

# JOURNALYZ: Aplikasi Gamifikasi Simulasi Pembukuan berbasis Android

## *JOURNALYZ: An Android-Based Gamification of Bookkeeping Simulation*

**Erienika Meiling Lompoliu**

Universitas Klabat, Jln. Arnold Mononutu, Airmadidi – Minahasa Utara  
Program Studi Manajemen Fakultas Ekonomi dan Bisnis, Universitas Klabat  
e-mail: [erienika.lompoliu@unklab.ac.id](mailto:erienika.lompoliu@unklab.ac.id)

### **Abstrak**

Proses belajar seringkali menjadi beban bagi pelajar. Konsep kompleks dalam akuntansi bisa sulit jika bahkan mengintimidasi mahasiswa sekalipun dan gamifikasi sebuah pelajaran bisa menjadi solusi. Sejumlah studi empiris telah menunjukkan bahwa, karena pendekatannya yang unik dan memiliki efek positif bagi audiens yang lebih muda, gamifikasi dapat memberikan alternatif bagi siswa selain media konvensional yang ada. Journalyz dimaksudkan untuk menjadi pengalaman belajar yang berbeda bagi mahasiswa dalam mempelajari akuntansi dan mengevaluasi transaksi bisnis dengan studi kasus dunia nyata. Program ini akan membantu siswa dalam mengembangkan pemahaman yang kuat tentang transaksi bisnis pada perusahaan dagang dan jasa serta berkenalan dengan berbagai bentuk transaksi yang digunakan dalam bisnis. Selanjutnya, siswa akan belajar menganalisis transaksi dengan melihat dokumentasi bisnis dan mencatatnya pada akun yang tepat. Aplikasi ini berjalan di perangkat Android sehingga mudah dan bisa di jalankan dimana saja.

**Kata kunci**— akuntansi, analisis transaksi, Android, gamifikasi, pedagogi

### **Abstract**

Learning process often be a burden for students. Complex concepts in accounting can difficult be if not intimidating even for undergraduate students and gamification of that lesson can be a solution. Numbers of empirical studies has shown that, due to its unique approach, have positive effects for younger audience and could add another channel for students aside the existing conventional media. Journalyz is intended to be a gamified education for undergraduate students studying accounting and evaluating business transactions based on real-world examples. This program will assist students in developing a solid grasp of the business transactions of a merchandising and service firm as well as being acquainted with the many forms of transactional papers used in business. Furthermore, students will learn to assess transactions utilizing business documentation and record them on relevant accounts. The app is build for Android devices so it is handy and simple to be used anywhere.

**Keywords**— accounting, transaction analysis, Android, gamification, pedagogy

## 1. INTRODUCTION

The twenty first century sometimes regarded as the disruptive era where innovation changes the way things used to be, cutting of the middleman and processes and mostly produce or gives better way in getting the expected result. Astonishingly, without us knowing it, each part of our lives is presently some way, or another are intensely depended on or improved by innovation. The education field has been one of the has been susceptible for changes. From digitalization of study materials as well as the new pedagogical method that have been introduced such as the flip classroom, an asynchronous class, or the online evaluation test with software-based test. While it may not be perfect, but these innovations have changed the face of education for the past decades.

### 1.1 *Edugame and Gamification*

Traditional interactive games began in the 1970s and are aimed towards children and adolescents. When video games were introduced in the 1980s, they catapulted the gaming business to unprecedented heights, outperforming every other form of entertainment [1]. As computer starts arriving to every tertiary level education and eventually primary schools, it is inevitable that computer-based learning method will be part of every aspect of learning if not a crucial one. This gave birth to edugame, specifically video-game-based edugame which apparently are more pleasing and attract students attention due to its “active participation and interaction” as the core experience that the medium offers [2]. Edugame also have spread to various subject areas, but not limited to, such as math [3], physics [4] as well as accounting [5].

