaching Cost and Management Accounting for non-accounting students. In particular, the benefits of the game in terms of usefulness, ease of use and learning opportunities are examined.

The remainder of this paper is structured as follows: Section “Literature review” discusses the studies on game-based teaching and learning, game in accounting education and background of Smart Costing Game. The next section is “Methodology” which explains both the simulation and the game employed together with the data and methodology and followed by the “Finding” section, which presents our results and includes the discussion. Finally, in the “Conclusion” section, we summarized our conclusion.

2. LITERATURE REVIEW

2.1 Game-based Teaching and Learning

A well-designed game engages players in some type of figurative challenge. This means that it should incorporate a guideline on how to play the game, enable the students to cooperate with each other and provides feedback to enumerate the outcomes of the game activities. Ramli [7] proposed that the game designer must understand their target player to design a game. Adding animations on the game interface also lends excitement to the game and is non-

intrusive to the game. It makes the game more memorable for the players. This is consistent with Prensky [8] who had suggested some of the important characteristic associated with gameplay which includes providing motivation and structure through rules and goals, engaging the learner through interactivity, promoting creativity by imposing competition and challenging problem solving, eliciting pleasure during the play process and enhancing self-esteem by encouraging winning.

2.2 Game in Accounting Education

According to Howieson [9] in too many aspects, accounting education is being delivered the same way today as it was 20 or 30 years ago. In addition, despite actual and predicted changes in business practice, accounting is still largely taught within the long-established format of lectures, tutorials and workshops and from the perspective as if it consists of nothing more than a series of discrete independent topics relating to technical matters, usually entirely divorced from other related disciplines, see [10].

This is also consistent with Low [11] who stated that accounting course in the past have been too technical focused with accounting graduates admitting that most of their group work assignment and soft skills learned at university were from non-accounting courses. The students also mentioned that accounting education being too textbook-based. However, due to advancements in technology and expansive changes in accounting regulation during the late 1980s, it had spawned a demand for change in accounting education, see [6]. The development of a variety of games based activities has been introduced in accounting education which can be summarized in the following table, see [6].

Table 1. The Development of a variety of Games in Accounting Education

Researchers	Games
Knechel (1989) – Financial accounting practice set. Albrecht (1995) – Financial accounting and investments. Tanner & Lindquist (1998) – Principles of financial accounting. Layman (2003) – Principles of financial accounting. Ulstad (2005) – Principles of financial accounting.	Monopoly™
Cook (1997) – Revenue Reconciliation Act of 1993 for tax. Seda (2003) – Financial accounting and tax. Bee & Hayes (2005) – Accounting information systems. Murphy (2005) – Governmental accounting. Moncada & Seda (2010) – Principles of accounting and accounting systems.	Jeopardy®
Haywood, McMullin & Wygal (2004) – Professional and ethical reporting.	Bingo
Gupta, Elson, & Ostapski (2006) – Principles of accounting crossword puzzles. Moncada (2010) – Computer fraud word search in accounting information systems. Elson, Ostapski, O’Callaghan, & Walker (2011) – Governmental/nonprofit accounting crossword puzzles.	Puzzles
Fratto (2011) – Managerial accounting.	Twenty-Questions
Pillsbury (1993) – Auditing softball game for internal controls. Busta & Kimmel (1993) – Impact of information on the stock market in intermediate accounting. Hoffjan (2005) – Calvados cost accounting simulation. Nitkin (2011) – Principles of financial accounting “Game of Business” based on the Hasbro’s Game of LIFETM.	Other

Source: Moncada & Moncada [6].”

Based on the above literature, it is depicted that numerous games invented emphasize on financial accounting courses and management decision-making games in business school such as cash management, inventory management and cash budgeting see [6]. This result may be due to the incorporation of basic financial accounting and management decision-making course in curriculum design for programmes in many universities worldwide.

Williams [12] suggested the change that must take place in accounting instruction where he depicted that students should be taught to identify and solve unstructured problems, learn by doing, work in groups, and learn to use technology effectively, such as databases for researching issues. Their learning should focus on skills as well as knowledge and most importantly, students should develop good communication and interpersonal skills. In addition, their ethical and professional values should be enhanced.

