# "Alone in Space" - Escape Room Game for VR

Patrik Voštinár(✉), Aleksandr Mandrichenko
Matej Bel University, Banská Bystrica, Slovakia
`patrik.vostinar@umb.sk`

**Abstract**—Virtual reality (VR) technology has undergone a huge breakthrough in development and distribution over the last few years. It is now becoming an increasingly popular tool not only in the field of creating computer games, but also in industry and educational process. From the beginning, VR devices were big, uncomfortable, and very expensive. For this reason, they were used mainly in research laboratories, high-tech companies, and military installations. Currently, leading companies in the field of new technologies, such as HTC, Google, Sony, Samsung, Oculus, resp. Meta have filled the market with compact and accessible devices for nesting in the VR. They managed to create a completely new category of consumer goods. The paper is devoted to the study of virtual reality technologies and their use for the development of our own free-of-charge game. The created game combines several genres, escape room, with elements of the genre of Shooter (FPS) and Logic. Our game could be used to practice logic and observation. The paper describes process of developing our virtual reality game "Escape room" from the beginning step by step until game over (choosing game engine, add correct assets, creating non-player character, basic methods). The aim of our research was identifying interesting educational games, which could be used as a tutorial for those who want to create virtual reality game and also for those who had virtual reality helm and want to try something new and freely available.

**Keywords**—virtual reality, escape room, educational games

## 1 Introduction

The educational process is constantly changing; new methods of education are emerging, research teaching, flipped teaching, etc. The need to change the educational problem is related to the weak motivation of students to study some subjects. Each subject needs a special method, which is suitable for teaching. Verawati et al. [1] used smartphones to improve mathematical problem solving skills and find validation through Android-based learning media to improve mathematical problem solving skills. Vidakis et al. [2] through his work, aim to emphasize and extend the use of learning analytics in serious games, simplify the production of data, and record events with educational value. Maharjan and et al. [3] study examines the role of ICT tools in mathematics and their features and importance in promoting meaningful learning in mathematics. Pokorný [4] use of digital technologies to teach geometry teaching.

Vidakis et al. [5] through his work aim to expand the reach of learning analytics into serious games, facilitate the generation of such data in commercially popular development tools and identify significant events, with educational value. Papadakis [6] in his study use App Inventor and a game-development approach in school lessons, as an example of constructionist learning in an introductory programming course for novices. Kalogiannakis et al. [7] in his study's presented the empirical findings of the state-of-the-art literature on the use of gamification in science education. In computer science, we are currently researching using ICT devices to increase motivation of students through gamification, game support learning for teaching creating mobile applications, virtual reality applications, etc.

Applications based on virtual, extended, or mixed reality are rapidly gaining popularity in commercial games and services to various science research areas such as healthcare, economy, space, and in the education processes of all types of education (from primary schools to universities).

Many authors [8-11] deal with detailed development and milestones in history. The concept of virtual reality has existed since the 1950s. Morton Heilig, often referred to as the 'father of virtual reality', was an American filmmaker who developed cinema in the 1960s. He developed the Sensorama machine, which immersed the viewer in VR using short films, which were accompanied by the smell, wind, and noise of the city. This facility is considered to be one of the important milestones in the development of VR. From Morton Heilig's arcade concept (1962) to Ivan Sutherland's head-mounted display, The Sword of Damocles (1965-1968) ideas, from Myron Kruger's Videoplace (1974) to cave software (cave automatic virtual environment, Electronic Visualization Lab at University of Illinois Chicago, 1962) [12]. All of these inventions influenced the further development of virtual reality.

Since 2012, virtual reality devices have become popular in the entertainment industry. Several innovative people and creative companies have started working to create their own virtual reality facilities.

Although devices are becoming more and more affordable, the problem is still the small number of applications created that could be used in the teaching process or just for testing a virtual environment. The aim of our research was to create game for virtual reality, which is free of charge, to have good story with interesting graphics, or spectacular graphics, and to have educational potential. The game should be used for showing virtual reality at schools (it could be a good example of how to navigate in the VR environment and what can be created in the Unity engine). We wanted this environment to be attractive to students, so we chose the theme of an escape room. The game should also be open-source so that everyone can see how it is created, and can continue to create additional tasks in this environment. Another aim of this paper is to use it like a tutorial for creating virtual reality games.

