Research Trend in Management and Technology

PREPARATION OF 3D VIRTUAL GAME-BASED AUDIT SIMULATION APPLICATIONS FOR PROSPECTIVE AUDITORS

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Abstract
This study aims to develop a 3D virtual game-based audit simulation application as an innovative learning medium for prospective auditors. The study is motivated by the limited practical understanding of audit procedures among students due to learning methods that are still predominantly theoretical and lack real audit experience. This research employed the Research and Development (R&D) method using the ADDIE model, which consists of Analysis, Design, Development, Implementation, and Evaluation stages. The developed application includes simulations of various audit procedures, such as stock taking, cash count, accounts receivable and payable confirmations, and revenue testing based on auditing standards and PSAK. The results indicate that the 3D virtual audit simulation application can improve students' learning motivation, conceptual understanding, and practical auditing skills in a more interactive and effective manner. This study is expected to support the advancement of technology-based auditing education in higher education institutions

Keywords: *audit simulation, 3D virtual game, audit learning, ADDIE, prospective auditors.*

Introduction
Entering the modern era, prospective auditors are required to have high technical and professional skills in order to compete in the job market. The university not only serves as a venue for theoretical development, but also prepares aspiring auditors with relevant practical experience. One example is an internship program held by an educational institution. This program serves as a liaison for prospective auditors to develop the technical and professional skills needed to face the world of work. As a prospective auditor, an internship is an important step to implement an attitude of integrity, independence, and professionalism. Internship experience is valuable for prospective auditors because they can apply the knowledge they have gained as well as hone the practical skills needed in the field of auditing (Yusuf et al, 2025). Public Accounting Firm (KAP) Heliantono and Partners has an important role in ensuring that clients' financial statements are presented fairly in accordance with the Financial Accounting Standards (SAK) and Financial Accounting Standard Statements (PSAK) enforced in Indonesia (Hartono et al., 2025). In the professional world, the quality of audits and accounting services is greatly influenced by the understanding and compliance with established accounting procedures, such as inventory matching, cash calculation, operational cost procedures, capital procedures, and revenue procedures. This procedure is a crucial component in internal control and the preparation of reliable financial statements The knowledge or limited understanding of the prospective auditor of these measures shows that there is a gap between the applicable accounting standards and the practical capabilities possessed. Responding to this problem, a learning approach is needed that is not only theoretical, but also applicable and innovative. The latest in the research of prospective auditors in using current audit tools such as ATLAS is still experiencing some problems of understanding in the KAP, researchers have reviewed and checked on various websites for audit games and similar games are not found and the average audit game is only quiz-based on google has not yet existed in the process of understanding

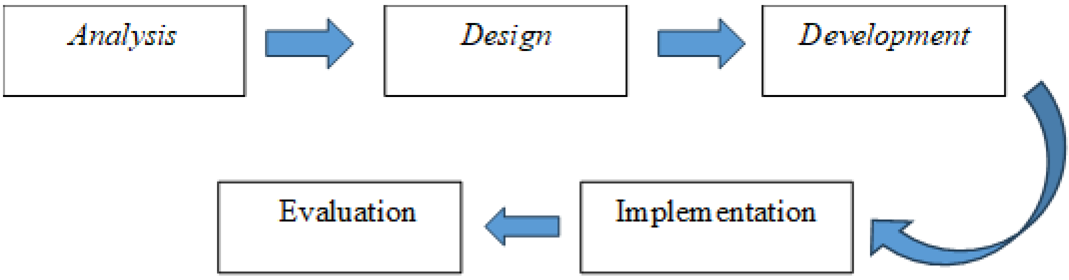
game-based auditing. Thus, the novelty of this research is that the presence of a 3D Virtual Game-Based Audit Simulation helps prospective auditors in understanding several clear and precise audit procedures and complete features to help prospective auditors in direct practice to become a competent auditor The use of digital platforms in the form of audit simulation games on the audit learning system in the teaching of audit courses aims to increase the motivation to learn prospective auditors.

Material and Method

Research Design

This study applies a Research and Development (RnD) approach using the ADDIE Model. This approach serves as the basis in mobile app development, which includes five steps namely Analysis, Design, Development, Implementation, and Evaluation. The use of ADDIE models in mobile applications can support the learning process or provide new information to users.

ADDIE Model Flow



Source: Processed by the Author, 2026.

