

# CREB1T: Sebuah Aplikasi Gamifikasi Untuk Sistem Akuntansi Pencatatan Ganda Berbasis Android

## *CREB1T: A Gamification of Double Entry Accounting System Based on Android Application*

**Erienika Meiling Lompoliu**

Fakultas Ekonomi dan Bisnis, Universitas Klabat

e-mail: [erienika.lompoliu@unklab.ac.id](mailto:erienika.lompoliu@unklab.ac.id)

### *Abstrak*

*Teknologi mengubah segalanya. Setiap bagian dari kehidupan kita sekarang sangat bergantung pada dan bahkan telah diubah oleh teknologi. Metode pedagogi sendiri telah cukup dipengaruhi oleh berbagai media teknologi khususnya di perguruan tinggi. Mulai dari pembelajaran komputasi yang telah mengganti metode belajar tradisional seperti belajar dan ujian membaca dan menulis contohnya penggunaan buku elektronik, video tutorial dan ujian komputer. Gamifikasi, di sisi lain, mampu meningkatkan pemahaman belajar siswa. Kegiatan membaca yang biasanya monoton menjadi pengalaman yang menyenangkan dan bukan memberi tekanan. Pembelajaran pencatatan ganda dalam akuntasi adalah salah satu topik penting yang akan terus dipakai dalam dunia nyata, namun terkadang dapat repetitif dan membosankan bagi siswa yang mengambil kelas akuntansi. Untuk membantu meringankan masalah ini, aplikasi CREBIT inipun dibuat. Dengan pendekatan gamifikasi dan dijalankan pada smartphone, dua hal yang umum oleh mahasiswa, diharapkan aplikasi ini mampu mengurangi masalah di atas. Dan oleh karena medium ini terdapat di dalam handphone mahasiswa, mereka bisa mudah untuk belajar di mana saja dan kapan saja sesuai dengan gaya belajar masing-masing.*

**Kata kunci**— akuntansi, sistem akuntansi pencatatan ganda, Android, gamifikasi, pedagogi

### *Abstract*

*All is altered by technology. Every aspect of our lives is now, in one way or another, heavily dependent on or seamlessly improved by technology. Different technology media, channels and resources, especially in the higher education, have greatly affected the method of pedagogy in recent years. First was computer-based learning, which has replaced most of the traditional way in reading, learning and test taking. This include the use of electronic books, videos and the computer-based exams. On the other hand, gamification has been able to enhance students' understanding of learning. From the usual monotonous reading to the recollection of an enjoyable game-like experience, which gives them the feeling of pleasure instead of pressure. The students undertaking accounting classes have a great deal to learn basic accounting including debit and credit principles – a double entry accouting system method, which are one of the essential and important to the skills they have in the real world, and yet they can be repetitive, boring and tearful. The CREBIT application aimed to tackle this issue by incorporating gamification approach in the lesson and deploy it on a mobile application, a platform where most millenials students are receptive with. And since it's on mobile students may able to learn it anywhere during their spare time giving them freedom to suit their study habit.*

**Keywords**— accounting, double entry accounting system, android, gamification, pedagogy

## 1. INTRODUCTION

Technology changes everything. Every aspect of our lives is now some way, or another are heavily relied on or seamlessly enhanced by technology. In recent years, pedagogical method has been greatly affected by various technology media, channels and tools, especially at the higher education level [1]. First, the computer-based learning that have replaced most of the traditional pen and paper-based way. These including computer-based test and usage of electronics books. As internet becomes more and more accessible and affordable, many universities and schools started to utilize it. Online classrooms first are very useful for long distance learning, however, due to the emergence of software as service scheme, online classroom have become essential addition to the regular classroom. Many resources such as notes, books and video recordings are now available for students via online groups giving them tremendous flexibility in learning and reviewing the materials [2] [3].

On the other hand, technology have also changed the way people study. According to several sources, gamification have changed the student perception of studying. From the typical monotonous reading and memorizing into a fun and exciting game-like experience, making them perceived as amusement instead of burden [4].

