Vol. 12 No. 1 (2025) 1-20
Sosio-Didaktika:Social Science Education Journal
https://journal.uinjkt.ac.id/index.php/SOSIO-FITK

THE DEVELOPMENT OF GAMIFICATION-BASED LEARNING MEDIA | "*AKUBI: AKUNTANSI BIAYA* (COST ACCOUNTING)" AT SMK MUHAMMADIYAH 2 MALANG

Fina Melika Firdausi, Sheila Febriani Putri[2*]
State University of Malang
Email: sheila.febriani.fe@um.ac.id
https://doi.org/10.15408/sd.v12i1.42313

Received: 2024-11-08 ; Revised: 2024-12-14; Accepted: 2025-06-19

Abstrak

Kemajuan teknologi pada era Society 5.0 menuntut pendidik untuk menciptakan media pembelajaran yang terintegrasi dengan teknologi digital. Adanya penelitian ini bertujuan untuk mengembangkan "AKUBI: Akuntansi Biaya", media pembelajaran berbasis gamifikasi, dan mengukur efektivitasnya terhadap motivasi belajar. Metode yang digunakan adalah Research and Development (R&D) dengan model ADDIE. Hasil uji validasi oleh ahli diperoleh persentase sebesar 92,10% dengan kategori sangat layak dan respon siswa terhadap media adalah 90,86% yang dikategorikan sangat layak. Hasil pengukuran n-gain menunjukkan adanya peningkatan motivasi belajar sebesar 0,58 (kategori sedang) dan 57,84% yang berarti media gamifikasi cukup efektif dalam meningkatkan motivasi belajar. Implikasi dari penelitian ini menunjukkan bahwa media pembelajaran berbasis gamifikasi "AKUBI" dapat menjadi solusi inovatif dalam meningkatkan motivasi belajar siswa pada mata pelajaran yang kompleks, serta mendorong integrasi teknologi dalam pembelajaran di era Society 5.0.

***Kata kunci**: Akuntansi Biaya, Pengembangan, Gamifikasi, Motivasi Belajar, Media Pembelajaran.*

Abstract

The technological advancement in the Society 5.0 era requires educators to create learning media that are integrated with digital technology. This study aims to develop "AKUBI: Akuntansi Biaya (Cost Accounting)", a gamification-based learning media, and measure its effectiveness on learning motivation. This study used the Research and Development (R&D) method with the ADDIE model. The results of the validation test by experts obtained a percentage of 92.10% with a very feasible category and student responses to the media were 90.86% which were categorized as very feasible. The results of the n-gain measurement showed an increase in learning motivation of 0.58 (moderate category) and 57.84% which means that gamification media is quite effective in increasing learning motivation. The implications of this study indicate that gamification-based learning media AKUBI can be an innovative solution in increasing student learning motivation in complex subjects, as well as encouraging technology integration in learning in the Society 5.0 era.

Keywords: Cost Accounting, Development, Gamification, Learning Motivation, Learning Media

* Alamat Korespondensi

Introduction

The Society 5.0 era has been launched since 2019, which provides the concept that all aspects of human life are connected to technology. This technological development also reaches the field of education. Facing this reality, the world of education is required to be able to adapt to changes and progress, especially for the learning process. One of the elements associated with technology is learning media which is also the most important factor in achieving learning goals (Silmi & Hamid, 2023). The importance of learning media is due to its function to facilitate the educators in delivering materials to their students (Harsono et al., 2019). Learning media also has an important role in driving student motivation and involvement in learning (Silva et al., 2021). The integration between the learning process and technology can increase student motivation and enthusiasm for learning (Haleem et al., 2022). The selection and utilization of the appropriate learning media is very necessary to ensure the effective and efficient delivery of learning to the students. The determination of the media not only facilitates the transmission of knowledge but is also able to direct meaningful learning and develop skills that must be possessed by students in the 21st century.

One of the determining factors of the level of learning success that can realize meaningful learning is learning motivation. Learning motivation can make students more enthusiastic, active, and focused during learning activities (Pramesti et al., 2020). Low learning motivation will have a negative impact on delaying assignments (Usman & Yulianingtias, 2022). In addition, low learning motivation also causes students to have difficulty understanding the material (Mauliya et al., 2020). This will have an impact on decreasing student performance and learning outcomes (Mauliya et al., 2020; Oknaryana et al., 2020). Therefore, schools need to implement relevant and adaptive learning strategies that can increase student learning motivation.

In practice, vocational schools face unique challenges in balancing practical skills with conceptual theory to prepare students to enter the workforce effectively. SMK Muhammadiyah 2 Malang is a private vocational school that has implemented a Center of Excellence program with the aim of improving quality and performance with expertise competencies that are relevant to the industrial world. Equipped with more mature competencies, SMK becomes a place that is

able to create students with special competencies needed by today's workforce (Rahmadhani et al., 2022).

In an effort to prepare students with skills that refer to the needs of the workforce, SMK Muhammadiyah 2 Malang offers various expertise programs, one of which is Accounting and Institutional Finance (AKL). Accounting plays a vital role in daily business operations in every business sector and one aspect of it is cost accounting. Cost accounting equips students with the ability to manage and control costs effectively, make the right financial decisions, and contribute to the economic efficiency of the business (Purwaji & Muslim, 2023). This knowledge is essential in various sectors, making cost accounting an essential component of vocational education that empowers students to excel in the modern workplace.