The selection of this method was carried out because the purpose of the research was to explore the experience, understanding, and improvement of the ability of prospective auditors through audit simulation activities adapted in the form of 3D virtual games in the work environment of Public Accounting Firms. With a qualitative approach, researchers can understand the meaning experienced by participants as a whole and in context. In line with the principles of project-based learning, this study emphasizes both the learning processes and outcomes obtained by participants during their involvement in a series of planned audit projects while utilizing interactive simulation media.

The research design focuses on qualitative case studies that are descriptive, which aim to describe the phenomenon of understanding audit procedures (such as stock taking, cash count, operational expenses, capital, and revenue) experienced by prospective auditors during their internship programs and project-based graduate freshgraduate auditor candidates.

A. Analyze

The researcher made observations by conducting interviews with prospective auditors which included prospective accounting internship auditors who worked in the public accounting firm heliantono and colleagues. So that several needs and problems were found that prospective auditors for the first time entered the world of auditing public accounting firms must adapt to several audit procedures ranging from cash procedures, receivables, debts, inventory, equity, revenue and others. Thus, a study was conducted at the public accounting firm of heliantono and colleagues in order to help the prospective auditor in understanding several audit procedures easily using a 3D virtual game

B. Design

The design in designing or making this audit game uses flow charts as the flow in the game, Co-spaces as the software in making the 3D audit game.

C. Development

From the aspect of prospective auditors after conducting interview activities, this 3D virtual game is different from other audit applications, for example Atlas. Atlas software was not found to treat inventory stock taking procedures, and cash count. Thus, the 3D virtual game can make it easier for prospective auditors to understand the procedure easily.

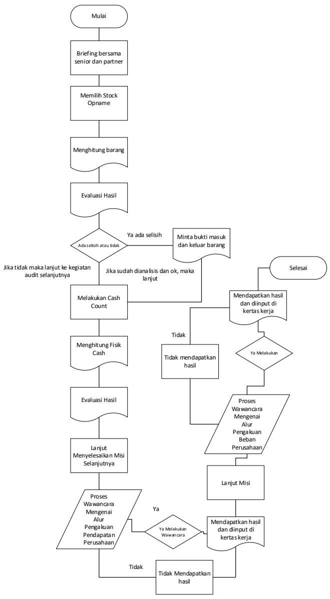
D. Implementation

This Virtual Audit Simulation Game will later be developed and implemented in several other public accounting firms and also applied on the campus of the State University of Jakarta, especially for prospective accounting auditors who take audit courses

E. Evaluation

The impact of this audit simulation game on prospective auditors is applied by prospective auditors which includes prospective intern auditors and prospective freshgraduate auditors at Public Accounting Firms in understanding audit procedure procedures. As well as an assessment from prospective auditors on the aspects of usability, convenience and user friendliness as well as in playing the game The research design flow starts from the introduction of the game to the assessment of audit performance, with the following stages:

Audit Simulation Game Process Flow



Source: Processed by the Author, 2026.

Instruments and Measures

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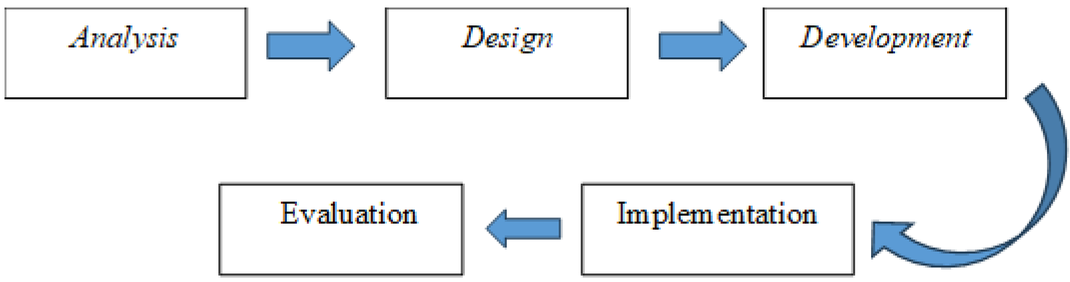

