

# Educational Game Introduction to The North Sumatra State Museum Building Using RPG Maker MV

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## Abstract

This study aims to develop an educational game titled "Introduction to the North Sumatra State Museum" to enhance young people's understanding of Indonesia's history, culture, and natural wealth. The game was developed using RPG Maker MV to create an accessible 2D educational game and applies the Finite State Machine (FSM) method to manage interactions with non-player characters (NPCs). A qualitative approach was used, with data collected through questionnaires distributed to 30 respondents aged 15–25. The evaluation focused on gameplay, functionality, and cross-platform compatibility. Results showed that 76% of respondents felt engaged during gameplay, while 74% agreed that the game was effective as an educational tool. Additionally, 74% of respondents stated that the game is suitable to be used as a learning medium for introducing the North Sumatra State Museum.

**Keywords:** *Introduction to the North Sumatra State Museum, Educational Game, Finite State Machine, RPG Maker MV*

## 1. Introduction

Educational games are games developed with learning objectives that are not only used for entertainment but also to increase knowledge (L Novia, 2020). According to Purwanti (2024), games allow students to experience something enjoyable. When students feel happy, they create new memories. Therefore, media elements such as text, graphics, games, audio, and animated videos can be combined into an interactive unity to support learning success. Learning that uses these various features will be easier to conduct and more engaging for users. Thus, the use of appropriate learning media can provide students with opportunities to learn anytime and anywhere. In addition, the use of technology-based learning media has become a necessity in modern education. Based on the background and problem identification previously described, the formulated research problems are as follows: (1) How is the implementation of educational games in the introduction of the North Sumatra State Museum building? (2) To what extent can educational games effectively enhance the understanding of individuals aged 15–25 regarding cultural and historical aspects presented at the North Sumatra State Museum? (3) What are the challenges in delivering historical and cultural information about the North Sumatra State Museum through learning media?

The research scope was established to ensure that the writing does not deviate from the determined topic. The limitations of this research are as follows (1) The game was developed using the RPG Maker MV game engine. (2) The storyline of the game is set in the North Sumatra State Museum. (3) The game is specifically designed to run on the Windows operating system. (4) The game created belongs to the RPG genre.

The research objectives were formulated to provide clear direction and measurable goals. The objectives of this research are as follows: (1) To analyze the impact of educational games on learning experiences and understanding of the introduction to the North Sumatra State Museum building. (2) To present information about the history and contents of the museum through engaging media, thereby enhancing young people's understanding and appreciation of the learning material within the museum. (3) To identify the strengths and weaknesses of the educational game about the North Sumatra State Museum building.

Games are one type of entertainment enjoyed by many people, whether to relieve boredom or simply to fill leisure time. Apart from serving as a medium of entertainment, games can also function as learning media that help improve children's intelligence (Indrabayu et al., 2023), such as quiz games that encourage children to think. Thus, by playing games infused with educational content, children can become more active in learning.

According to Damarjati (2021), educational games are designed to stimulate the mind, including enhancing the ability to focus and solve problems. Educational games are developed with learning objectives and serve not only as entertainment but also as a means of gaining knowledge. Games are interactive, technology-based activities that are played through various electronic devices such as computers, consoles, or smartphones, designed to provide enjoyable, educational, or competitive experiences.

## 2. Literature Review

The North Sumatra State Museum, located in Medan, is a cultural institution that plays an important role in preserving and showcasing the region’s historical and cultural heritage (Sinaga, 2021). Established in 1909, the museum holds a diverse collection, including prehistoric artifacts, ethnographic items, and fine art that reflect the ethnic and cultural diversity of North Sumatra. The classical architecture of the museum building further adds to its appeal, making it not only an informative but also an aesthetically pleasing destination for visitors. Role Playing Game (RPG) is a genre of game in which players control a character or avatar within a fictional world, typically in an environment that involves elements of storytelling, exploration, and combat. RPGs provide a type of gameplay where players take on the roles of imaginary characters and collaborate to weave a narrative together (Alfinggar & Prasetya, 2021). Players act as these characters and play according to the background or storyline that has been created. RPGs have several core elements that make them a distinctive genre.