Gamification is also a new trend that has been introduced in the past few years. Numbers of empirical studies has shown that, due to its unique approach, have positive effects for younger audience and could add another channel for students aside the existing conventional media such as books, audio, and video. As indicated by a few sources, gamification have been able to change students’ views of a “studying”. From the average repetitive and memorizing text into a fun and energizing game-like activities. In short, it literally, turning a homework-like burden into an enjoyable task. How might this edugame pique the attention of children in learning? The explanation is because of gamification. Gamification simply refers to the use of game-design features and ideas in non-game contexts. The learning experience becomes more intriguing and thrilling when gamification is used on a lesson since the monotonous learning is eclipsed or diverted by more pleasant game components such as animation, sound, and other game dynamics [3].

### 1.2 *Analysis of Business Transactions*

Accounting plays an important role for any organization because it allows them to keep track on the changes of their resources and essentially provides financial information in making business decisions. Accounting is well known as a financial information system that collects, records the economic events of an organization, and communicates that information to the interested users so they will have an accurate understanding of what is going on financially within an organization [7]. Its process which refers to the accounting cycles, includes several steps that begin with analyzing business transactions.

A business transaction is a financial event that affect the resources of an organization. Several transactions involve in a “give-get exchange” activity that occurs frequently between organization and other parties whether from within or from outside the organization, such as sales, cash receipt, purchase, and payment [8]. However, there are also some financial events that do not includes exchange activity, for instance physical wear on equipment and loss of assets due to theft, fire or natural disasters [9]. Business transactions that are recorded in accounting system should have monetary value and requires documentation including source

document and control document [10]. Source document will specify the details and the amount of a transaction, and it is used as evidence that financial transaction is occurred. Some examples of common source documents are cash register receipts, invoices, credit memo, checks and deposit slips. The accountant will use these documents as a basis to analyze each business transaction and determine the effect of each transaction on the company's accounts.

In analyzing business transactions, the accountant should be able to decide when to record the transaction, at what value, and where to record the transactions because the accuracy of financial reporting rely on the proper recognition, valuation, and classification of a transaction [9]. Therefore, it requires a good understanding about the concept of assets, liabilities, equity, revenue, and expense which is crucial in this stage.

All commercial transactions, according to the double-entry method, impact at least two accounts[7]. So, at the very least, two accounting entries should be produced for each business transaction to maintain the company's books in balance. All transactions will be recorded as debits and credits, with one offsetting the other [10]. As a result, the total amount deducted, and total amount credited are always the same. In recording transactions, there are debit and credit rules. Debit and credit essentially define the increase or decrease of an account, with the increasing side of the account referred to as normal balance. When asset and expense increase the transactions should be recorded in debit side. On the other hand, liabilities, equity, and revenue will be journalized in credit side when increase.

### 1.3 *Proposed solution*

With the concept, knowledge and problems presented above, we propose Journalyz, an android based interactive application for learning real world case in bookkeeping. With the mixture of edugame and gamification take on bookkeeping and accounting cycle concept, this application will help students to have good understanding about business transactions of a small merchandising and service organization and be familiar with the types of transactional documents used in business. Moreover, students will learn to analyze transactions using business documents and record the transactions on appropriate accounts.

## 2. RESEARCH METHOD

### 2.1 *Related Studies*

Several research has also have similar approach and goal. Research by [11] was also an Android app that serves as learning media for "Budget Accounting" using Thunkable, a web based tools, that can design and build Android app without any coding necessary. A validation studies also conducted at the end of the study with result above 81%, which is Very Feasible. The study aims for the same purpose as ours, however it only present a simple straight forward quiz-based interface thus have lack of interactivity and depthness as it is actually just as similar to a usual test or quiz on a mobile phone. The app also uses the Thunkable tools, which is less flexible tools hence limit the app function and extendability.

Another similar research also conducted by [12]. The research was to develop an Android -based app that serve as learning tools for 10<sup>th</sup> grade at Al Ikhlas Vocational High School at Langkat, Indonesia. Similar to the earlier stated research, the interface and content is similar more similar to a quiz-based app in addition of some static materials such as lessons and tutorials. The app itself was build with Website 2 APK Builder pro, which convert a website to an APK.