## 2      Virtual reality and games

Virtual reality creates the illusion that a person is in a different place. It is defined as a highly interactive multimedia environment based on computers in which the user becomes a participant in a computer-generated world [13-15]. We consider the following definition [16] to be the most appropriate: Virtual reality as a multidisciplinary research area aimed at interactive human–computer-mediated simulations of artificial environments. This definition captures applications ranging from simulation to training, to scientific visualization, and even entertainment. An important aspect of such VR-based systems is the stimulation of the human senses – typically sight, hearing, and touch – such that a user feels a sense of presence (or immersion) in the virtual environment.

The most common ways to immerse yourself in VR are specialized glasses. The 3D video is displayed on the screen in front of the user's eyes. The gyroscope and accelerometer are part of these helmets, so all translational and rotational movements of the head are transmitted in the form of data to a computer system that changes the image on the display depending on the readings of the sensors. This gives the user the opportunity to 'look around' in VR and feel in it, just like in the real world. An important part of the special glasses are also controllers that allow user to control the movement and interaction with objects in the virtual space. Many of the controllers also have tactile feedback in the form of vibrations and several buttons for various interactivity functions. Even in some cases, controls are not needed at all and the user's hands are enough to control the movement. Their movement is captured by cameras built directly into the headset (e.g Oculus/Meta Quest 2).

The driving force of the VR market is currently the entertainment industry. VR and digital games (DG) are two areas which share many similar characteristics, among which the three most important are as follows. Both of them have to focus on Human to succeed (feeling of presence for VR, entertainment for DG). VR and DG exploit the technological breakthroughs of several fields such as image synthesis, electronics, etc. Finally, both act sometimes in a virtual realistic world, such as a flight simulator or therapy environment. Sometimes, they allow us to operate in a fantasy world which does not necessarily respect usual physical laws.

In the early days of virtual reality games (VRG), when compared to classic games, there was an immersion level very high in VRG, but the emotion level was quite low. As an example of VRG we can notice that DisneyQuest opened in 1998 which was an interactive indoor theme park that contains several VR attractions such as Aladdin's Magic Carpet Ride.

In the coming years, technology has improved and VRG has acquired a high level of not only immersion, but also an emotional level.

The main problem that the creators of VR games have to constantly face is the disease (or nausea) of movement of a person in a helmet in a virtual environment. The user begins to feel depressed when the brain receives conflicting information from the vestibular apparatus and the eyes. That is why the nature of everything that happens before eyes is important when designing VR games. For this reason, there are high technical requirements for applications: developers must take into account the performance of

modern VR helmets and optimize the code so that there is no delay in the game. Otherwise, graphics problems affect the user's health. For example, when developing games for mobile devices and computers, developers focus on the minimum number of exchangeable frames per second, FPS. An article [18] was devoted to removing this problem, where three different ways of creating movement in the environment were compared and an optimal solution was found.

# 3      Developing VR game in Unity 3D

We can create games designed for VR in various development environments. The most used development environments are Unity 3D and Unreal Engine. We decided to choose Unity 3D because on Unreal Engine 4, it is problematic to create large seamless worlds designed for many players and problems with a large number of NPCs (non-player character is a character that cannot be controlled by the player).

Unity is a multi-platform computer game development environment developed by the American company Unity Technologies. The Unity environment was founded in 2005 and has been continuously evolving since then. Due to this environment, thousands of games and applications have been created. Unity uses the programming languages C# and JavaScript to develop games. The biggest advantages of this environment are the following.

- Unity has a simple Drag & Drop interface that is easy to customize and consists of different windows, so developers can debug the game directly in the editor.
- Various libraries, assets, and add-ons that can significantly speed up the game development process.
- Unity is available free of charge.

The biggest disadvantages of this environment:

- Creating large and complex scenes with many components can adversely affect game performance, requiring developers to devote more time and resources to optimizing and possibly removing some elements from the project.
- Created applications are memory intensive and take up a lot of disk space.