On the other hand, Brophy [13] stated that in education, motivation is considered a key determinant of learning and is used to explain the attention and efforts students dedicate to learning activities. This is also supported with a research done by Buckley & Doyle [14] who asserted that teachers or lecturers must manage learner motivation, where the objective is to increase motivations levels with a view to engender positive outcomes, such as increased effort and persistence and enhanced student performance. In the extant literature, Lázaro [5] puts forward that lecturers must strive to build intrinsic motivation in their students by stimulating them to be interested in the activity leading to learning. They contended that games are highly attractive activities to students and the students will boost their motivation towards learning the subject. However, little is known about the game in basic cost and management accounting field.

In this context, basic cost and management accounting field of study usually covers the basic cost elements and terminology such as material, labour and expenses, cost accounting system and decision making, see [15], [16], [17], [18]. There are not many changes in how cost should be computed as compared to changes in the standard for financial accounting and reporting. Therefore, there are many educators who applied the same teaching method over the years. Usually, they will use the traditional teaching system, such as the use of memorization as a way to evaluate a student's success in their studies, see [11]. Therefore, in order to fill the gap of knowledge and the need for changes, the Smart Costing Game was developed to help the students learning in a more creative and attractive way in the teaching of basic cost and management accounting.

3. SMART COSTING GAME

The objective of this game is to enable students to correctly classify costs according to certain criteria and subsequently use the cost figures to compute total costs, profit and selling price. A complete game kit consists of four (4) sets of laminated A3 size game materials. The four sets relate to four distinct business settings consisting of manufacturing, restaurant, laundry and clinic.

The materials include an introduction to the game, rules and regulations, pictures depicting the business setting, and answer sheets. The answer sheets are subdivided into folders of cost classification and a final Cost Statement page. A scoring sheet is also added to the kit. A total of 6 sessions have been held with the students of two faculties at the Universiti Teknologi MARA Kampus Seremban, namely the Faculty of Computer and Mathematical Sciences and

the Faculty of Administrative Science and Policy Studies. Each session lasted 40 minutes. During each session, the following procedures are followed, as shown in Figure 1:

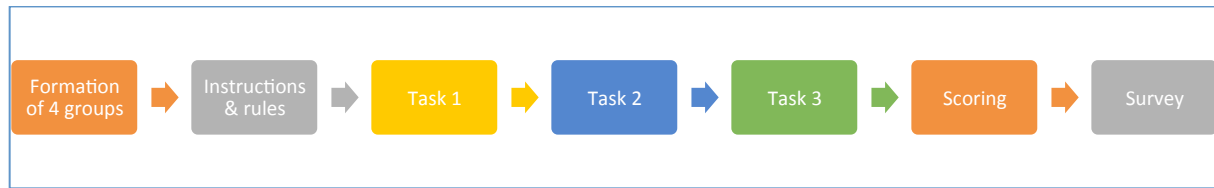


Figure 1. Smart Costing Game Process

As shown in Figure 1, the process of the game is divided into the following sequence;

1. Each class of students are divided into four groups. This will involve between five to seven members in a group.
2. The instructor distributes the game sets to each group and delivers a briefing of game introduction and instructions to follow.
3. The students are allocated 40 -45 minutes each to complete three tasks:
 - a. Task 1 – Each group/individual must read the task and observe the items available in each business setting (pictures). In each business, there are about 15 to 25 items (pictures) that represent various types of costs. Each group/individual must find those pictures. Then, classify it according to the appropriate classification of cost by placing each picture in the relevant cost folder (task one).
 - b. Task 2 – Each group/ individual must prepare a cost statement with an appropriate title and sub-heading. The sub-headings are direct material, direct labour, production overheads and non-production overheads.
 - c. Task 3 – Each group/ individual is required to calculate total selling price and profit for the business
4. At the end of the session, the answer sheets are collected and scoring is done accordingly.
5. Finally, the students are required to complete a survey in order to assess their response to the game via an online survey.