Lastly a research that is also produced an Android application in accounting field is CREBIT [5]. The research offers a gamification of novice bookkeeping by giving statements/questions and have user to choose wether it goes to debit or credit on simple as well as compound journal entry on several different accounts such as "account receivable", "cash",

“sales return & allowances”, “cost of goods” and “inventory”. The interface is very playful and gives less serious impression compared to typical evaluation tools. This research however lack of details of a real bookkeeping. In the current research, the app will offer a more realistic invoices and various types of transactions involved.

Table 1 Related Studies and Its Comparisons

Comparisons	Tools used and Programming Language	Provide varieties and interactivity	Type of questions	Expandability
Research 1 [11]	Thunkable, no coding.	Straightforward and simple	Simple	Possible, but would need to edit the entire project via Thunkable
Research 2 [12]	Website2APK Builder Pro. No Coding	Straightforward and simple	Simple	Possible, but would need to edit the entire project via Website2APK.
Research 3 [5]	Unity 3D, C#	Two types of entry: simple and compound journal. Multiple ways to answer the question. Choices can be different depends on the questions	Moderate. Includes several accounts and journal entries	Simpler from the import interface on Unity 3D.
Current Research	Unity 3D, C#	Yes. It provides choices of chart of accounts and number to input on each case.	Advanced. Includes business document where user needs to analyze and choose the correct chart of accounts as well as input the correct amount at the correct journal entry.	Simpler from the import interface on Unity 3D

## 2.2 Research Method

Figure 2 depicts the many stages of the Agile technique. The Agile technique is used in this study since it is a highly flexible but effective execution process for maximizing the app feature's potential. It is also common practice to employ this strategy in the development of applications [13]. The following are the steps in the agile technique. The first step is to identify your needs. Having a dialogue with the potential customer is essential. As this project is also launched by a professor in the relevant discipline, the researcher herself will provide the essential information. As part of this step, we'll also conduct a literature analysis and compile a database of simulated test questions. These will be added to the list of things to be studied and analyzed. This is a self-assessment phase.

Secondly, the researcher then moves on to step two, which entails defining the tasks based on the criteria. Design and coding may begin after the tasks have been assigned and completed. The app is constructed in pieces or modules in Agile, unlike the waterfall process where task is continuous. The next step is to test that piece of function to make sure it works and once it is completed is completed, then the researcher may get gets another parts. Finally, we'll be able to use those components when they've been thoroughly tested. Once all parts are completed the app then may be deployed and ready to use.

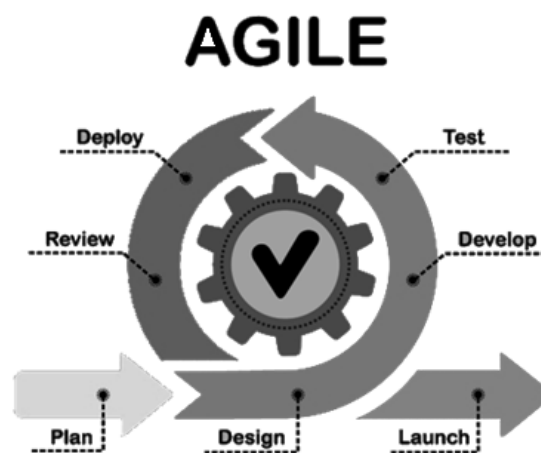


Figure 1 Agile Methodology [13], [14]

### 2.3 Development Tools

For development purposes tools that are being used are Unity 3D as it has a built in Game Manager feature and C# for the programming language on Microsoft Visual Studio IDE (default IDE chosen by Unity 3D). Some free to use images and assets such as background music and main page illustrations.

## 3. RESULT AND DISCUSSION

The app can be run on most Android devices running minimum Android 5.0 (Lollipop) including smartphones and tablets. Below are the discussion of the created app including its interfaces, game concepts and how it works.

### 3.1 Game Concept and How to Play It.

The game will enforce students to utilize their investigation abilities as well as accounting and bookkeeping knowledge. The app is consisted of two interfaces: the main menu interface (Figure 3) and the game scenes interface (Figure 4).