Based on the Nature of Social Sciences (IPS), educators need to master the materials and develop innovative teaching skills so that they can stimulate critical thinking skills in students (Kurniawan, 2022). This is very much needed so that students can gain knowledge and create the necessary skills. This design can be expressed through learning media that is integrated with technology and multimedia (Kummanee et al., 2020).

The results of the pre-research conducted on February 19-20, 2024 at SMK Muhammadiyah 2 Malang showed that the media used by teachers in accounting subject tended has limited variety of learning materials because they only used PowerPoint slides and printed media in the form of Handouts and Student Worksheets (LKPD). The limited variety of media causes students to have no motivation to learn. This statement is in line with previous research that relying solely on PowerPoint slides as a teaching medium has no effect on learning, which means that PowerPoint is not effective in fostering student learning motivation (Wang et al., 2023). Low learning motivation is also caused by the Cost Accounting material which is considered as a difficult subject. In addition, based on the results of pre-research observations conducted on March 26-28, 2024, during class learning, students tend to play their gadgets, such as playing games or doing other activities that are not related to the lesson. The underlying reason for this behavior is due to uninteresting and less interactive teaching which causes students to use gadgets for purposes unrelated to class (Lestari & Sulian, 2020; Nursakdiah et al., 2023). This disrupts the concentration and effectiveness of the teaching and learning process. This condition indicates that there is

a gap between conventional teaching methods and the expectations of students who are familiar with technology. Students have become accustomed to the interactive and engaging nature of digital platforms that often provide instant feedback, as a result the passive nature of learning media is unable to capture their motivation to learn.

This problem shows the need to create more interesting and innovative learning media that can increase student learning motivation and make it easier for students to understand the material better. Interactive learning media can create a fun learning environment that can trigger development in students' cognitive aspects. Therefore, the development of gamification-based learning media AKUBI is expected to be a solution to overcome these problems. This media is designed by utilizing digital technology and adapting to student interests so that it can support an optimal learning process in Cost Accounting at SMK Muhammadiyah 2 Malang.

Gamification is the practice of transforming processes, products, organizational structures, or all human-integrated activities into game-like experiences, with the aim of leading to desired behavioral changes (Thomas et al., 2023). Gamification-based learning has been shown to be effective in various educational contexts as explained in previous studies that games can provide comfort and ensure students having high learning motivation (Zainuddin et al., 2020). Therefore, an innovative, creative, and interactive learning design is needed by using gadgets to optimize students' interest in using gadgets effectively as a learning medium (Sari et al., 2019; Tiarasari, 2021).

Several previous studies that examined gamification media in Accounting learning, including research on the development of game-based learning media on Bank Reconciliation Accounting material. Gamification media can help students understand material that has a high level of difficulty and complexity in a fun and interactive way (Yana et al., 2019). These findings are further strengthened by the results of research by other researchers who developed game-based mobile learning and showed a significant positive impact on learning motivation, user satisfaction, and learning engagement (Kao et al., 2023). The final results of the study on the effectiveness of the monopoly game in learning Financial Report material showed that gamification-based media can improve students' learning motivation (Buchory et al., 2022).

Based on previous research on the development of gamification-based learning media in Accounting learning, there is still little research that examines the development of game media for material centered on Cost Accounting. Thus, the author aims to develop interactive gamification-based learning media for Cost Accounting material, especially the Process Costing and Order Methods under the name "AKUBI: Cost Accounting". This media provides various interesting features by utilizing digital technology. These features include the presentation of learning materials equipped with illustrations, learning evaluations in the form of practice questions and assessments, and the main highlight is the game page. The development of this media is expected to provide benefits for researchers and also for schools in a long term, especially for Cost Accounting material as well as improving learning motivation of the students.

Research Method

This study used Research and Development (R&D) method with the ADDIE model which aims to develop gamification-based learning media, namely AKUBI and measure its effectiveness in increasing student learning motivation. The ADDIE model is a systematic process used in learning design to create effective, interesting, and efficient teaching materials in a supportive environment, presenting concepts, theories, and practices. This model has five stages, namely the Analysis (A), Design (D), Development (D), Implementation (I), and Evaluation (E). The researchers used this type of development model due to its comprehensive approach, flexibility, iterative nature, emphasis on evaluation, and research-based foundation. The following are the stages in the development of the "AKUBI: Cost Accounting" media based on gamification which consists of 5 stages.

***Analysis Stage*.** In this initial stage, the researchers analyzed student characteristics and needs, both from the teacher and the students. The analysis process was carried out by conducting observations and interviews with the Accounting subject teachers and XI AKL students. Observations were conducted to determine the characteristics of students during learning, while interviews were conducted to determine what media and teaching materials had been used, and the problems that existed during accounting learning. Taking into account the condition of the school, the completeness of the facilities and infrastructure owned, and aligning it with the target users, the next stage was to determine the media that could answer these

problems. The conclusion obtained was the development of gamification-based learning media in the form of "AKUBI".

Design Stage. After deciding on the learning media that was considered appropriate according to the needs, the researchers began to formulate the concept and design the product that would be developed together with the direction of the teacher concerned. The design stage also included the preparation of teaching materials, practice questions, learning evaluations, Graphical User Interface (GUI) button design, background display, audio, and storyboard design.