In a study by [5] shows that many students still didn't perceive mobile phone as learning tool in learning accounting. This may be related to another study by [6] shows that digital media such as learning-based games on smartphones have huge potential as educational tool however resources are scarce since suitable tools are still hard to find.

Therefore, to reduce the 'scarcity' tools, this research aimed to gives another channel to students in learning basic accounting such as debit and credit concept in bookkeeping. While it can be repetitious, tedious and wearying, yet the concept is a very important for future accountants as it serve as the fundamental knowledge that will be used all the times in the real world. The application is a mobile based application called CREB1T that aspired to teach students the concept of double-entry accounting system in the form of a handy mobile game.

## 2. RELATED TOPICS

### 2.1. Double Entry Bookkeeping

Most of businesses use double-entry accounting system to record their transactions. This system is based on the accounting equation in which assets equal to liabilities plus equity. This system helps businesses to keep track of where the money comes from and where it goes. According to double-entry system, every business transaction affect at least two accounts. So, at the minimum, there are two accounting entries should be created for each of business transactions in order to keep the company's book in balance. All the transactions will be recorded in terms of debits and credits where one shall offset the other. Therefore, the total amount debited, and the total amount credited are always equal [7].

In double-entry accounting system, there are rules of debit and credit for recording the business transactions. The rules are fundamental to the accounting system and if they are well understood, students will be able to categorize and record the transactions properly. Debit and credit basically describe the increase or decrease of an account, where the increase side of the account is called normal balance [8]. The rules of debit and credit for the accounts, as seen on Figure 1, are as follows:

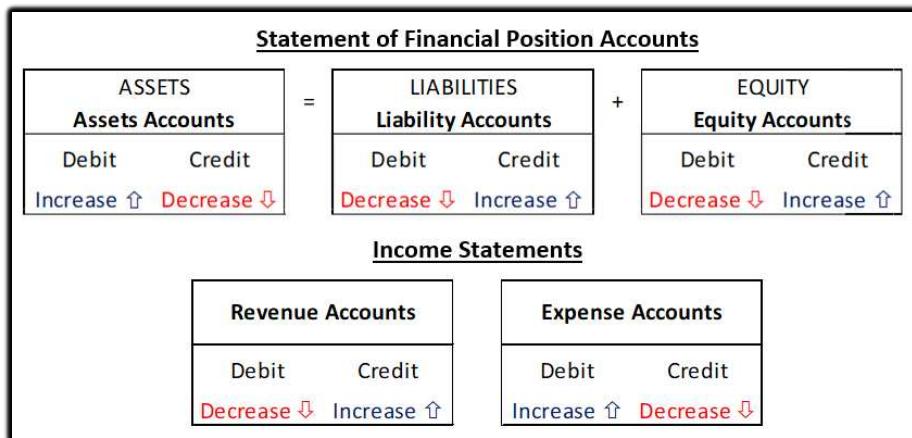


Figure 1 Rules of Debit and Credit [8]

## 2.2 Edugame

Conventional interactive games came into existence in the 70s and are targeted at children and teenagers. When video games came into existence in the 80s it has boosted the game industry into a new level beating all other entertainment industry worth [9]. Edugame, short for educational game, starting to have their audience when Apple's PowerMac and iMac entered most the entire K12 schools in the US in the early to late 90s and being used till mid of 2000 [10]. While it is not as hype as its console game counterpart, with the increasing reach of mobile devices, edugame on mobile applications were on steady growth and able to gain market for kids in kindergarten and elementary level. However, it also has small audience for the high schoolers and undergraduate level [11].

How can kids be interested into learning through this edugame? Well, the answer is due to gamification. Gamification is simply means applying game-design elements and principles in non-game context. With gamification on a lesson, the learning experience becomes more interesting and exciting as the tedious learning is overshadowed by or distracted by the more friendly game elements such as animation, sound and other game mechanics [12].

