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The Effects of Using Minecraft to Learn Space for kids

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Abstract

The environment in outer space is very different from that on Earth. Therefore, to operate in space, it is necessary to train beforehand. To do so, special machines and simulators are needed, and they are very expensive.

Therefore, it is out of reach for children like us. The hurdles are so high that it is difficult to get them interested and to keep them interested.

Therefore, we tested whether the sandbox game "Minecraft" (Mojang Synergies AB) could solve this problem. First, we conducted a test and questionnaire about knowledge and interest in space and asked people to play Minecraft with mods that lead to space experiences. Then, they were tested again to evaluate the effectiveness.

Minecraft's virtual space is low-cost and can be experienced and cultivated even by children. It is believed that training children from an early age can improve their knowledge and skills, and by making them feel closer to space, it can increase the number of people interested in working in space in the future. In this paper, we will introduce actual cases and effects. Besides, the created world can be accessed from all over the world, and children from all over the world can collaborate to create something. In the future, we plan to further investigate the possibility of space development training in teams led by children.

Keywords: (gamification, Education, Minecraft, virtual space, child)

1. Introduction

In general, training for space activities requires very expensive machines and simulators. In Japan, there are almost no such facilities. This is even more so when it is for children. Therefore, it is out of reach for children like us. And even if there are, they are already completed, and the children just play as they are told. This makes it difficult for children to get interested and continue to play.

These days, sandbox games are becoming more and more accessible." Minecraft is a popular adventure and building game for children in Japan, with approximately 140 million monthly active users worldwide [1], more than 238 million software units sold, and the most viewed game video on YouTube in the world.

Minecraft allows users to build their own creative worlds through online collaboration [2]. There are mods that recreate the space environment, and even children can freely design space buildings and vehicles.

2. Material and methods

To recreate the space environment, I used the Galacticraft mod by Mitch Petrie (micdoodle). With this mod, you can go from Earth to the Moon, Mars, Venus, asteroids, and more. This time, five children between the ages of 8 and 12 had the opportunity to experience it. To prevent the spread of the coronavirus, the actual experience was all done online.

First, they were given a test and questionnaire regarding their knowledge and interest in space, and then asked to play "Minecraft" with mods that lead to space experiences. We then asked the question again to evaluate its effectiveness.

Questions to ask before the experience are as follows

(1) Are you interested in space?

(2) Would you like to go to space?

(3) If yes, where would you like to go? And what would you like to do?

(4) What do you have to be careful about when you go to the moon, Mars, or Venus?

After experiencing and playing with them, we asked the following questions.

(1) Has your interest in space changed?

(2) Did your desire to go to space change?

(3) Are there any thoughts or new things you noticed after playing the Minecraft

Minecraft activities begin by going from the Earth to the Moon. At first, the experience is in Creative Mode. In creative mode, you can build anything, so there is no need to build a rocket. The experimenter first heads to the moon. If the lander touches the moon's ground too soon, it will explode. There is a base on the moon that the experimenter must visit. They can also take a ride in a lunar car. After enjoying all the experiences, the rocket will take you back to earth.

The second and subsequent participants will take part in the survival mode. In the survival mode, you need to collect materials to build your own rocket. Rockets are made by collecting various raw materials from around the planet, plating them, making wafers and other materials, combining them with machines to make intermediate materials, making modules, and so on. Because of the enormous amount of work involved, it is difficult for one person to perform these tasks alone. However, by cooperating with a large group of people, it is possible to proceed efficiently. While consulting with everyone, divide up the work of gathering materials and making bases. Teamwork is important.

3. Results

The students were asked to express their interest in space and whether they would like to go there on a 10-point scale. As shown in the figure, the scores increased significantly in all categories.

In addition, we received the following responses regarding what they would like to do in space.

I want to explore the land of the moon and Mars. I want to explore the Moon and Mars and cultivate the land for human habitation. I want to make a big jump in a place with low gravity. Before this experience, I had no particular interest. But now I am interested.

The following are some of the responses about what they learned from this experience.

I was surprised at how long the moon's days and nights are.

I learned that you can not only fly high but also descend slowly.

I thought Mars was cold, but now I know that it can be too hot.

I learned that Venus is hotter than I thought, with sulfuric acid pouring down on the planet in a harsh environment.

I became interested in planets and their satellites and learned many things about them.

I learned that teamwork is the key to making things.

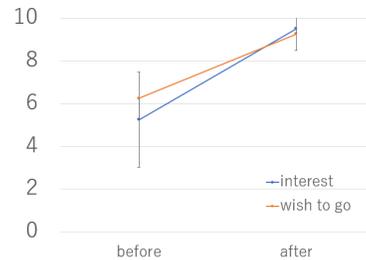


Fig. Increased interest in space

4. Discussion

Minecraft's virtual space is low-cost and can be experienced and cultivated even by children. It can also be linked to VR to provide a more realistic experience. We believed that training children from an early age can improve their knowledge and skills, and by making them feel closer to space, it can increase the number of people interested in working in space in the future. In fact, through this experience, children who had always liked space became even more interested in it, and children who had never been interested in it became more interested in it. Some of the children became very knowledgeable about planets and satellites after the experience. This time, it was only children in Japan, but within Minecraft, it can be accessed from anywhere in the world, and children from all over the world can work together to build rockets and bases. In the future, we plan to collect data from more children's experiences and further explore the possibilities of space development training with teams of children.

6. Conclusions

Using Minecraft, the children were able to plan and execute their own space experience. This experience increased the children's interest in space.

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