

Research article

Improving Students' 4C Skills Using Video Games

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ORCIDMitra Istiar Wardhana: <https://orcid.org/0000-0002-7637-3159>**Abstract.**

To be able to apply the knowledge learned in school in the community, students need not only skills but also knowledge of potential problems and decision-making abilities. Therefore, students need four skills (4C skills) that must be imparted at the beginning of learning and nurtured continuously in order to compete and thrive in an academic environment. Educators have recognized that such goals are important yet challenging. For this reason, it is necessary to use supporting media that can assist in honing students' critical thinking skills. The proposed media for this study was social video games. The selection of games was based on the flexibility of media that can be accessed ubiquitously and allows for interactions with other players in cyberspace. In this article, we examined several methods that can be applied in social games to improve students' 4C skills.

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1. Introduction

Learning in schools is carried out to shape the character and abilities of students so that they can be applied in social life. To be able to survive in the era of globalization, there are 4 skills that must be possessed and always nurtured from the start so that students can survive and compete with other students. These skills are critical thinking, creative thinking, communication, and collaboration or commonly referred to as the 4Cs. To be able to implement 4C in learning in schools, teachers prepare all devices such as curriculum, lesson plans, and models or methods that are integrated with learning [1]. To be able to produce good learning tools, technological assistance is needed, especially for the manufacture of learning media.

Critical thinking is a directed and clear process that is used in mental activities such as solving problems, making decisions, persuading, analysing assumptions and conducting scientific research. Critical thinking is the ability to think in an organized way. Critical thinking is the ability to systematically evaluate the weight of personal opinions and the

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opinions of others [2]. Chaplin in [3] states that creativity is the ability to produce new forms in the arts or in the arts, or in solving problems with new methods.

Communication is the process of language exchange that takes place in the human world. Therefore, communication always involves humans both in intrapersonal, group and mass contexts. Communication researchers prove that until now language is recognized as the most effective medium in communicating in an interaction between individuals such as counselling and coaching activities, teaching, and learning processes, workplace meetings and others. According to [4], "Collaborative is an adjective that implies working in a group of two or more to achieve a common goal, while respecting each individual's contribution to the whole.

The pandemic condition that makes students must study at home also exacerbates the process of implementing the 4Cs in learning. The limited number and duration of face-to-face meetings between teachers and students causes the application of 4C in learning to not run optimally. Skills that require students to be able to communicate and collaborate with classmates cannot be implemented because students are not allowed to gather and study together for health reasons.

In this condition, the use of learning media must be improved so that it can still accommodate 4C learning in students. Of course, the media must have the ability to accommodate 4C learning. Media that can make students think critically, be creative, collaborate as well as communicate with other users are not widely available. The teachers have developed many media in online-based learning. Digital presentation media and learning videos are the two most widely used media in online-based learning.

Digital presentation media and learning videos are less able to accommodate the 4Cs because of the one-way nature of the media so that students can only see and listen to the teacher's explanation. Therefore, the 4C ability must be developed further by providing additional instructions or adding assignments to students. Interactive media can be used as an alternative because teachers and students will be able to interact directly through the media. By using interactive media, students will also not be limited in time in accessing learning media. This advantage can be used to increase the limited face-to-face time.

2. Method

This research is a library research. This study explores the concept of 4C skills in learning. In addition, data and information related to various types of learning media were also collected to determine the most suitable media for use in 4C learning.

Literature research is a series of activities related to the method of collecting library data, reading and recording and processing library collection materials without the need for field research [5]. Library research can also be interpreted as a series of activities related to library data collection methods [6]. According to Abdul Rahman Sholeh, library research is research that uses methods to obtain information data by placing existing facilities in the library, such as books, magazines, documents, records of historical stories.

3. Result and Discussion

The use of games as learning media must consider the type of games to be used. There are many types of games that can be used to deliver learning content. Adventure, Simulation, and Role Play games can be used as learning media because these three types of games focus on characters and storylines. The character will be a representation of the student, so that in the game students will be directed to become a character who has 4C skills. Stories are also an important part, because stories can be used in delivering learning materials to train students' 4C skills.

3.1. Adventure Game

Adventure games are story-based games. Just like in the movies, in adventure games the player takes on the role of the main player. What distinguishes it from movies, in adventure games players could set the storyline. The storyline in adventure games is dynamic and is usually divided into events that the player must go through. To reach the end of the story, players are given the freedom to choose which events will be completed first.