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Data Analysis

Data analysis was carried out in a qualitative descriptive manner, following the following steps:
1. Data Reduction Classify the data from observations, interviews, and documentation into related themes: (a) understanding of audit procedures, (b) 3D simulation experience, (c) the contribution of simulation to understanding. 2. Data Presentation Present findings in the form of narratives that support contextual explanations of the participants' experiences of prospective auditors. 3. Verification and Triangulation: Review data from various sources of instruments to ensure consistency of findings (observations, interviews, documentation). Draw conclusions related to the research objectives and refer to the influence of project-based qualitative methods and the use of simulations on the competence of prospective auditors. Qualitative analysis like this is often used in Project Based Learning studies

Results

This research was carried out based on direct discussion by prospective auditors who still have limited understanding of audit procedures when entering work practice at Public Accounting Firms (KAP). In fact, many prospective accounting auditors and novice auditors have gained a theoretical understanding of auditing during the lecture process, but still have difficulty in applying audit procedures directly to real conditions in the field. This situation shows that there is a gap between theoretical academic knowledge and the actual application of professional audit practices.

Figure 4.1 Audit Process

Audit planning is the initial stage in the audit process that aims to help auditors understand the company's condition, identify the risk of material misrepresentation, and determine the right audit strategy. At this stage, the auditor understands the client's business, understands the company's industry, determines materiality, and prepares an audit program. According to IAPI (2021), audits of cash and cash equivalents are carried out to ensure that the amounts reported in the financial statements are actually physically present, legally owned by the entity, and have been appropriately assessed. In audit practice, the procedure for checking cash and cash equivalents must be carried out strictly and systematically to ensure the reliability of the information presented by the entity. However, the main problem that often arises in the field is the gap between systematic and procedural audit theory, with real conditions that require professional adjustment and analytical acuity.

Cash Audit Procedures and Objectives

A. Purpose of Cash Audit

The purpose of a cash audit includes: ensuring the existence of cash, ensuring ownership rights, ensuring complete recording, ensuring accurate cash balances, ensuring presentation in accordance with PSAK. According to SA 500, auditors are required to obtain sufficient and accurate audit evidence of cash accounts because cash is particularly vulnerable to manipulation.

B. Cash Audit Procedure

1. *Cash Count*

   Cash counting is carried out by calculating cash directly to ensure the physical balance according to the company's records. Auditors usually check: cash, petty cash, checks, current accounts, temporary proof of cash. If a discrepancy is found between the records and the physical cash, the auditor will conduct further investigation. Recent research shows that *cash counting* is effective at detecting petty cash fraud and cash receipt manipulation.

2. Bank Reconciliation

   The auditor compares the balance by company with the bank statement. Reconciliation objective: find outstanding checks, deposits in transit, recording errors, and unrecorded transactions. Bank reconciliation is the main procedure because many cash frauds occur through manipulation of corporate bank accounts.

3. Bank Confirmation

The auditor sends a confirmation letter directly to the bank to ensure: account balances, loans, guarantees, dormant accounts, and account restrictions. Bank confirmation is evidence of an external audit that has a high level of reliability.

C. Cash Audit Evidence

Proof of cash audit includes: bank statements, *cash count results*, proof of cash inflow, proof of cash out, bank confirmation, bank reconciliation.

Audit Procedure on Accounts Receivable

A. Definition of Debt Audit

Debt is a company's obligation to other parties that arises as a result of past transactions and must be resolved at the expense of economic resources in the future. In financial statements, debt is one of the most important accounts because it is directly related to the company's obligations to creditors, suppliers, banks, and other third parties. According to Arens et al. (2021), accounts payable have audit risks in the form of understatement liabilities, namely companies deliberately do not record debts so that profits appear larger and financial conditions appear better.

B. Purpose of Debt Audit

The objectives of a debt audit include: ensuring that all debts really exist, ensuring that all liabilities have been recorded, ensuring that debts are recorded according to the accounting period, ensuring accurate debt balances, ensuring correct debt classification, ensuring presentation and disclosure in accordance with PSAK. In audit practice, the main purpose of debt audits emphasizes more on completeness, because the biggest risk of debt accounts is the existence of unrecorded debts.

C. Internal Debt Control

Before performing substantive procedures, auditors usually understand the company's internal controls related to the purchasing and debt cycles. Good internal debt control includes: separation of duties of the purchase section, receipt of goods, and recording, use of *purchase orders*, use of *receiving reports*, purchase authorization, and periodic debt reconciliation. If the company's internal controls are weak, the auditor will increase substantive testing.

D. Debt Audit Procedure

1. Understanding the Purchasing and Debt System

   The auditor first learns: the company's purchasing flow, debt recording system, debt payment procedures, and the documents used by the company. This stage is important so that auditors understand the points prone to fraud and recording errors.