**Fig. 1:** Game RPG  
Source: (Alfinggar & Prasetya, 2021)

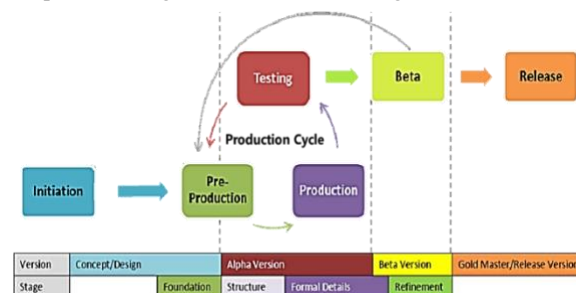
RPG Maker MV is an RPG creation program developed by the Japanese team ASCII, which was later succeeded by Enterbrain. The RPG Maker MV series was first released in Japan, but many users began pirating it and distributing the program illegally. RPG Maker MV was officially released by Degica on October 23, 2015. RPG Maker MV introduced many changes and updates compared to its previous versions. This version supports cross-platform use, features improved visuals, and offers high-resolution support



**Fig. 2:** RPG Maker MV  
Source: (Prayogo et al., 2025)

## 3. Research Methods

GDLC is a concept in which the basic idea of a game is developed. This includes identifying the objectives of the game, selecting the game platform, and developing the storyline, characters, and gameplay. The second stage is the design phase, where detailed planning is carried out regarding the visual and technical aspects of the game, such as level design, character interactions, and other features.



**Fig. 3:** Game Development Life Cycle (GDLC)

Source: (Rizal H et al., 2023)

## 4. Results and Discussion

Use case diagram can describe an interaction between one or more actors and the system to be developed. A use case diagram can be used to identify the functions within a system and represent the interaction between actors and the system. It is a visualization of several components, such as actors, use cases, and the relationships between these components. Several symbols or notations are used to illustrate the functionality of a system in a use case diagram.

Flowchart is a graphical representation of the steps and sequence of procedures in a program (Zalukhu et al., 2023). It is a diagram that depicts the steps or stages that must be followed to achieve a particular goal. Flowcharts are often used in computer science, engineering, business, and many other fields to describe and analyze workflows or processes.

Storyboard is used to help developers organize the step-by-step design of an application (Ariyana et al., 2022). With a storyboard, it becomes easier to determine the correct placement and clarify the menus in the application being developed.

Questionnaire is a data collection technique that involves providing a set of written questions to respondents to be answered (Rudiyanti et al., 2025). This technique is widely used in research because it allows data to be collected from many respondents more efficiently in terms of time and cost.

Black box testing is a testing method that only examines the external behavior of the software. It is a testing technique that focuses on the functional requirements of the software, based on the software specification. There are several methods used in black box testing, such as equivalence partitioning, boundary value analysis, cause-effect graphing, comparison testing, random data selection, feature testing, all-pairs testing, fuzzing, orthogonal array testing, sample testing, robustness testing, behavior testing, performance testing, endurance testing, and others (Pratama et al., 2023)

The Finite State Machine (FSM) model, which is used to describe and control the flow of execution, is commonly applied in computer programs and sequential logic circuits. It is highly suitable for implementation in game AI, producing effective results without requiring complex code. The system design illustrates the behavior or working principles of the system using three components: states, events, and actions. At any significant period of time, the system resides in one active state. The system can transition to another state when it receives a specific event, either from external devices or internal system components.

In games, the FSM process operates by following certain rules: if a mission is completed or a quest is fulfilled, the state transitions to the next level; if the mission is not completed or the quest is unfulfilled, it remains in the initial state. FSM is used to control the dynamic behavior of Non-Playable Characters (NPCs), thereby enhancing the interactivity of the game (Prayogo et al., 2025).

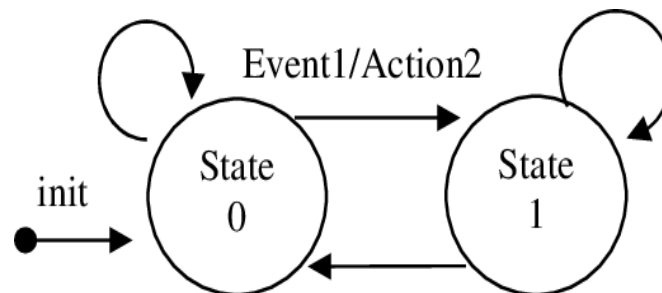


Fig. 4: Diagram State simple  
Source: (Prayogo et al., 2025)

The discussion of the research findings and tests obtained is presented in a theoretical explanation, both qualitatively and quantitatively. The experimental results should preferably be displayed in the form of graphs or tables. For graphs, the format should follow the standards used for diagrams and figures.