To support a dynamic storyline, a strong character depiction is needed. Like the story of a film or animation, a good story if it is delivered by a bad actor then the story will not be conveyed properly to the audience. Likewise, adventure games require characters who can support the story. A dynamic storyline also requires special rules that ensure the characters in the game develop according to the selected storyline. In other words, although players are free to determine the storyline, they must still follow the rules of the storyline made by the player not to leave the main storyline.

The selection of events in this story can be used to hone critical thinking skills, where students as players are required to be able to make the right choices according to the conditions and problems they face. Players can also creatively determine their

own storyline which will indirectly hone the creative skills of players. Collaboration and communication skills can be done if the game supports multiplayer features. Collaboratively, players can work together as well as communicate with each other about strategies to complete the game well.

The concept of adventure games to train students' 4C skills can take themes that are close to students' daily lives. Cultural-themed games can be an interesting example. Players are on an adventure to gather information about the indigenous culture of an area. Indigenous local culture that contains elements of stories such as fairy tales or fables can be developed into adventure games. The storyline in the fairy tale is divided into several sections that the player can choose from. Each part of the story must be structured in such a way to hone the player's 4C skills.

Critical thinking can be honed by providing clues that must be assembled into information needed to complete parts of the story. Meanwhile, creativity can be honed by giving players the freedom to assemble the pieces of clues they get, until players find the right information. Communication and collaboration can also be honed when several players complement each other's pieces of clues that are obtained and then combined into one whole information.

3.2. Simulation Game

Simulation games are games that try to describe real-world conditions as realistically as possible. At first the simulation has not entered the type of game. Computer-based simulations or simulators were originally used in training activities to save costs. Aviation is one of the industries that develops simulators to train pilots to understand how to properly fly various types of aircraft. Using a simulator is much cheaper than using a real plane. In addition, using the simulator also eliminates the risk of loss of life and material loss resulting from damage to the original aircraft. The use of simulators also makes it easier for pilots to practice flying aircraft in various conditions. Starting from weather conditions to different aircraft conditions.

Simulators are growing not only at the industry level. Game developers began to develop simulation-type games to meet the wishes of fans. Technological developments also allow simulators that initially could only be built in the industry to be able to be played on a computer or laptop through game applications.

In simulation games, students can feel the conditions in the real world through games. 4C skills can be trained through this type of game because simulation games are made as close to the real world as possible. Choosing a theme is one of the most important

elements. For example, a natural disaster simulation game can train students' 4C skills ranging from critical thinking to analysing phenomena that can trigger natural disasters. Creatively students can also be trained to make rescue tools from the objects around them. Students can also be asked to develop individual or team disaster management plans which will indirectly train students' communication and collaboration skills.

3.3. RPG Game

Role Play Game (RPG) is a game where the player takes on the role of a character and develops the character that is played during the game. If adventure games focus on the story, then in Role Play the focus is on character development. In RPG games, character development is marked by increasing the level of players, the amount of money, weapons, and abilities of the players. In RPG games the player tries to constantly increase his level to face increasingly powerful enemies.

If it relates to 4C, then RPG games can be used for players to better understand what 4C is. Because the focus of RPG is character development, 4C can be used as the main skill possessed by a character that can be continuously developed during the game. This main skill can be continuously improved during the game with the hope that at the end of the game the player has an adequate understanding of 4C. To support the understanding of 4C in RPG type games, supporting elements such as the environment and property in the game must also be designed according to the game's purpose to introduce 4C skills to students.

The concept of an RPG game that is suitable for teaching 4C to players can use school-themed games, where players take on the role of students trying to improve their 4C skills throughout the game. The developed game can be divided into several tasks or missions that must be completed by the player. Completion of tasks / missions must use a combination of 4C in its completion. Critical thinking skills can be honed through problem analysis in each mission, creativity can also be honed through ideas generated by players in solving problems in each mission. Similarly, communication and collaboration can also be developed from group missions that must be completed together by several players.

4. Conclusion

Games can be used to hone 4C skills in students. But not all games can be applied. The types of games that can be used are Adventure, simulation, and RPG games. These

three games have characteristics that focus on characters and stories. Game characters can be considered as representatives of players in the virtual world, and stories can be used as a medium to convey information about 4C.

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