2. Confirmation of Debt to Supplier

   The auditor sends a confirmation letter to the supplier to ensure: the debt balance is correct, the purchase transaction is correct, there are no outstanding debts. Debt confirmation is one of the most reliable external audit proofs because it comes directly from a third party. If there is a difference in the balance between the supplier and the company, the auditor will conduct further investigation.

3. *Search for Unrecorded Liabilities (Subsequent)*

   This procedure is the most important procedure in a debt audit. Auditors look for outstanding debts by: checking payments after the balance sheet date, checking period-end invoices, checking goods receipt documents. The goal is to ensure that there are no hidden liabilities of the company. According to recent research, many financial statement frauds occur because companies do not record end-of-period debts. (Corporate Debt and Liability Audit)

Audit Procedure on Accounts Receivable

A. Definition of Receivables Audit

Receivables are the company's right to collect to customers due to the sale of goods or services on credit. Receivables include current assets that have uncollectible risks so they need to be carefully audited. The purpose of the receivables audit is to ensure that: receivables really exist, receivables can be collected, complete recording, reasonable receivables assessment, and presentation according to accounting standards. According to Arens et al. (2021), accounts receivable have the risk of overstatement because companies can record fictitious sales to increase profits.

B. Purpose of Receivables Audit

The purpose of receivables audits: ensuring the existence of receivables, ensuring ownership rights, ensuring receivables can be collected, ensuring adequate receivables loss reserves, ensuring accurate recording.

C. Receivables Audit Procedure

1. Receivables Confirmation

The auditor sends a confirmation letter to the customer. Types of confirmation: positive confirmation, negative confirmation. The goal is to ensure: the balance of receivables is correct, the customer acknowledges the debt, there are no fictitious receivables. Confirmation of receivables is the main audit procedure on accounts receivable.

2. Analysis of the Age of Receivables

The auditor checks the aging schedule to see: current receivables, overdue receivables, stuck-stuck receivables. The objective: evaluate collectibility, determine the reserve of receivables losses.

3. *Subsequent Collection Review*

The auditor examines the payment of receivables after the balance sheet date. If the customer pays after the audit period then the receivables are considered valid.

Audit Procedure on Capital Accounts

A. Definition of Capital Audit

Capital is the owner's residual right to the company's assets after deducting all liabilities. A capital audit is conducted to ensure that the company's capital changes are recorded legally and in accordance with legal documents. Capital audits are important because they relate to: owner investments, dividend distribution, changes in the company's structure.

B. Purpose of Capital Audit

The purpose of a capital audit: to ensure that capital is actually present, to ensure that capital changes are legal, to ensure that capital transactions are recorded as complete, to ensure that capital balances are accurate.

C. Capital Audit Procedure

1. Examination of Deeds and Legal Documents

The auditor examines: deed of incorporation, change of capital, minutes of the GMS, shareholders' decision.

2. Capital Deposit Examination

The auditor checks: proof of transfer, bank account, proof of owner's investment.

3. Review of Capital Mutation

The auditor examines changes in capital resulting from: profit and loss, dividends, prive, additional investments.

4. Dividend Examination

The auditor ensures that the dividend distribution has the approval of the shareholders.

Audit Procedure on Revenue Accounts

A. Definition of Revenue Audit

Revenue is the most vulnerable account to manipulation because it is directly related to the company's profit. According to ISA 240, fraud most often occurs in revenue recognition.

B. Purpose of Revenue Audit

1. ensure that the income is correct,
2. ensure recognition in accordance with PSAK,
3. ensure complete recording,
4. ensure the cut-off is precise.

C. Revenue Audit Procedure

1. Sales Vouching
   Auditor checks: invoices, contracts, delivery orders.
2. Sales Cut-Off
   Ensure transactions are recorded for the correct period.
3. Analytical Procedures
   Compare: sales trends, profit ratio, revenue growth.
4. Review Returns and Discounts
   The auditor checks: returns, discounts, credit notes.

Audit Procedure on Expense Accounts

A. Definition of Expense Audit

Expenses are economic sacrifices that companies use to earn income. Load audits aim to ensure: loads are correctly occurring, are recorded completely, are periodically appropriate, and are properly classified.