4. METHODOLOGY

This study utilizes the quantitative methodology to examine the effectiveness of the Smart Costing game among the targeted respondents. A replication of questionnaires in McAuley [19] was used for this study. The participants in this study were non-accounting students who enrolled in the Cost and Management Accounting course at a public university. The course is taught among students in two faculties which are the Faculty of Computer and Mathematical Sciences and the Faculty of Administrative Science and Policy Studies. While the students of the former faculty registered for the course in their fourth semester, the students in the latter faculty studied the course in their second semester.

This study used a survey method for collecting data from a total of 73 participants who took part in the Smart Costing Game. Each participant was required to answer the questions on an online survey form. The survey instrument consists of four (4) sections: section 1 – demographic; section 2 – Usefulness of the game; section 3 – Ease of use and section 4 –

Learning opportunities. In sections 2 to 4, the respondents were asked to respond by choosing the most appropriate answer to a series of questions using a Likert scale ranging from 1- Strongly Disagree to 5 – Strongly Agree. The data was then analysed using frequency statistics.

5. FINDINGS

There are 21.92% (16 out of 73 participants) of male participants who had joined this game, and the remaining participants are female (57 out of 73 participants). As shown in Figure 2, 63% of the respondents are students of the Faculty of Administrative Science and Policy Studies, while only 37% are from the Faculty of Computer and Mathematical Sciences.

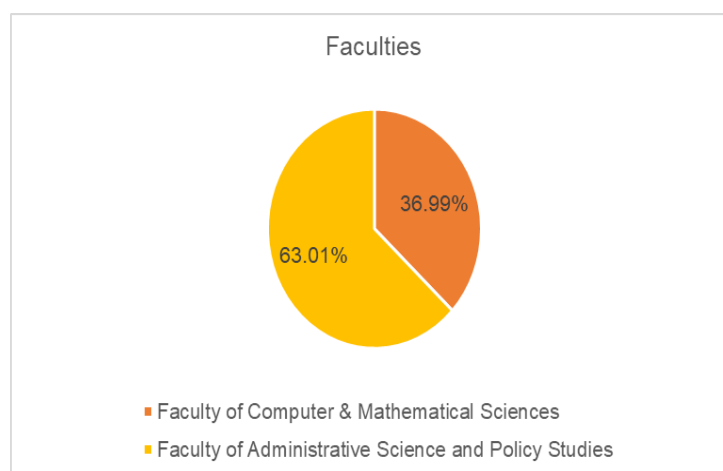


Figure 2. Distribution of respondents by faculties

Findings on how the *Smart Costing Game ease of use in classroom* revealed that nearly more than 90% of students found the costing lessons using this game are easier and interesting as they used interactive gaming education. The result showed that 64 out of 73 students had agreed and strongly agreed that by using this game it enables them to interact with subject matter clearer and more understandable. This is consistent with Ramli [7] who emphasized that students nowadays found gaming and simulations interesting. These students have a strong preference in the evolution of educational games that have helped in shaping the new ways in education. This is also supported by Carens [20] who had found that there are no significant differences in perception regarding cognitive learning outcomes between the simulation and the videogame whereby both are perceived as equally effective in terms of learning outcome.

The analysis on *the usefulness of using the Smart Costing Game* in classroom, as shown in Figure 3, revealed that 93.16% or 68 out of 73 students had agreed and strongly agreed that the game could increase their learning productivity and 94.52% or 69 out of 73 students had agreed and strongly agreed that the game improved their understanding in basic costing. On top of that, the study has shown that the game had encouraged and motivated the students to improve their performance and working ability to achieve better grades and results.