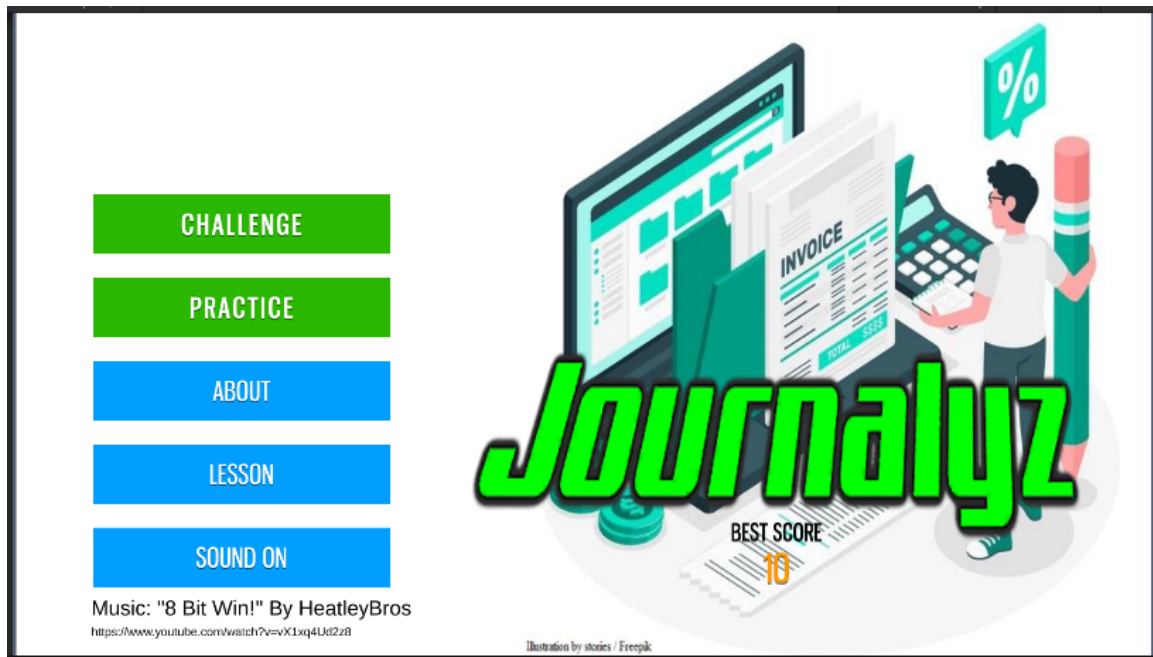


Figure 2 Main Menu Interface

**CHALLENGE MODE** 2:40 Rules: The DEBITS are entered first and then CREDITS; starts with higher amounts SCORE 0

**INVOICE** **Weasley Advertising**  
(San Jo. Wilson, California 95091)

Date: March 8, 2021 Bill To: D'Scannery Center  
 Invoice No: 209 Fair Oaks, Charminghad  
 Terms: Net Cash California 95608

Description	Amount
Advertising Design for Promotion	\$ 385.00

**CASH PAID**

Enter Document Number... Set Date

Journal Entry	Debit	Credit
None	Enter...	Enter...
None	Enter...	Enter...