Development Stage. This stage included the development stage and running several animations with the help of special software, namely Construct 2 to produce games. After the product was completed, the media were put into the expert validation assessments from the media experts, material experts, and programming experts in order to test the feasibility and improvement of the media. The questionnaire instrument was used to obtain validation assessments from expert validators. There are five validators for the AKUBI media consisting of two material experts (Head of the Accounting Expertise Program and Accounting teacher), two media experts (Communication and Visual Design teachers), and one programming expert (Computer and Network Engineering teacher). After being deemed feasible, a product trial was conducted on a small group to improve the quality of the product based on input provided directly by students who were the target of the research. The assessment by the experts was processed using a Likert scale, namely 1 (Very Bad), 2 (Bad), 3 (Fair), 4 (Good), and 5 (Very Good). The following are the assessment indicators for each expert.

Tabel 1 Indicators of Expert Validation Assessment

Validator	Indicator	Number of questions
Media Expert	Text Readability	3
	Illustration and Animation	6
	Layout and Color	6
Programming Expert	Navigation buttons	14
	Ease of menu selection	4
	Clarity of user manual	3
	Audio	4
Material Expert	Suitability of material content	2
	Suitability of facts, concepts, principles, and procedures	3
	Appropriateness of material concepts	2
	Material delivery	2
	Suitability of illustration and animation with the delivered materials	2
	Evaluation questions	3
	Media support for student independency and motivation	2

Source: (Khoirunnisya, 2021)

Descriptively, the percentage data analysis technique was used in the questionnaire instrument. The collected data were converted into percentages, and the results were interpreted in qualitative form. The measurement of the percentage of feasibility is as follows.

$$Percentage\ of\ Feasibility\ (\%) = \frac{Observed\ Score}{Expected\ Score} \times 100\%$$

In the assessment of media feasibility, the results of expert validation must be shown with a minimum percentage of 60%, so that it can be stated as fairly feasible and can be used in learning. Improvements to the media are also made to increase its feasibility. The following are categories of interpretation of the results of the feasibility percentage calculation.

Tabel 2 Scale of Percentage of Feasibility

Percentage	Interpretation Category
81% - 100%	Very Feasible
61% - 80%	Feasible
41% - 60%	Fair
21% - 40%	Less Feasible
≤ 20%	Not Feasible

Implementation Stage. The implementation stage involved student preparation, product use, and data analysis. This stage was carried out on all students of class XI AKL SMK Muhammadiyah 2 Malang. First, students were given an explanation regarding the learning objectives and were given guidance and direction in using the media. Then, students started using the media during the learning process. Finally, the questionnaires were analyzed to evaluate the effectiveness of the media and its impact on student motivation.

Evaluation Stage. The purpose of the evaluation stage is to evaluate the product that has been developed at each stage. After the implementation stage, the action focused on examining the developments that occured due to the use of the product to assess its quality in supporting learning activities based on student and teacher perceptions. The expected result is positive feedback or response related to the media containing Cost Accounting material, especially for the Costing and Order Method. At this stage, the output produced was a gamification-based learning media "AKUBI: Cost Accounting" in the form of a website that has been revised and refined.

The subject in this study were all students of class XI AKL SMK Muhammadiyah 2 Malang. The data sources used were primary data obtained directly from teachers and students of SMK Muhammadiyah 2 Malang. The data were collected through interviews and questionnaires. The types of data collected in this study included qualitative and quantitative data. Qualitative data were the

results of the analysis of needs and perceptions of students and teachers regarding the media that has been developed, while quantitative data were the results of measuring student learning motivation.

The effectiveness of using gamification media on learning motivation is measured by the n-gain test of student learning motivation between before and after for each indicator and the entire sample. The n-gain results will be transformed into qualitative form with the appropriate criteria in Table 3. The n-gain measurements are as follows.

$$N - Gain = \frac{Posttest\ Score\ -\ Pretest\ Score}{Ideal\ Score\ -\ Pretest\ Score}$$

Tabel 3 Interpretation of N-Gain Value Index

N-Gain Score	N of Items
g > 0,7	High
0,3 ≤ g ≤ 0,7	Medium
g ≤ 0,3	Low

Results and Discussion

Details of the development of gamification-based learning media in the form of AKUBI are explained in the following stages.

Analysis Stage. Based on the results of observations, the learning media used by teachers are Handouts, Student Worksheet, YouTube videos and PowerPoint slides. The less interactive learning media causes the delivery of material to be done through lectures. This has an impact on decreasing student enthusiasm in learning. Students also consider Cost Accounting to be a difficult material so that students tend to be lazy and not interested in participating in learning activities. As a result, students often play gadgets during learning and use them for activities that are not related to academic activities, such as playing games.

From the problems above, innovative and creative learning media are needed by integrating technology to increase student learning motivation. Media development is needed by aligning student interests. Gamification-based media was chosen as a solution for Cost Accounting learning. Gamification stands out as a very effective approach that can make learning more interesting and interactive (Annisa et al., 2022; Fajri et al., 2021; Srimuliyani, 2023). This is also a media innovation at SMK Muhammadiyah 2 Malang, especially in the Cost Accounting subject.