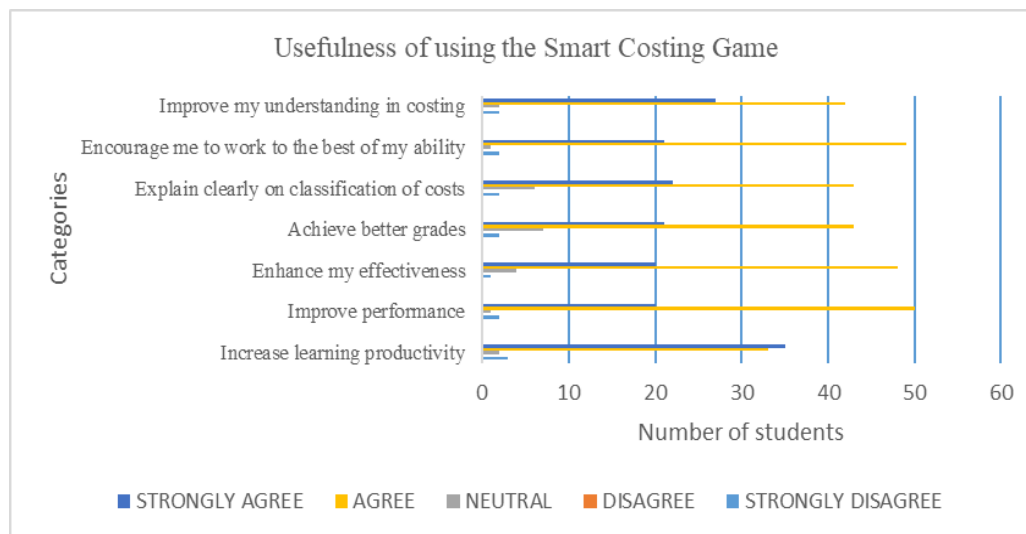


Figure 3. The usefulness of using the Smart Costing Game

Furthermore, as shown in Figure 4, 86.30% of the students found that they have increased their knowledge on classification of cost and able to prepare cost statements by using this game. The students attested that though they had learnt from the traditional educational costing method, the educational game is more effective. This is justified with the result which shows that 94.52% of the students found that the costing lesson using this game is interesting and the game had allowed them to experience things they had learnt clearly. This finding shows that this game has an added value to the costing subject. The use of this game is central to the broader area of learning together with the traditional method which has increased the educational scope. This study also shows that by implementing this game has increased the students' focus by using educational games together with traditional educational context.

The study also showed that more than 90% of educational costing games increased motivation and learning among students. Students had learnt from playing educational costing games both on specific knowledge items and in practical. The students who were taught through educational costing games found the experience motivating and want to play the educational costing game again. The study testifies that the game had increased motivation in connection with educational costing games. Thus, the game was found to be more effective and motivating than traditional teaching. This is consistent with a research done by Lázaro [5] who asserted that by playing the different games which offered progressive way of difficulty, the students will overcome the problems arising from the fragmentation of the contents and from excessive mechanization and memorization of the accounting concepts ("surface approach" to learning) and will understand their interrelationship ("deep approach" to learning). The unique concept using the real business setting in the Smart Costing Game enables the students to familiarize themselves with how to classify the cost and prepare the cost statement in an easier manner.