What about in accounting? A subject that is common in tertiary level and may be in higher level compared to the much more simpler topics and audience such in primary or secondary students, a research found that a non-traditional approach such as simulation and gaming both shows higher students' motivation than the conventional method [13].

## 3. RESEARCH METHOD

### 3.2 Related Studies

There are several researches that is related to this study. First was [14], where the author describes the same problem as this research. The research also integrates game element into the learning activities. Its method is a simulation based which employ boards and games as its tools. A survey is conducted at the end of the game and shows that students enjoyed and prefer that way of learning. While the purpose may be the same, our research also aimed to tackle the same problem with a different medium than traditional face-to-face gatherings that is a just require a single player and an Android mobile phone.

Another research also by [15] which also take the portability of mobile application. The application is an edugame where it teaches the user about the usage of money including currency exchange and shopping. While the game also a mobile app but it is a simple game that aimed for elementary students.

While the related studies shared similar concept, this research have also offered new ideas and features that may be usefull specifically for accounting or business major students in tertiary level.

### 3.1 Development

On this research we use the Agile method as this model has a very flexibility yet effective execution procedure in getting the most out of the app feature. This method is also widely used in developing application [16]. As seen of figure 2, the following are several steps in Agile method.

Following are details on each step:

1. First is getting requirements. It is important to have communication with the prospect user. As this project is also initiated by lecturer herself on the related field the necessary information will be gathered from the researcher herself. On this phase we will also gather the required data and resource as literature review and create the simulated questions bank. These will be placed on the backlog and will be analyze. This step will be on self-check.
2. The second step is where the researcher will define the tasks from the requirements. Once the tasks are ready then the design and coding can be started. However, unlike waterfall method, in Agile, the app is built by parts or modular based.
3. The part then is being tested to make sure it works.
4. The researcher then pickup another parts. Lastly, once all function has been tested, we can deploy that parts.
5. While Agile doesn't prioritize documentation, the researcher does documentation as it needed to be documented on this writing.

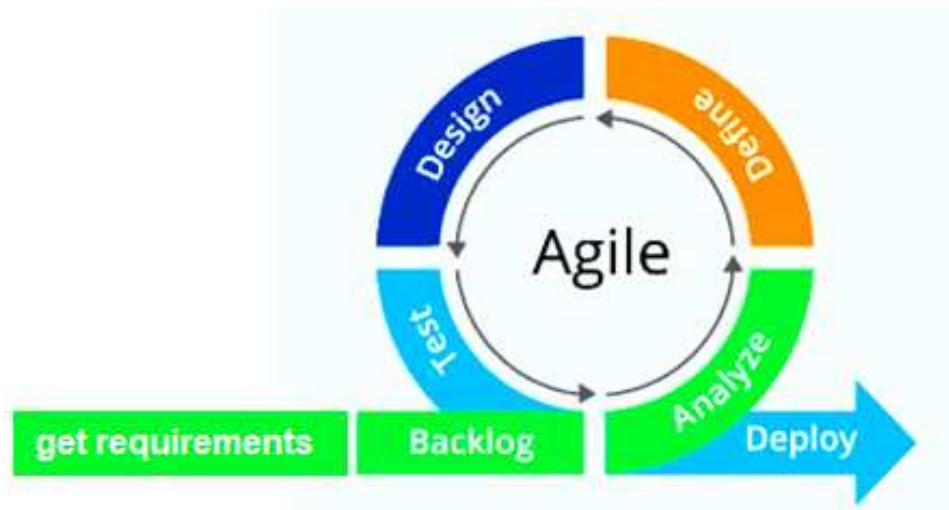


Figure 2 Agile Methodology [16]

#### 4. RESULT AND DISCUSSION

The game is a typical trivia game with focus in answering whether a transaction should be recorded in debit or credit sides on a single, double or multiple entry. The following are the full concepts and features of the application.