Design Stage. This stage was carried out after analyzing the needs and deciding on the learning media that is considered a solution step. The activities carried out at this stage were collecting the teaching and learning materials obtained from certain textbooks that have become the reference for the teacher concerned. In addition, other activities carried out were compiling practice

questions and learning evaluations in the form of multiple choices questions. Researchers collected several elements to make the media more interesting, such as logos, backgrounds, GUI buttons (navigation buttons to direct to certain views), audio, and game assets. The tools used for the design process were Canva, AI (Artificial Intelligence) platforms, and Adobe Photoshop. Before developing the learning media, the researcher made a storyboard design as shown in Figure 1.

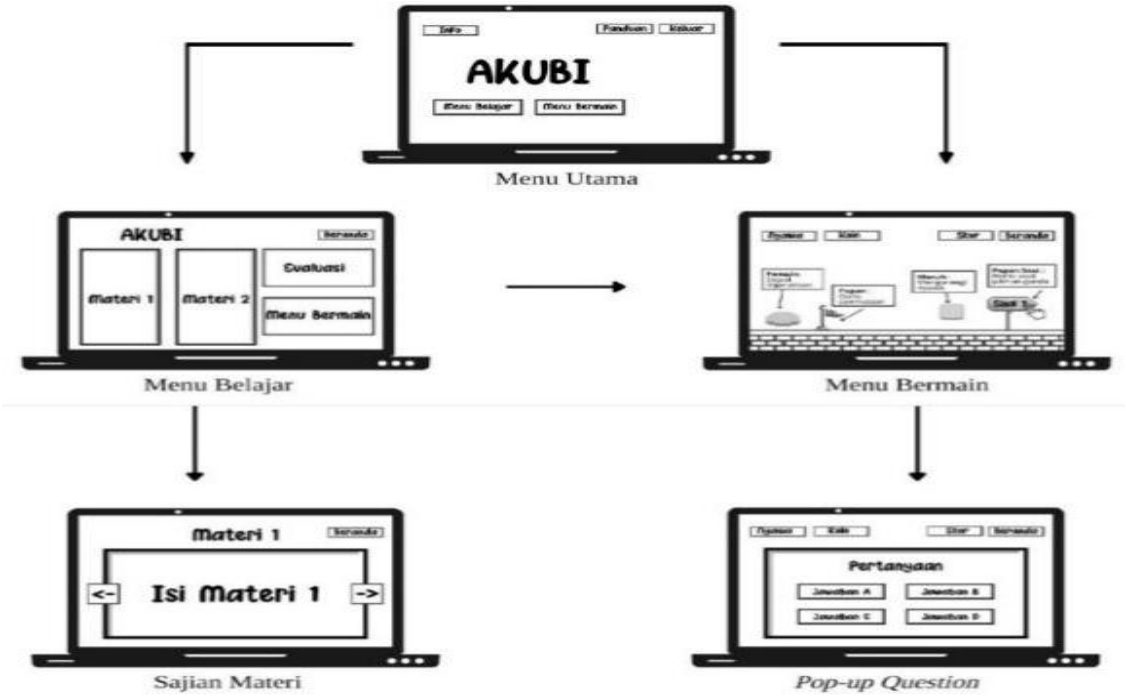

***Figure* 1** Storyboard Design of the Media

Development Stage. After making the storyboard design, the gamification-based learning media was developed with the help of Construct 2 software. Games that can be developed with this software do not only refer to games, but also support the development of educational games that can be used to support learning activities.

Before conducting a product trial on target users, a validation test from experts is needed to measure the level of feasibility of the media that has been developed. This validation test was carried out by teachers of SMK Muhammadiyah 2 Malang according to their professional fields, namely Communication and Visual Design teachers as media experts, Computer and Network Engineering teachers as programming experts, and Accounting teachers as material experts.

Tabel 4 Results of Media Expert Validation Test

Indicator	Ideal Score	Validator 1	Validator 2	Score Average	Percentage
Text readability	15	15	13	14	93,33%
Illustration and Animation	30	26	29	27,5	91,67%
Layout and Color	30	28	28	28	93,33%
Average					92,78%

Based on Table 4, AKUBI got a percentage of 92.78% and was categorized as very feasible. Media experts suggested changing the title on the learning menu from AKUBI to "Learning Menu" so that users know that they are in the learning menu. In addition, remove the play menu on the learning menu so that students can focus more on learning first.

Tabel 5 Results of Programming Expert Validation Test

Indicator	Ideal Score	Validator Score	Percentage
Navigation buttons	70	64	91,43%
Ease of menu selection	20	20	100%
Clarity of user manual	15	15	100%
Audio	20	15	75%
Average			91,61%

Table 5 shows that the AKUBI media is categorized as very feasible with a percentage score of 91.61% from programming experts. Programming experts also provided input to add a back button to each menu, so that users do not need to return to the main menu. In addition, a button needs to be added to deactivate the backsound to provide comfort for students who have visual learning characteristics and for students who are not suited to an audio learning style

Tabel 6 Results of Material Expert Validation Test

Indicator	Ideal Score	Validator 1	Validator 2	Average Score	Percentage
Suitability of Material Content	10	10	10	10	100%
Suitability of facts, concepts, principles, and procedures	15	14	13	13,5	90%
Appropriateness of material concepts	10	10	10	10	100%
Material delivery	10	9	8	8,5	85%

Suitability of illustration and animation with the delivered materials	10	9	8	8,5	85%
Evaluation questions	15	13	12	12,5	83,33%
Media support for student independency and motivation	10	10	10	10	100%
Average					91,90%

Based on Table 6, the results of the validation test from material experts showed a percentage of 91.90% or very feasible. The validator suggested adding a glossary related to the terms used. This is intended so that students can easily find the meaning of difficult words or terms.