B. Load Audit Procedure

1. Vouching Load
   The auditor checks: invoices, receipts, proof of transfer, contracts.
2. *Load Cut-Off*
   Ensure loads are recorded at the correct period.
3. Load Classification Inspection
   Ensure classification: operational, administrative, marketing.
4. Analytical Procedures
   Compare: load ratio, cost trend, unnatural fluctuations.

This problem can be seen from various audit activities, such as the implementation of *stock taking*, *cash count*, implementation of receivables procedures, implementation of debt procedures, testing of income and expenses, to the preparation of audit working papers. Most prospective auditors still do not fully understand the stages of auditing according to standards, document examination flows, methods of collecting audit evidence, and audit decision-making processes that refer to Audit Standards and PSAK. The audit learning method, which has been using more lectures and case studies approaches, is considered to be unable to provide practical experience that resembles the working conditions of auditing at Public Accounting Firms in real terms. Limited hands-on practice opportunities in the audit environment cause prospective auditors to have difficulty understanding the flow of the audit process systematically. Based on these conditions, this research presents an innovation in the form of an audit simulation application based on a 3D virtual game as an interactive learning medium for prospective auditors.

Discussion

Analyze Stage

The analysis stage was carried out to identify user needs for technology-based audit learning media. Based on the results of observations and interviews with prospective auditors and seniors at the public accounting firm Heliantono and colleagues, it is known that the audit learning process is still dominated by learning methods that still do not carry out direct practice

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while on campus and theoretical discussions so that prospective auditors have difficulties in understanding direct audit practices. In addition, the limitations of interactive learning media cause prospective auditors to lack a systematic understanding of audit procedures.

Design Stage

At the design stage, the researcher began to design a *3D virtual game audit simulation concept* that will be developed using a flowchart with several systematics that have been made sequentially. This stage includes the preparation of the game flow, the determination of audit materials, the design of the interface display, and the preparation of the audit simulation scenario. The simulation design is made to resemble the auditor's work environment so that users can get a realistic learning experience. In this simulation, the user plays the role of an auditor who is in charge of auditing the company's transactions and financial statements.

The features designed in the *3D virtual game* audit simulation include:

1. Audit simulation main menu

   This initial menu is for the auditor to enter the office and ready to receive assignments from superiors or senior auditors. The auditor staff, which includes junior and senior auditors, has ensured in determining the materiality taken from the income. Because the Company is profitable, therefore the auditor takes materiality from *the revenue* or income account. And the auditor must prepare a BAP (Proof of Audit Event consisting of *Stock Taking, Fixed Asset Observation, and Cash Count*

Figure 4.2 Main Menu

2. The assignment from the supervisor to conduct an audit of the Company PT. X and must complete an audit procedure consisting of cash, debts, receivables

Figure 4.3 Assignment View

3. Read audit procedures to review and complete assignments from superiors for company audit preparation. The researcher has prepared several procedures in each account and is complete in the flow as well.

Figure 4.4 Audit Processor Reading View

4. Audit document examination which includes account procedures (*Fixed Asset Observation*) and *Stock Taking* (*Inventory*).

Figure 4.5 Audit Inspection Display

5. Understanding the *process of stock taking flow*
   Before doing *stock taking* , which is the inventory account procedure, the thing that must be done is to request an inventory listing from December 31, 2025 to today's date because it is to ensure data on the entry and exit of goods

Figure 4.6 Stock Taking Process Understanding Display

6. Simulation *of Stock Taking* and *Fixed Asset Observation*
   Conducting *stock taking* and *fixed asset observation* by counting several items that the Company has, then the final result will be written in the Proof of Audit Event

Figure 4.7 Stock Taking Simulation View

7. Perform cash *count testing*
   This *cash count* test asks for mutation data from December 31, 2025 until the *cash count* is carried out as of February 4, 2026. The point of checking when doing *a cash count* of real money must be the same as the Company's financial mutase data. Then the results of the *cash count* will be entered into the cash working paper.

Figure 4.8 Cash Testing Display

8. Understanding of revenue procedures
   This understanding will later be posted and entered into the revenue working paper, so that we can know the flow of the initial mechanism for revenue recognition in the audited Company.