## 5. Conclusion

### 1. Implementation Game

The educational game entitled "Introduction to the North Sumatra State Museum" has been successfully implemented using the RPG Maker MV software. This game is designed to provide an interactive exploration experience within a virtual museum environment while incorporating educational elements through storytelling, challenges, and narrative choices. The implementation of the game was carried out by adapting the flow design that had been developed in the previous stage. The game allows players to interact with various historical objects, choose different adventure paths, and complete educational missions related to the preservation of natural ecosystems. The following presents the detailed implementation of each game component.



### Picture 5 Implementation Menu Game

The implementation of FSM in this game covers various aspects, such as managing NPC states, responding to player actions, and handling transitions between states based on certain conditions. For example, an NPC may have states like Idle, Talking, Walking, or Fighting, which change according to player interactions or in-game events.

## 2. Black Box Testing

Black Box Testing was carried out to ensure that the game runs properly, is free from bugs, and achieves the intended learning objectives. The testing process involved several stages, starting with functionality testing and compatibility testing.

## 3. User Testing

User Testing was conducted to examine how effective the game “Introduction to the North Sumatra State Museum Building” is as a learning medium.

### a. Questionnaire Items

The researcher described the questions designed to measure the effectiveness of the educational game “Introduction to Animals at the North Sumatra State Museum” as a learning medium about wildlife. The questionnaire was structured to evaluate key aspects of gameplay experience, understanding of animals, and the effectiveness of the learning media provided. It was divided into three main sections, each containing seven questions, focusing on the following aspects.

### b. Gameplay Experience

This section evaluates the visuals, gameplay controls, asset completeness, difficulty level, and benefits from the player’s perspective. The aim is to identify the extent to which players enjoy the game and how the game elements support or hinder their playing experience.

### c. Understanding and Educational Effectiveness

The questions in this section are designed to measure the extent to which players understand the material on the introduction to history, culture, and natural resources delivered through the game. This includes assessing players’ comprehension of facts, narratives presented, and how the game helps deepen their knowledge of culture, history, and natural wealth.

### d. Feedback, Impressions, and Suggestions

This section assesses the effectiveness of the game as a learning tool. The questions evaluate whether the game succeeded in achieving its educational objectives, how it compares to traditional learning methods, and whether it increased players’ interest in further studying history.

## 4. Assessment Results

User testing was conducted through an online questionnaire distributed via Google Forms, involving 30 respondents aged 15–25 years. This age range was selected because it represents a group that is predominantly still engaged in formal education, either at the junior high school, senior high school, or university level. Such a selection enables a more relevant evaluation of the game’s effectiveness as a geography learning medium for both students and university learners. The respondent data are presented in the following table.

**Table 1** Questionnaire Respondent Data

No	Nama Inisial	Jenis Kelamin	Usia	Pendidikan Terakhir
1	RDH	Laki-Laki	24	SMA/SMK
2	ZKY	Laki-Laki	22	SARJANA/D3
3	ALD	Laki-Laki	24	SARJANA/D3
4	S	Perempuan	22	SMA/SMK
5	MH	Laki-Laki	20	SMA/SMK
6	DND	Perempuan	17	SMA/SMK
7	AM	Perempuan	20	SMA/SMK
8	D	Laki-Laki	16	SMP
9	WL	Laki-Laki	19	SMA/SMK
10	DNL	Laki-Laki	19	SMA/SMK
11	YSR	Perempuan	23	SMA/SMK
12	N	Perempuan	21	SMA/SMK
13	AK	Laki-Laki	15	SMP
14	LE	Laki-Laki	21	SMA/SMK
15	P	Perempuan	23	SMA/SMK
16	JEP	Perempuan	24	SARJANA/D3
17	PRA	Laki-Laki	25	SARJANA/D3
18	ZU	Perempuan	19	SMA/SMK
19	L	Perempuan	23	SARJANA/D3
20	SYH	Laki-Laki	24	SARJANA/D3
21	RYN	Laki-Laki	23	SARJANA/D3
22	MD	Laki-Laki	20	SMA/SMK
23	Y	Laki-Laki	17	SMA/SMK
24	SA	Laki-Laki	24	SARJANA/D3
25	AZ	Laki-Laki	16	SMA/SMK
26	NAN	Laki-Laki	22	SMA/SMK
27	J	Laki-Laki	18	SMA/SMK
28	SCW	Perempuan	23	SARJANA/D3

29	WMS	Laki-Laki	23	SARJANA/D3
30	WHY	Laki-Laki	23	SARJANA/D3

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