# 4      Escape room game

Before creating our own game, we analyzed different types of virtual game genres. Inspired by genres like Shooter, Sports, and Logic, we decided to create a game that will include selected elements from these games. The environment of our game will be located on a spaceship. The player will play the role of a space guard on the ship whose goal will be to complete the mission. There will be various obstacles on the ship in the form of logical tasks and the need to find the necessary objects to open the rooms. The aliens on the ship (from the movie 'Alien vs. Predator") will interfere in the mission, and the player will be able to defend against them with weapons. The game will be called Alone in Space.

### 4.1 The story of the game

Alone in space consists of one level but has three different modes: Campaign, Challenge, Survival. The level in the game is a closed place, a spaceship with a certain number of rooms. The main tasks of the player are to explore the world, interact, find objects, and shoot enemies. Successful completion of a level is considered necessary if the player has survived and completed the mission. In Figure 1 is displayed the game menu with stats, load level, and settings.

The first game mode is the campaign mode, which is available from the very beginning. The other two modes of the game will not open until the player has played the first mode. The challenge mode means that you can complete the game in a limited time. In this case, the logical tasks of the game become complicated. If the player does not have time to complete the game within the set limit, he loses, and the game must start again. Survival mode means survival mode. The arcade of the game is accompanied by a large number of enemies.



**Fig. 1.** Menu of the game *Alone in Space*

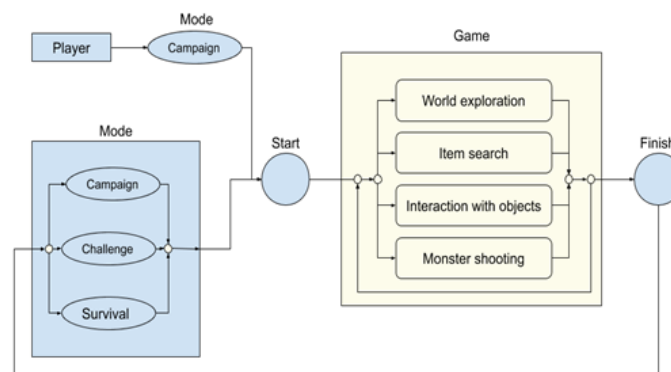In Figure 2 is displayed the diagram of the game process.



**Fig. 2.** The process of playing Alone in Space

The game focuses on telling the story using found things like photos or a lot of everyday things. The story of the game was borrowed from the story of the film Alien, so part of the interior of the ship vaguely resembles scenes from this film (Figure 3). The mission of the player leads to an interesting logical conclusion: the company that hired him was not interested in rescuing the crew of the ship. He is only interested in obtaining secret information about the intruder research that has been carried out on this ship.
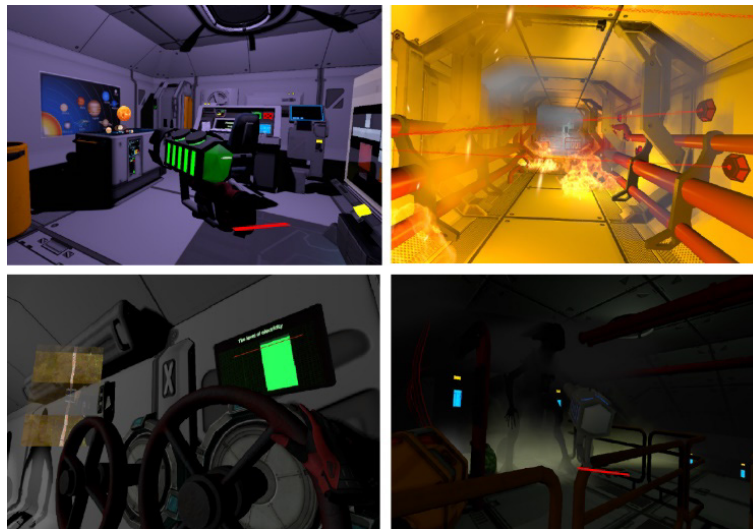


**Fig. 3.** Figure 1 Screenshots of the game Alone in Space

### 4.2 Assets, which we used for the game

We used several free assets from the Unity store to create the game. In some assets, we modified the logic, in some we left it, and we also created a large number of our own sets.