0 0

**RESET** **SUBMIT**

Figure 3 Game Interface on Challenge Mode

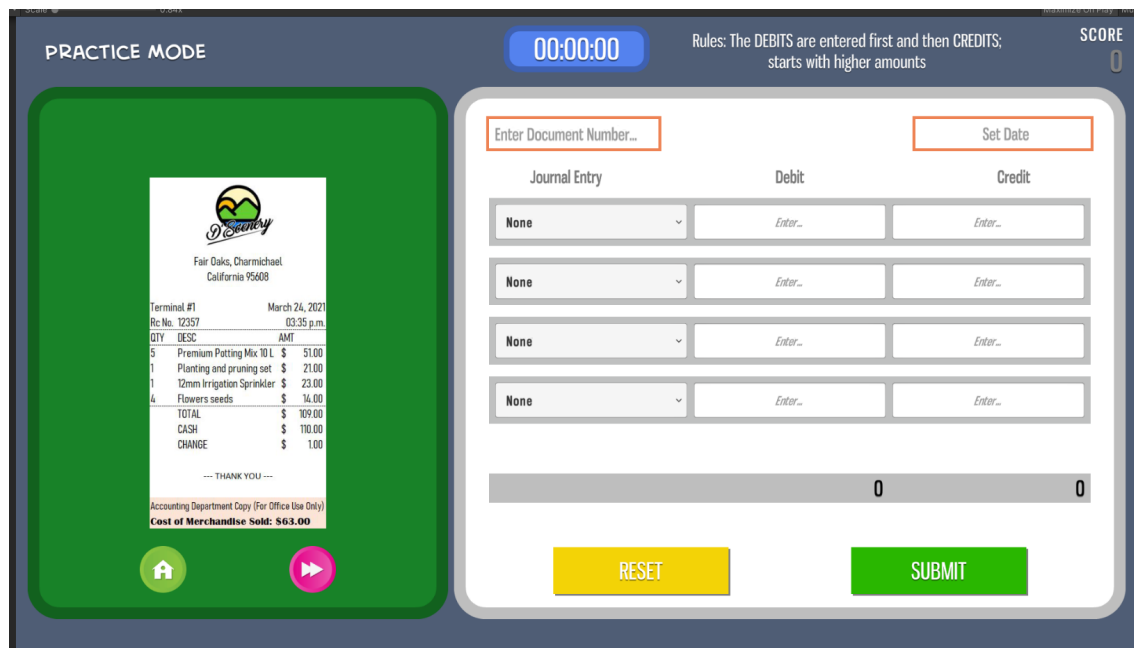


Figure 4 Game Interface on Practice Mode, with time is off and scoring is disabled

The main menu consist of “Challenge”, “Practice”, “About”, “Lesson” and “Sound On” buttons. The auxiliaries blue button are : “About” button will show the author or developer information while “Lesson” button will show the basic lessons of the bookkeeping that is being covered in this game and the last button is turn on or off the sound or music.

The main green button are “Challenge” where user can play the game with timer and scoring that will be recorded and the second one is “Practice” a similar feature but without scoring and timer. These two will be the main features of the app.

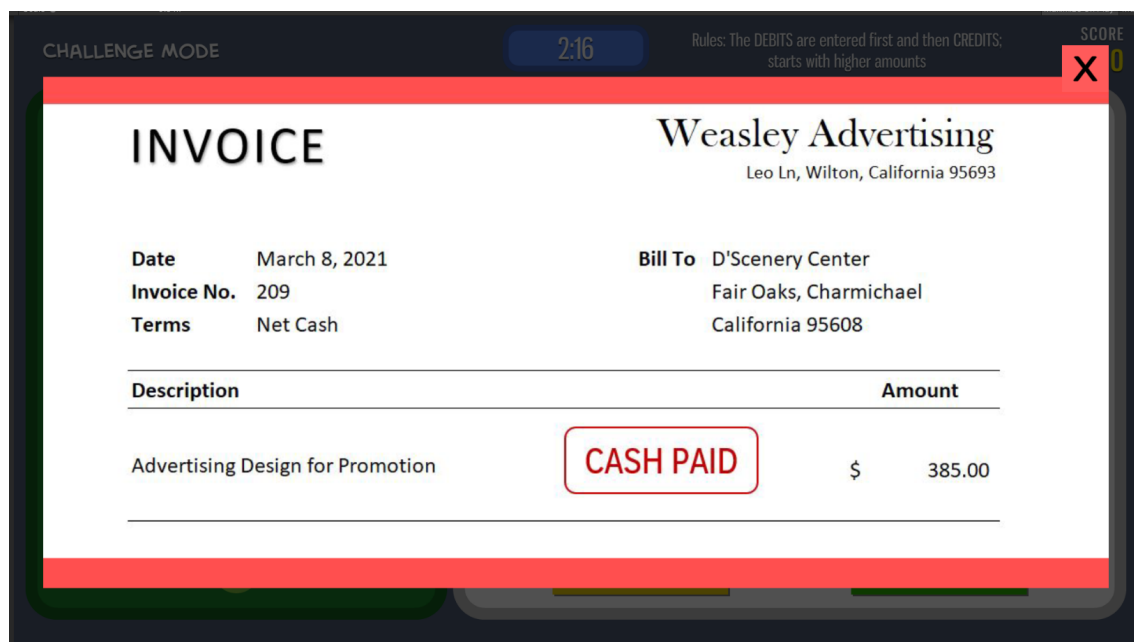


Figure 5 One of the business document on left side when zoomed

As shown on Figure 4 and 5, the game interface consists of game timer on center top and scoring on the right top corner. On the left side will be image of a business document that user need to analyze. The business document (such as invoices, credit memo, etc) will have all