##### 4.1 Game Concept

The game is designed to be fun and serious at the same time. The interface and background sound may be found amusing like a typical mobile game. Nevertheless, the contents are a tertiary level standards which need to be taken seriously. Like a trivia game, the game is about answering the right question and gets points. However, there are three modes that can make the game more interesting and challenging: single account, double accounts and multiple accounts. That is one answer for single account, two answers for double accounts and up to four answers on multiple accounts. Player can check more than one mode allowing a mixed mode. Once started players will be given questions where they must choose the coin labeled “credit” or “debit” according to the questions as seen on figure 3.

Points will be given for the right answer and a warning will be given for each wrong answer along with changing expression of a comical “boss” icon from happy to angry face shown at the center top.

Game is over when player made five mistakes, that is upset the boss or once the time is up. The screen will then show player score and saved as the best score, if it is the highest score as seen on Figure 3 and on Main Menu on Figure 5.

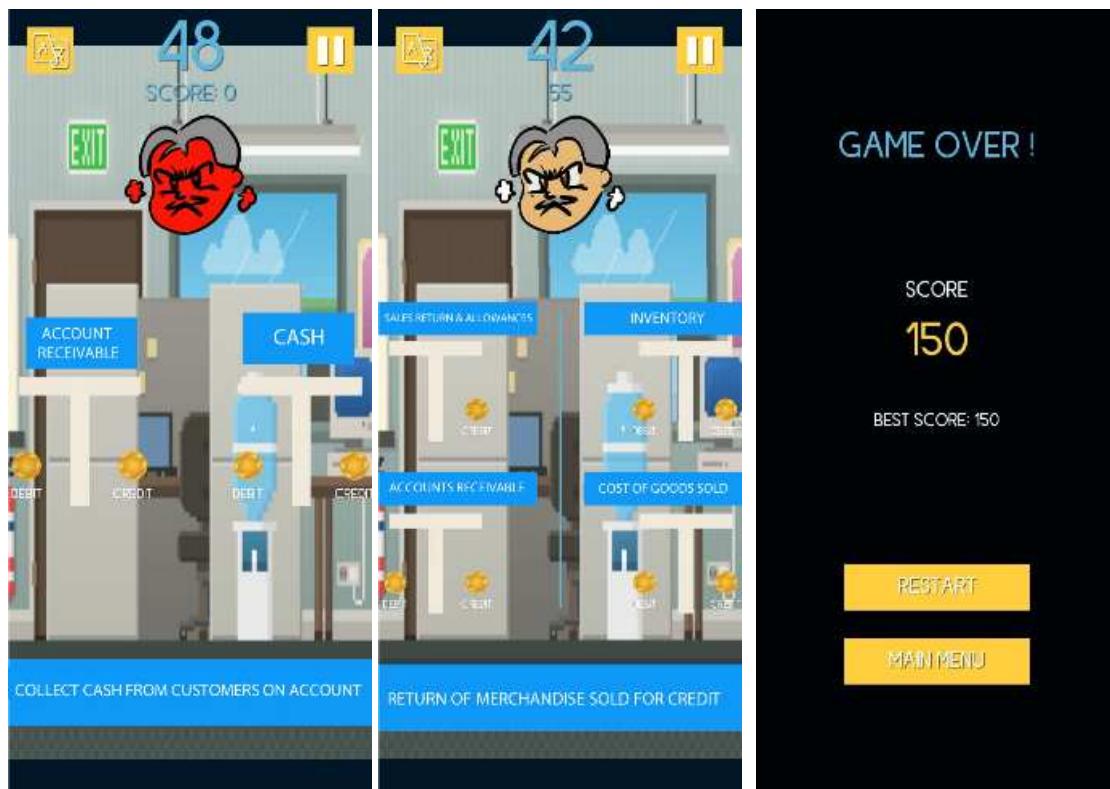


Figure 3 Double Account, Multiple Account Mode Game and Game Over Screen

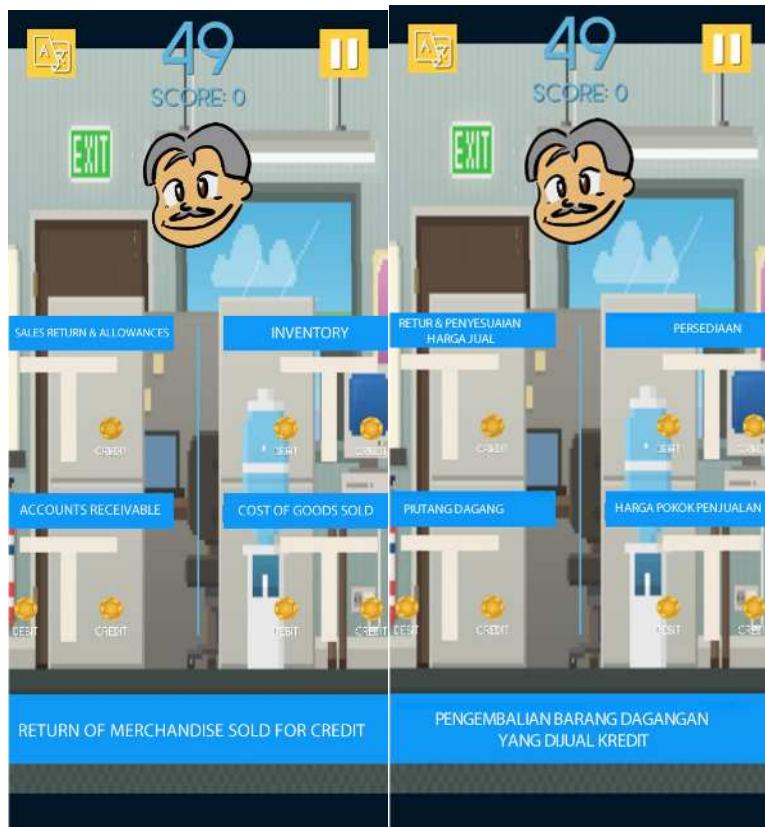


Figure 4 Dual Language Feature

#### 4.2 Game Features

##### *High Score and Time Limit*

With a high score feature player is encouraged to perform better on each play. Players could see whether they get the highest score. The highest score then will always be saved at the end of the game and shown on Main Menu (Figure 5). Each game is set to 60 seconds per game giving players limited time and pushed them to think fast to reach a better score for each play.

##### *Penalty for Wrong Answer*

While player may answer the wrong questions, but it may cost the “lives”. Currently they player is limited to five wrong attempts before it ends the game prematurely before the countdown timer goes out (Figure 3).

##### *Dual Language*

The game also provides dual language that is Bahasa Indonesia and English by clicking on the left top option and both questions and answer will be changed as seen on Figure 4.

##### *Expandable Question Bank*

There are currently 50 questions come from various case and real accounts such as account receivable, sales return and allowances, cost of good solds, inventory

and many more loaded to the questions bank. More questions and answers can be added in the future updates.

#### *Music On/Off*

The game comes with a joyful background tune (original music is used with permission) and the option to disable it.

#### *Pausable*

Player may pause the game at anytime. They then may resume, restart or go back to Main Menu.