The main model that we used is a spacecraft with internal compartments (Sci-Fi Level Construction Kit 210). This package contains a model of a spaceship with rooms, models of various accessories to fill the space, and models for the construction of rooms. The package also includes textures for models:

- Dynamic Space Background Lite – Skybox cover around the whole scene that shows what the world looks beyond our geometry (= what we see from the windows in our spaceship).
- Object Player – in the game we can use VR controls to move objects, touch objects, press buttons, teleport using the trackpad, choose a weapon, and shoot from it (asset FPS Microgame, which we have programmed for VR control).
- Asset for setting up life (FPS Microgame) - After our death we will start the game from the beginning; within this asset we have completed several functions for taking life.

There are many objects on the spaceship, e.g. beds, wardrobe, tables, and also small items such as barrels, chairs, boxes. We can lift these objects, while we wanted to set the same physical properties for this object, but we cannot lift all of them. Some of the furniture in the game has doors: a wardrobe, chests of drawers, and a box for storing weapons. We need to use the Circular Drive script to open them. Figure 4 shows the setting of the circular drive script.
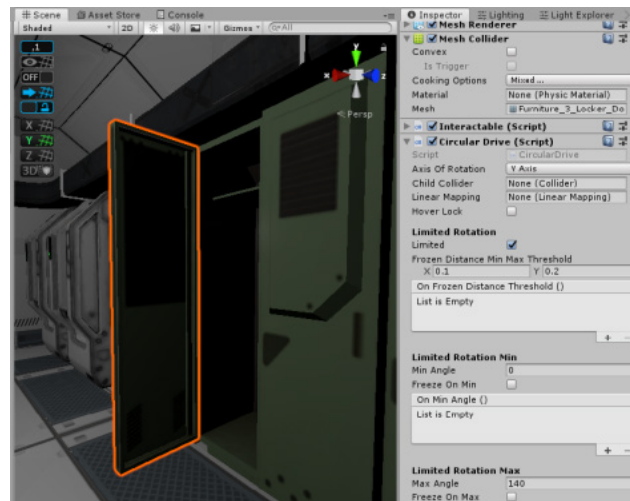


**Fig. 4.** Setting the script Circular drive

An important part of the spaceship are room doors, which we had to programme. There is a sliding door to enter any room of the spacecraft. To work, we need to make an animation of opening and closing the door. We also had to program the buttons that opened and closed the doors. Figure 5 shows the door model button.
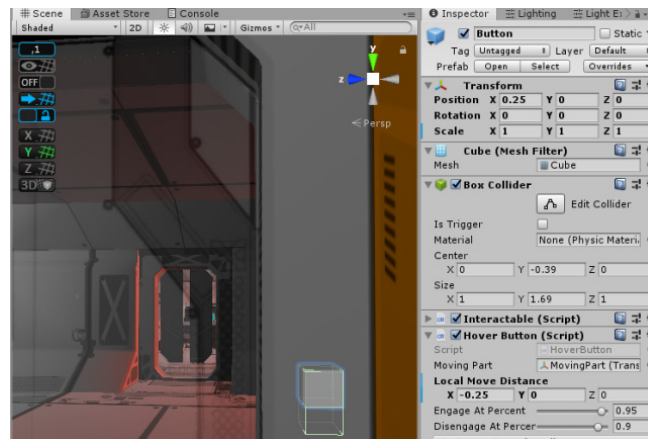


**Fig. 5.** Adding button

The particle system sets the atmosphere and volume of the game world. In fact, these are small details that do not affect the logic of the game, but without them it is possible to feel the freshness and uniformity of the environment (various liquids, clouds, and anything related to fire). We used the Ultra Emissive Particles Shader asset, which simulates sparks from electricity, and Aura Volumetric Lighting, which simulates dust particles in the air. We also create our own particle system in the form of a blue fire, which we place in large glass bottles. The impression will be that the ship engines are working. Figure 6 shows the particle system, simulating fire.
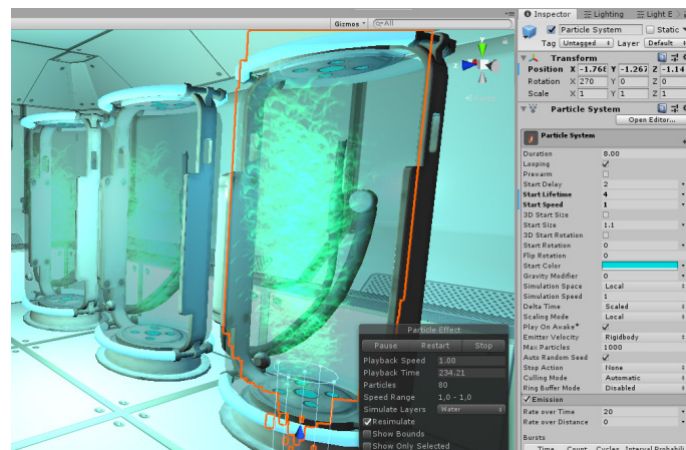