***Figure* 2** Main Menu

The main menu provides a learning menu, a play menu, info, guide, and an exit button. The learning menu directs users to the material presentation that has been provided. If the user selects the play menu, the user will be navigated to the game. The info button contains developer information, while the guide button contains a guide to using the media, and the exit button is used to exit the media. Based on the advice of the validator expert, the main menu provides a button to turn off the audio.

***Figure* 3** Pre-Improvement Learning Menu

***Figure* 4** Post-Improvement Learning Menu

In the learning menu, users can choose from the available material presentations. There are two choices of material, namely (1) Basic Concepts of Cost Accounting and (2) Process and Order Costing Methods. Users can also select the learning evaluation menu and the glossary menu. The appearance of the learning menu has changed according to the validator's direction, namely what was originally shown as in Figure 3 has changed to the appearance in Figure 4. There are

additions to the glossary menu which was originally a play menu. This is intended so that students can focus more on learning activities while in the learning menu. Cost Accounting is different from Accounting in general, because there are foreign terms that are new to users so that a glossary is needed to recognize these new terms.

***Figure* 5** Material Delivery Menu

The teaching materials will appear after the user selects one of the material presentations. The user can press the next button (right arrow) to move to the next page, and back (left arrow) for the previous page. The materials presented include "Basic Concepts of Cost Accounting" as an initial introduction to Cost Accounting material and "Order and Process Costing Methods" containing how to calculate production costs and their journaling. The material presentation is also equipped with examples in the form of images to explain cost classification and examples of recording cost accounting transactions.

***Figure* 6** Learning Evaluation Menu

In the learning evaluation menu, users will be directed to a Google Drive link that contains a collection of practice questions and summative assessments to measure students' abilities and understanding. The folder can be accessed by the public, making it easier to practice solving the questions that have been provided.

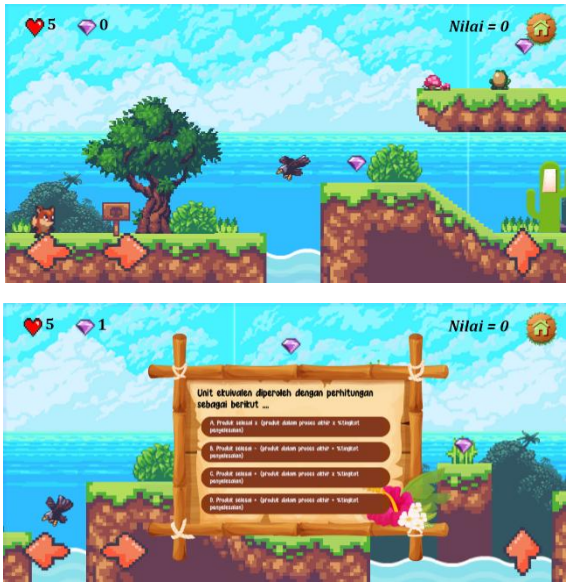

***Figure* 7** Play Menu

In the play menu as shown in Figure 7, users will be directed to learning activities through a game. Users as players are required to reach the finish line by passing enemies

and answering several multiple-choice questions. If the user collides with an enemy, their lives will be reduced. If the user is able to answer the questions correctly, the value obtained will increase. The questions given range from basic concepts of Cost Accounting to how to record journals for a transaction.

Tabel 7 *Results of Overall Validity Test*

Validator	Percentage	Category
Media Expert	92,78%	Very Feasible
Programming Expert	91,61%	Very Feasible
Material Expert	91,90%	Very Feasible
Average	92,10%	Very Feasible

Based on Table 7, the average validation test results from experts were 92.10%, which means that the AKUBI media is very suitable for use to support Cost Accounting learning activities. Because this media has been considered very suitable, the media was tested on several students in class XI AKL of SMK Muhammadiyah 2 Malang as many as 4 (four) people. The results of the trial showed that students were very active during Cost Accounting learning and received positive responses.

Implementation Stage. After the validation process and small group trials, the AKUBI was used in Accounting 2 learning for Cost Accounting material in class XI AKL SMK Muhammadiyah 2 Malang. This stage involves all class XI AKL students. The activities carried out at this stage are providing direction and how to use the product, then students learn through the learning menu with the available material presentation, and play by answering several practice questions formulated in the form of multiple choices. At this stage, students filled the questionnaires related to students' learning motivation before and after using the AKUBI.

Tabel 8 Results of Student Responses on the Media

Indicator	Ideal Score	Students' Average Score	Percentage
Software engineering aspect	15	13,3	88,89%
Learning design aspect	20	17,8	88,89%
Communication and visual aspect	15	14,2	94,81%
Effect on learning strategy aspect	15	14,1	94,07%
Average			90,86%

Evaluation Stage. Based on the results of the questionnaire in Table 8, the student response to the AKUBI learning media is 90.86%. This can be interpreted that AKUBI is very suitable for use in learning activities on Cost Accounting material. The students

responded that the media had been presented in an interesting way and the game could run smoothly without any obstacles. In addition, this media also provides convenience in learning because learning can be done anywhere and anytime with complete materials that are available.