Figure 4.9 Revenue Procedure Understanding View

9. The next stage is the final part, which is to enter the results of the audit in the Company into their respective working papers, starting from cash, debts, receivables, capital, revenue, and expenses. When the book is clicked, a sample of a simulation of a large part of the work paper will appear. There are several stages of audit procedures that must be carried out, starting from the first stage, namely the cash account which consists of procedures in the cash account, namely lead, *cash count*, bank account. The second stage is Debts: lead (Numbers from client TB to taxpayers), Debt confirmation,

Subsequent, Aging schedule, third stage receivables: Lead lead (Figures from client TB to taxpayers), receivables confirmation from company to customer, subsequent, aging receivables, vouching receivables documents, then the fourth stage is capital account: Lead lead (Number from client TB to taxpayers), shareholder confirmation, recap of the act. The fifth stage is Revenue: Vouching document invoice, and the last sixth stage is the expense account: Vouching document invoice

Figure 4.10 Paper Display

Figure 4.11 Complete Audit Procedure

Figure 4.12 Example of Revenue and Expense Invoice

Figure 4.13 Confirmation Letter of Debts and Receivables and Aging

Development Stage

The development stage is the stage of product development based on a design that has been made before. At this stage, the researchers began to create *a simulation of a 3D virtual game* audit using game development software. Development is carried out by adjusting the auditing materials and applicable audit procedures. The researcher created a virtual environment in the form of a corporate office, a document archive room, a inventory warehouse, and an auditor's examination room. In this simulation, users can perform several audit activities such as:

1. Checking the transaction documents.
2. Conduct audit evidence testing.
3. Stock *taking* inventory.
4. Identify recording errors.
5. Prepare audit conclusions.

After the product is completed, the researcher validates media experts and material experts to determine the feasibility of simulating a 3D virtual game audit.

Implementation Stage

The implementation stage was carried out by piloting *a 3D virtual game audit simulation* to prospective auditors of the Accounting Study Program. The trial was conducted to determine the response of prospective auditors to the use of learning media that has been developed. Based on the results of the implementation, the prospective auditor showed high enthusiasm for the use of *3D virtual game audit* simulations.

Evaluation Stage

The evaluation stage is carried out to determine the effectiveness and feasibility of the learning media that has been developed. The evaluation is carried out based on the results of expert validation, the response of prospective auditors, and the results of observations during the implementation process. Based on the results of the evaluation, *the 3D virtual game audit simulation* is considered suitable for use as an auditing learning medium. This media is able to help prospective auditors understand audit concepts and procedures in a more interactive and applicable manner. The results of the evaluation also showed that the use of *3D virtual game audit* simulations can improve prospective auditors' understanding of audit procedures.

Development of *3D Virtual Game* Audit Simulation Using ADDIE Model

The results of the study show that the ADDIE model can be used effectively in the development of *3D virtual game* audit simulations. The Analyze stage helps researchers identify user needs for technology-based audit learning media. Tahapan Design helps researchers design learning media that suit the needs of prospective auditors. Furthermore, the Development stage allows researchers to develop interactive and realistic audit simulations. The Implementation stage shows that the use of *3D virtual game audit simulations* received a positive response from prospective auditors.

Advantages and Disadvantages of *3D Virtual Game Audit Simulation*

A. Advantages

1. Help prospective auditors understand audit procedures in practice.
2. Provide an interactive learning experience.
3. Increase the motivation to learn prospective auditors.
4. Simplify the understanding of audit procedures.

B. Disadvantages

1. Requires a computer device with specific specifications.
2. Media development takes a long time.
3. Some features still need to be further developed.

Conclusion, Implication, and Recommendation

Based on the results of the research that has been conducted, it can be concluded that the development of digital technology provides a great opportunity in creating audit learning innovations that are more interactive and applicable for prospective auditors. This research succeeded in producing a 3D virtual game-based audit simulation application designed to help accounting students and novice auditors understand audit procedures more easily through a simulation experience that resembles real audit conditions at a Public Accounting Firm (KAP). The findings of the study show that there is still a gap between the understanding of auditing theory gained in the academic environment and the ability to practice auditing when prospective auditors enter the professional workforce. Most prospective auditors still experience obstacles in understanding the implementation of audit procedures such as cash count, stock taking, receivables examination, debts, income, expenses, and the preparation of audit working papers. This research uses a Research and Development (R&D) approach with the ADDIE model which consists of the analysis, design, development, implementation, and evaluation stages. The application of the model is considered to be able to provide a systematic and directed learning media development process. At the analysis stage, the researcher identifies the need of prospective auditors for audit learning media that is more practical and easy to understand.

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