the needed information that is required on the journal on the right side. User may tap on the business document to enlarge it and it should have all the information that needed to be placed on answer box including the document number, document date, type of chart of account, and lastly the amount of debit and credit. Once answered user may submit the answer to proceed to the next randomized questions. For each right answer 1 point will be given and a warning will be shown if there's any missing box yet to be answered. Game is over when the player run out of time that is two and a half minutes and highest score will be recorded and displayed at the main screen.

Overall, the game is intended to be both entertaining and educational. Like a regular smartphone game, the UI and background music may be considered humorous. Nonetheless, the information meets university-level requirements and should be regarded seriously.

### 3.2 *Game Features*

#### *Time Limit*

Each game on challenged mode has 3 minutes limit per game giving players limited time and encourage them to think and analyze as fast as possible to reach higher score.

#### *Points and High Score*

Each answer will be worth 1 point and the highest score achieved on the challenge will be saved as the highest score showed on the main screen.

#### *Expandable Question Bank*

There are presently 20 questions loaded to the questions bank that originate from different case and actual accounts such as account receivable, sales return and allowances, cost of goods sold, inventory, and many more. In future updates, more questions and answers may be included.

#### *Music On/Off*

The game has a cheerful background track (original music used with permission) and the ability to turn it off.



**PRACTICE MODE** 00:00:00 Rules: The DEBITS are entered first and then CREDITS; starts with higher amounts SCORE 0

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Journal Entry	Debit	Credit
Accounts Payable	1595	0
Accounts Receivable	0	1595

1595 1595

RESET SUBMIT

Figure 6 Red and Green Mark shown for wrong and right answer on Practice Mode.

### 3.3 Testing

A testing technique is required to guarantee the software's functioning. To accommodate this, black box testing, in which the structure, design, or implementation are unknown to the tester, is used [15]. The testing was carried out by a third-party tester, with no intervention from the researcher. The test results are shown in Table 2 below.

Table 2 Black-box Testing

No	Tested Function	Situation	Accepted Response	Outcome
1	Loading Main Menu	The user may access the Main Menu and choose from the various buttons.	All buttons should function correctly.	Working properly. Shown on Figure 3
2	Begin the game in both modes.	The user may choose one or more game modes.	Challenge or Practice mode should run well.	Working properly. Shown on Figure 4 and Figure 5
3	On Challenge Mode, player gets points when answer correctly.	When answering each case.	Depends on the questions, some may have 6 to 10 boxes to be filled thus gives possible 6 to 10 points per question	Working properly.
4	On Practice Mode, player gets a mark instead of points.	When answering each case.	On Practice Mode, player gets a mark 'red' for the wrong answer or 'green' for the right one	Working properly. Shown on Figure 7
5	Music On / Off	Some users may choose to disable the	The background music should be switchable	Working properly Shown on Figure 3

		music..	in the settings sound on/off toggle.	
6	High Score	High Score feature for highest score	Score from each attempt on challenge mode will be recorded and shown as highest score if it's the highest ever on the device.	Working properly Shown on Figure 3

#### 4. CONCLUSSION

This study aims to provide students with an alternative method of learning a fundamental idea in a more relaxed and pleasurable manner. It also gives a real challenge for students not only picking up random answer but enforce them to analyze a real-world business documents and record it correctly. While more research is needed to prove how effective this app would be in terms of its impact on student performance, it can serve as a tool that educators can use in a much more easy and enjoyable way.

#### 5. FUTURE STUDIES

An evaluation of student reaction, reception, and influence on their study performance using this app is most likely the next stage in this study's progression. This will help us determine the app's efficacy, as well as gamification's potential as an educational tool. Another addition would be adding more questions and providing an Apple IOS version of it are worthy progression that can be made for this research.

#### 6. ACKNOWLEDGEMENT

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