The Use of Gamification-Based Learning Media AKUBI on Student Learning Motivation

This development research was carried out until the trial stage with expert validation test results of 92.10% and student responses of 90.86%. The evaluation results indicate that the AKUBI learning media is considered suitable for use to support learning activities. Gamification in accounting learning also creates learning motivation that can result in better participation (Buchory et al., 2022; Kao et al., 2023; Lengyel, 2020). Indicators that show students have learning motivation are being diligent in completing assignments, being persistent in facing difficulties, being interested in lessons, enjoying doing assignments independently, easily getting bored with routine tasks, being able to defend arguments, being persistent in holding beliefs, and enjoying finding and solving a problem (Sardiman, 2019).

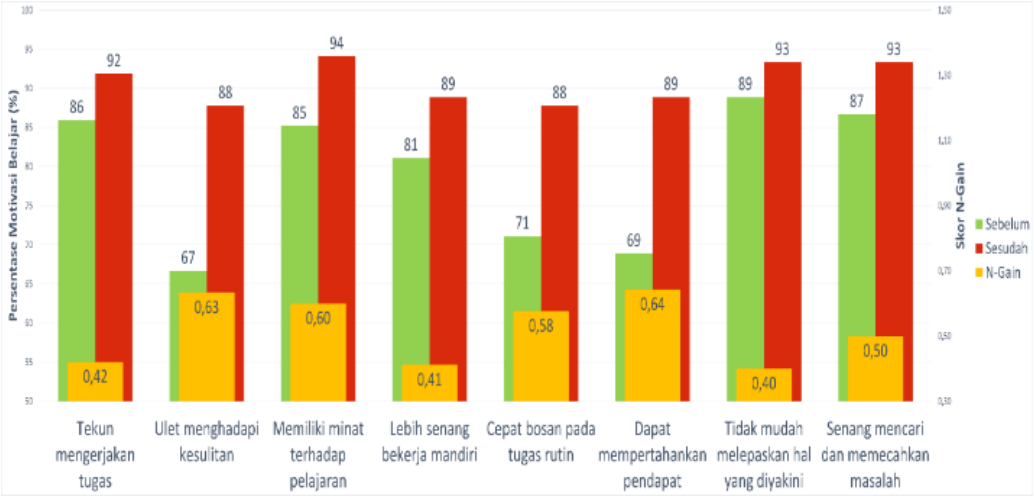

***Figure* 8** Recapitulation of *N-Gain* for Each Learning Motivation Indicator

The effectiveness of gamification-based learning media in the form of AKUBI is measured by students' learning motivation before and after its implementation. Based on the data in Figure 8, each indicator of students' learning motivation comprehensively shows an increase with an n-gain categorized as moderate ($0.3 \leq g \leq 0.7$). The learning motivation indicator that experienced the highest increase was the

indicator "can defend opinions" which initially only increased to 89% and an n-gain of 0.64 with moderate criteria. Furthermore, the second highest increase was in the indicator "persistence in facing difficulties" which was originally 67% increased to 88% and an n-gain of 0.63 with moderate criteria. Followed by the indicator "having an interest in the lesson" which increased from 85% to 94% with an n-gain of 0.60 with moderate criteria. The measurement of n-gain of learning motivation for the entire sample is shown in Table 9. The n-gain of learning motivation between before and after is 0.58 which has a moderate category. The n-gain percentage is 57.84% which means that gamification-based learning media in the form of AKUBI is quite effective in increasing student learning motivation in Cost Accounting material.

Tabel 9 N-Gain Test for the Motivation Before and After the Use of AKUBI

	N	Min.	Max.	Mean	Std. Deviation
N-Gain (Skor)	9	.25	1.00	.5784	.24537
N-Gain (%)	9	25.00	100.00	57.8375	24.53731

Based on the findings of this study, the AKUBI media is considered feasible and effective in increasing student learning motivation. The factors that make the "AKUBI" media considered very feasible for use in the Cost Accounting learning process so that it can increase student learning motivation are gamification as a new learning experience. The integrity of technology helps the learning process become more flexible. Learning can be done anytime and anywhere, without any specific limits (Dudar et al., 2021; Haleem et al., 2022; Saykili, 2019). This media also offers attractive features and innovative designs that can increase learning motivation. Visually attractive elements and interactive components in accordance with the digital era make the learning process more enjoyable so that it can reduce monotony and boredom that are often associated with conventional teaching methods (Anna et al., 2020; Arifudin et al., 2021; Shania & Iskandar, 2021).

Students who are motivated to learn will remain focused and concentrated in the learning process, so that learning is more productive. With this media, students are given practice questions that are packaged in the form of games, so that the thinking process and ability to solve questions emerge. The ease of understanding the material with interactive learning can significantly improve students' cognitive processes towards challenging subjects (Kurtz et al., 2019;

Sailer & Homner, 2020). With practice questions and learning evaluations, students will continue to practice so that they are gradually able to understand the material and have skills.