**Fig. 6.** Particle system - fire

### 4.3 Create an NPC (nonplayer character)

There are special tools for creating NPC characters, such as Blender, Maya, 3DsMax, etc. Working in programs is manageable thanks to the huge availability of materials, with which we can quickly learn to create models. However, the development of more complex models requires more experience.

We use the Blender rendering tool to create the skeleton of the model. We had to choose five types of animation for the alien, which we added to the Animator component:

- Idle – static state.
- Crawl – crawling on the floor.
- Run - Run.
- Attack – attack.
- Dead - Death animation from the source mixamo.com17.

Figure 7 shows an animation of an alien.
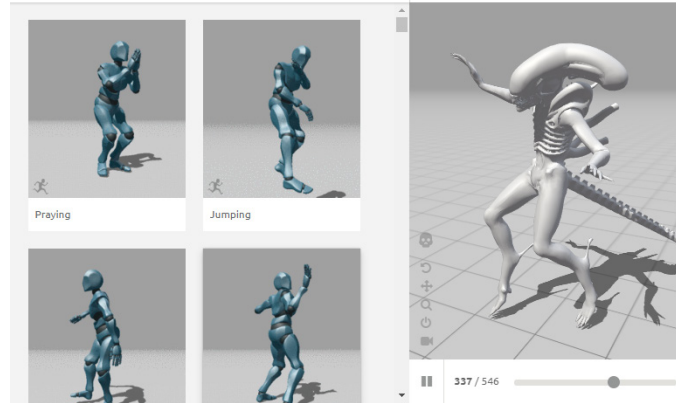
**Fig. 7.** Animation of an alien

To allow an alien (NPC) to be 'alive' in the game world and to move around the ship, we use the Unity navigation system. The navigation system allows us to create characters (artificial intelligence) that can travel through the world of the game. It gives the characters the ability to understand that they have to go up the stairs to reach the second floor, or jump through the ditch, or overcome an obstacle. Figure 8 shows the Unity NavMash system of our alien.
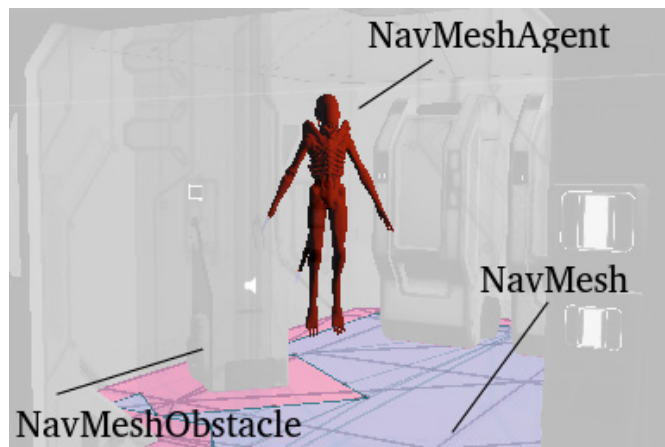


**Fig. 8.** System Unity NavMash

The alien is moving in certain areas (Patrol points). Each alien has the same life cycle as our character in the game. Figure 9 shows the state of the moving and lifecycle diagram of aliens.
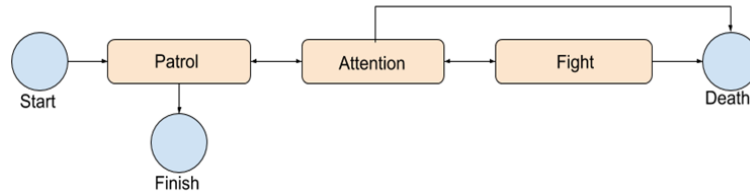
**Fig. 9.** State diagram of alien

### 4.4 Basic methods of the game genre Escape room

Escape room is a genre of adventure that requires the player to escape from an enclosed space. The room usually consists of locked doors, objects to be manipulated, and hidden evidence or hidden areas. The player must use objects to interact with other objects in the room to find a way to escape.