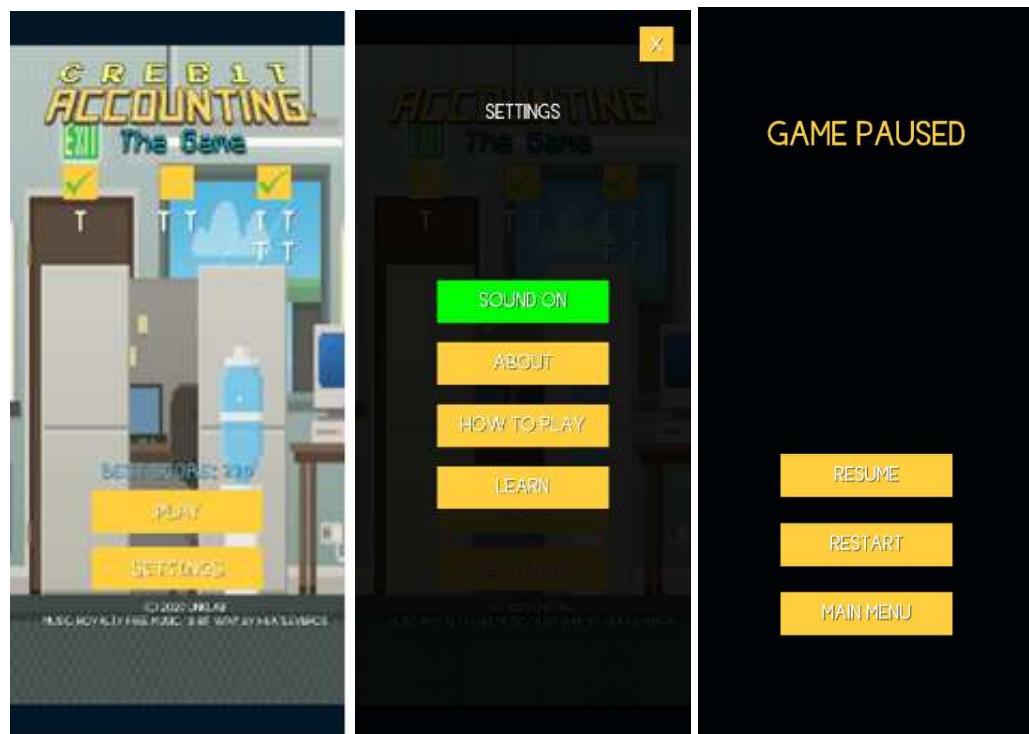


Figure 5 Main Menu, Settings and Pause

#### *4.4 Testing*

To ensure the functionality of the software a testing procedure is needed. A black box testing, a test where the structure, design, or implementation is not known to the tester, is chosen to accommodate this [17]. The testing was conducted by a third-party tester without any interference by the researcher. The results of the test can be seen on Table 1.

Table 1 Black-box Testing

No	Tested Feature	Testing Scenario	Expected Response	Result
1	Loading Menu	User can view the Main Menu and select the available	All Menus should work properly	Working. Shown on Figure 3

		menus		
2	Start Game with Different Modes	User can select one or more Game Modes	Single, Double, Multiple or Mixed Mode should selectable	Working. Shown on Figure 3 and 4
3	Correct Answer Checked	User can pick the “coins” to answer	The correct answer should give player points and wrong will change the “boss” icon	Working. Shown on Figure 4
4	High Score Shown and Saved	Score for each “session” should be shown and be compared to highest score.	If score higher than the previous highest score, current score will be the highest score	Working. Shown on Game Over screen and Main Menu Screen on Figure 3 and 4
5	Music On / Off	Some user may want to turn off the music.	On settings sound on/off toggle should able to switch the background music	Working. Menu shown on Figure 3
6	Switch Language	User wants to switch to Bahasa Indonesia or English language	On the game scene user can pick the language from the top left button	Working. Results shown on Figure 5

## 5. CONCLUSION

This research aimed to give students another way to learn a fundamental concept in a much more relaxed and enjoyable way. While there is still need more study to prove how effective this app would be in terms of its impact to students performance, yet this can serve a tool that may be used by educators in a much more “friendly” way as stated by [18] that educators resistance may be one of the inhibitor in using technology in teaching accounting.

## 6. FUTURE STUDIES

The most likely subsequent step for this study is to test and evaluate student’s response, reception as well as impact on their performance with this app and without such study may not only represent the effectiveness of the app but also how gamification, a new approach in learning, may prove to have a similar effect or even better. On top of that a study of their interest may also be added on that research to see if similar to [13] effect can be seen. Other upgrades probably adding number of questions and develop an Apple IOS version of it.

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