Conclusion

Based on the development of the learning media "AKUBI: Cost Accounting", this gamification-based media is very suitable for use for Cost Accounting material. The expert validation obtained a score of 92.10% which indicates very suitable. Students also responded to the media with a percentage of 90.86% which is categorized as very suitable. Gamification media is also quite effective in increasing student learning motivation with an n-gain percentage showing a value of 57.84% and an n-gain score of 0.58. This shows that learning motivation increases at a moderate level. The implications of this study support previous findings which state that gamification learning media can increase student motivation, especially in subjects that are considered difficult, and the development of the ADDIE model can be used well to create effective learning tools. In addition, AKUBI can help teachers increase student interest and active participation during lessons. This study suggests that schools and educational authorities encourage the use of gamification and provide training for teachers to support learning in the Society 5.0 era. This study is limited to the development of media that is still website-based and requires an internet connection. Further research is recommended to add game levels, develop media that can be accessed offline, and expand the measurement of effectiveness based on student learning outcomes.

References

Anna, Annisa, R., & Parwandar, R. (2020). Perancangan Game Petualangan Sebagai Sarana Pembelajaran Edukasi Berbasis Android. *SINTECH (Science and Information Technology) Journal*, *3*(1), 52–57. https://doi.org/10.31598/sintechjournal.v3i1.532

Annisa, N. A., Rusdiyani, I., & Nulhakim, L. (2022). Meningkatkan Efektivitas Pembelajaran Melalui Aplikasi Game Edukasi Berbasis Android. *Akademika*, *11*(01), 201–213. https://doi.org/10.34005/akademika.v11i01.1939

Arifudin, D., Manan Musyafa, A., & Halwa, A. (2021). Gamification as an Online Lecture Simulation to Increase Learning Motivation in The Pandemic Era. *Cogito Smart Journal* , *7*(2), 360–372.

Buchory, H. A., Homan, H. S., & Willy, S. (2022). Effectiveness Of Monopoly Accounting Game Media In Increasing Motivation And Learning Outcomes. *Jurnal ASET (Akuntansi Riset)*, *14*(1), 011–020. https://doi.org/10.17509/jaset.v14i1.45978

Dudar, V. L., Riznyk, V. V., Kotsur, V. V., Pechenizka, S. S., & Kovtun, O. A. (2021). Use of modern technologies and digital tools in the context of distance and mixed learning. *Linguistics and Culture Review*, *5*(S2), 733–750. https://doi.org/10.21744/lingcure.v5ns2.1416

Fajri, F. A., Haribowo P., R. K., Amalia, N., & Natasari, D. (2021). Gamification in e-learning: The mitigation role in technostress. *International Journal of Evaluation and Research in Education*, *10*(2), 606–614. https://doi.org/10.11591/ijere.v10i2.21199

Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, *3*(May), 275–285. https://doi.org/10.1016/j.susoc.2022.05.004

Harsono, H., Yulia Rosanti, S., & Abu Seman, N. A. (2019). The Effectiveness of Posters as a Learning Media to Improve Student Learning Quality. *The Journal of Social Sciences Research*, *SPI 1*, 97–103. https://doi.org/10.32861/jssr.spi1.97.103

Kao, M. C., Yuan, Y. H., & Wang, Y. X. (2023). The Study on Designed Gamified Mobile Learning Model to Assess Students' Learning Outcome of Accounting Education. *Heliyon*, *9*(2), e13409. https://doi.org/10.1016/j.heliyon.2023.e13409

Khoirunnisya, M. (2021). Pengembangan Media Pembelajaran Dengan Software Construct 2 Pada Materi Bangun Ruang Sisi Datar. *Universitas Islam Riau*. https://repository.uir.ac.id/13589/

Kummanee, J., Nilsook, P., & Wannapiroon, P. (2020). Digital learning ecosystem involving steam gamification for a vocational innovator. *International Journal of Information and Education Technology*, *10*(7), 533–539. https://doi.org/10.18178/ijiet.2020.10.7.

1420

Kurniawan, G. F. (2022). Hakikat Ilmu Pengetahuan Sosial: Strategi Memahami dan Perbaikan Kesalahan Konsep. *Jurnal Pendidikan Ilmu Pengetahuan Sosial Indonesia*, *Vo.9*(1), 64–78. https://doi.org/10.21831/jipsindo.v9i1.130617

Kurtz, J. B., Lourie, M. A., Holman, E. E., Grob, K. L., & Monrad, S. U. (2019). Creating assessments as an active learning strategy: what are students' perceptions? A mixed methods study. *Medical Education Online*, *24*(1). https://doi.org/10.1080/10872981.2019.1630239

Lengyel, P. S. (2020). Can the Game-Based Learning Come? Virtual Classroom in Higher Education of 21st Century. *International Journal of Emerging Technologies in Learning*, *15*(2), 112–126. https://doi.org/10.3991/ijet.v15i02.11521

Lestari, R., & Sulian, I. (2020). Faktor-Faktor Penyebab Siswa Kecanduan Handphone Studi Deskriptif Pada Siswa Di Smp Negeri 13 Kota Bengkulu. *Consilia : Jurnal Ilmiah Bimbingan Dan Konseling*, *3*(1), 23–37. https://doi.org/10.33369/consilia.v3i1.9473

Mauliya, I., Relianisa, R. Z., & Rokhyati, U. (2020). Lack of Motivation Factors Creating Poor Academic Performance in the Context of Graduate English Department Students. *Linguists : Journal Of Linguistics and Language Teaching*, *6*(2), 73. https://doi.org/10.29300/ling.v6i2.3604