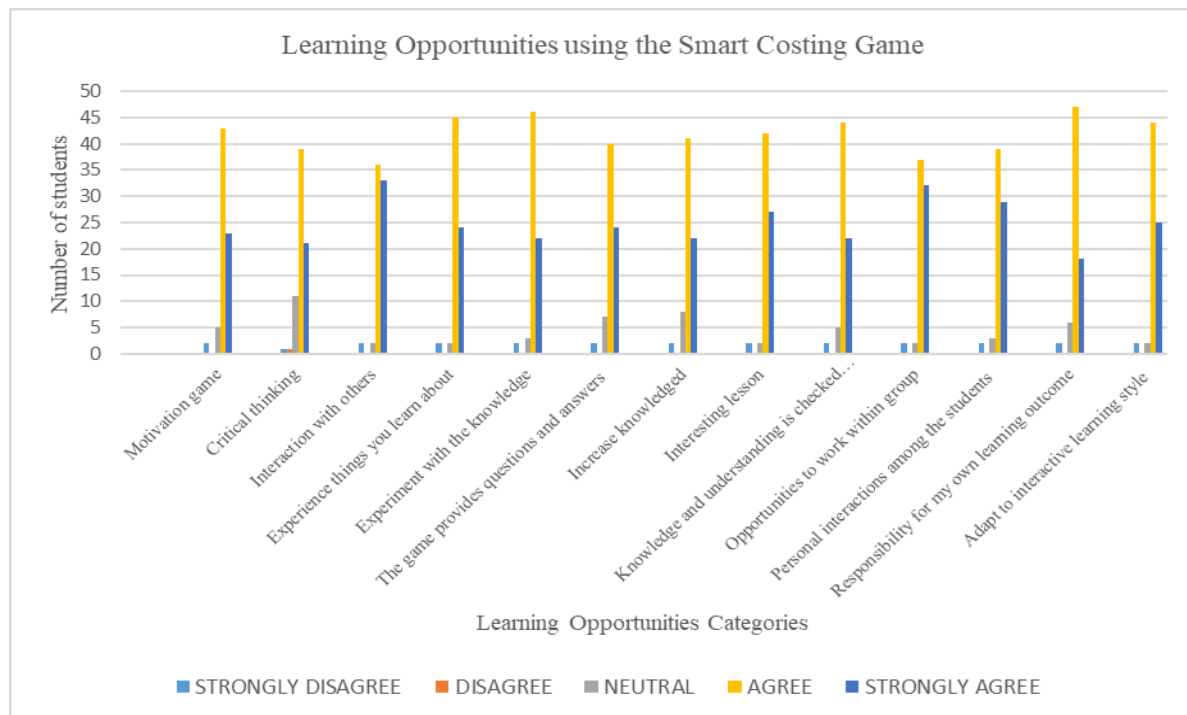


Figure 4. Learning Opportunities using the Smart Costing Game

The study also found that this educational costing game is effective for teaching specific knowledge. Students who used the costing game performed better compared to the control group. Students initially learnt the same using traditional ways but have better grades. The game has resulted in a strong retention of knowledge among the students. This is similar with a research by Rajashekar and Bellad [21] in Physiology field of study where their result of using card games verified significant improvement in the students' academic performance and their ability to analyse and retain knowledge for longer periods.

Notwithstanding the foregoing, the learning outcome is still critically affected by lecturers. Lecturers still used both traditional and costing games when conducting their lectures. However, it cannot be denied that educational costing game proves to be highly effective. As a result, this costing game was found to be motivating, engaging, and ultimately successful in teaching the non-accounting students. This game also may be suitable for teaching and learning tools strategy for approaching Cost and Management Accounting course to cater to individual differences, especially for those without basic accounting knowledge.

6. CONCLUSION

The most obvious finding that emerges from this study is that the game enables the students to go beyond a mere recollection of specific facts and to think critically, answer subjective questions, collaborate with each other and make collective decisions in studying basic Cost Accounting courses. This indicates that it is worth considering blending the traditional way of teaching and using Smart Costing Game in helping the students to learn and understand how to prepare a cost statement in easy and fun ways. Attractive visuals and picture of the game provide an opportunity for students to familiarize themselves with how to classify the cost and

prepare the cost statement in an easier manner. In addition, the unique concept of using real business settings also enhances creativity and problem-solving ability of the students. It integrates real-life situations to the problem-solving activity to which each student can easily relate.

The finding from this study also suggests that the game encourages students to experience more effective communication and analytical skills. This implies that students have strong preferences in the evolution of educational games that added value to the costing subject. These results support the inclusion of Smart Costing Game as a successful game-based strategy in teaching Cost and Management Accounting to the non-accounting students.

For future improvement, the researchers are considering making the games to be fully visualized using digital or CD to enable the students to play it via computer online or offline. On top of that, additional real business setting other than the four distinct above can be added to cater the need of different non-accounting students who enrolled in Cost and Management Accounting course such as in tourism, sport and management and others. This game also can be recommended to be used as a part of coursework activity in teaching Cost and Management Accounting course.

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