Nursakdiah, N., Khairinal, K., & Syuhada, S. (2023). Pengaruh Lingkungan Sekolah dan Efikasi Diri Terhadap Kejenuhan Belajar dan Dampaknya Terhadap Motivasi Belajar pada Mata Pelajaran Akuntansi Siswa Kelas XI SMK Negeri di Kabupaten Sarolangun. *Jurnal Manajemen Pendidikan Dan Ilmu Sosial*, *4*(2), 653–664. https://doi.org/10.38035/jmpis.v4i2.1626

Oknaryana, O., Astuti, Y., & Murdy, K. (2020). Pengaruh Motivasi Belajar, Computer Attitude Dan Fasilitas Laboraturium terhadap Prestasi Belajar Komputer Akuntansi. *Jurnal Inovasi Pendidikan Ekonomi (JIPE)*, *10*(2), 169. https://doi.org/10.24036/011103580

Pramesti, A. A., Ilmiah, F., & Ramadhani, T. R. (2020). Peran Guru dalam Menumbuhkan Motivasi Belajar Siswa. *Confrence of Elementary Studies (C.E.S)*, *1*(1), 122–126. https://journal.um-surabaya.ac.id/Pro/article/view/19720/6726

Purwaji, A., & Muslim, S. (2023). *Akuntansi Biaya Edisi 3*. Penerbit Salemba. https://books.google.co.id/books?id=0xfjEAAAQBAJ

Rahmadhani, S., Ahyanuardi, & Suryati, L. (2022). Vocational High School Students' Competency Needs to the World of Work. *Mimbar Ilmu*, *27*(2), 349–355. https://doi.org/10.23887/mi.v27i1.42161

Sailer, M., & Homner, L. (2020). The Gamification of Learning: a Meta-analysis. *Educational Psychology Review*, *32*(1), 77–112. https://doi.org/10.1007/s10648-019-09498-w

Sardiman, A. M. (2019). *Interaksi dan Motivasi Belajar Mengajar*. PT RajaGrafindo Persada.

Sari, A. C., Fadillah, A. M., Jonathan, J., & Prabowo, M. R. D. (2019). Interactive gamification learning media application for blind children using android smartphone in Indonesia. *Procedia Computer Science*, *157*, 589–595. https://doi.org/10.1016/j.procs.2019.09.018

Saykili, A. (2019). Higher Education in The Digital Age: The Impact of Digital Connective Technologies. *Journal of Educational Technology and Online Learning*, *2*(1), 1–15. https://doi.org/10.31681/jetol.516971

Shania, A., & Iskandar, I. C. O. B. P. (2021). Measuring the Influence of Gamification Features to Needs Satisfaction. *2021 6th International Conference on Management in Emerging Markets (ICMEM)*, 1–7. https://doi.org/10.1109/ICMEM53145.2021.9869364

Silmi, T. A., & Hamid, A. (2023). Urgensi Penggunaan Media Pembelajaran Berbasis Teknologi. *Inspiratif Pendidikan*, *12*(1), 69–77. https://doi.org/10.24252/ip.v12i1.37347

Silva, R., Rodrigues, R., & Leal, C. (2021). Games Based Learning in Accounting Education–Which Dimensions are the

Most Relevant? *Accounting Education*, *30*(2), 159–187. https://doi.org/10.1080/09639284.2021.1891107

Srimuliyani, S. (2023). Menggunakan teknik gamifikasi untuk meningkatkan pembelajaran dan keterlibatan siswa di kelas. *EDUCARE: Jurnal Pendidikan Dan Kesehatan*, *1*(1), 29–35.

Thomas, N. J., Baral, R., Crocco, O. S., & Mohanan, S. (2023). A framework for gamification in the metaverse era: How designers envision gameful experience. *Technological Forecasting and Social Change*, *193*(October 2022), 122544. https://doi.org/10.1016/j.techfore.2023.122544

Tiarasari, A. (2021). The Effectiveness of Interactive Multimedia to Improve Cognitive Skill on Elementary School Students. *Jpi*, *10*(2), 387–395. https://doi.org/10.23887/jpi-undiksha.v10i2.17357

Usman, O., & Yulianingtias, R. (2022). The Effect of Reading Interest, Learning Discipline, and Learning Motivation on Student Learning Outcomes. *International Journal of Education and Teaching*, *2*(1), 13–28. https://doi.org/10.51483/ijedt.2.1.2022.13-28

Wang, Q., Wen, Y., & Quek, C. L. (2023). Engaging learners in synchronous online learning. *Education and Information Technologies*, *28*(4), 4429–4452. https://doi.org/10.1007/s10639-022-11393-x

Yana, E., Komara, A., & Anisah, A. (2019). Pengembangan Game Edukatif Berbasis Android Sebagai Media Pembelajaran Akuntansi untuk Meningkatkan Analysis Ability Mahasiswa. *Assets: Jurnal Akuntansi Dan Pendidikan*, *8*(2), 157. https://doi.org/10.25273/jap.v8i2.4916

Zainuddin, Z., Shujahat, M., Haruna, H., & Chu, S. K. W. (2020). The role of gamified e-quizzes on student learning and engagement: An interactive gamification solution for a formative assessment system. *Computers and Education*, *145*(October 2019), 103729. https://doi.org/10.1016/j.compedu.2019.103729