Our game contains several such elements:

- When a player enters a room, the room is locked until he finds the key (we created scripts for it) - in our case the player must enter it via the correct password and keyboard.
- The second key point of the game is the interaction of objects with other objects. The player most often needs to place a certain object in a certain place. This place can be highlighted as a help for the player. There will then be an event in the game that will be associated with escaping from the room. For example, in the game, there is a battery object that needs to be inserted into the electric box object to turn on the electricity in a room without energy. We want the place where we have to insert the battery item to be highlighted when we hold it in our hands. If the battery object is in the zone of this location, it should pull the battery object together. Create an attachment script and add it to the battery object that we want to connect to the Electric Box object.

## 5 Methodology and results

The main objective of our research was to find out if the game is interesting to players, so we can use this game as the first touch with virtual reality (for some of them) in primary school or also in our study subject at university (Virtual reality). Our small research was carried out in 2019/2020 and 2021/2022. The game was tested in the university by 38 users aged 10 to 24 years. We tested our game on some students from our department and with some children from primary schools, because we organize free extracurricular activities for primary school children from the area of our city Banská Bystrica. Figure 10 shows our game test.

**Fig. 10.** Test game with children of extracurricular activities in our department

The lower number of respondents was affected by the Covid-19 pandemic in 2019-2021 (we taught online so it was not possible to test VR). To test the game, we used a questionnaire with 11 questions that we designed for the students and the students who played our game. We used the semi-structured questionnaire. We also used observation and an interview with students after playing our game. The respondents liked our game, especially its theme, atmosphere, and ability to interact with various objects. Some did not like the moments associated with moving in the game and the inability to restore the player's health during the game.

The basic questions for our research were:

1. "Could virtual reality increase interest in studying computer science?"
2. "Could our free game "Escape room" be a good game for explaining what virtual reality is and how could be the movement in a virtual reality environment realized?"
3. "Is motion sickness during driving in a car/bus related to motion sickness in a virtual environment?"

The first question was aimed at the gender and age of responders. The questionnaire filled 28 men-and 10 women. In the question "Do you have previous experience with VR technology?" 24 respondents answered no and 14 answered yes. With this question, we asked if they had tried VR before. Figure 11 shows answers from questionnaire.

Do you have previous experience with VR technology?
38 odpovedí
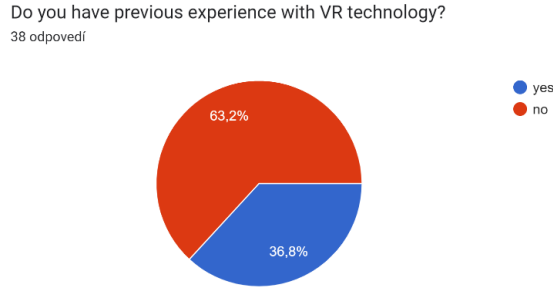


**Fig. 11.** Answers of the questionnaire: previous experience with VR

In the question 'Do you suffer from motion sickness while driving?' we want to find if motion sickness in VR could be related to motion sickness during driving in the car. Figure 12 shows that 20 respondents did not suffer motion sickness during driving the car, 13 respondents sometimes, and 5 never.

Do you suffer from motion sickness while driving?
38 odpovedí
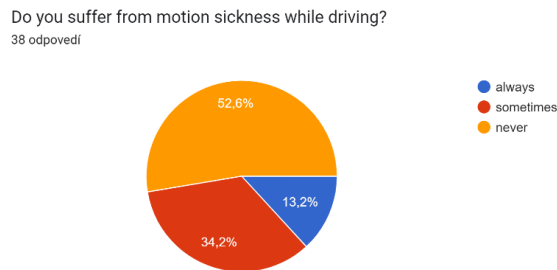


**Fig. 12.** Answers of the questionnaire: motion sickness while driving

In the question "Do any of the symptoms of nausea appear during testing of the application?" we wanted to test whether users have a problem with using VR. Figure 13 shows the responses of the respondents. The answers to this questionnaire question show that the number of people who have weak or average symptoms is related to the previous question (symptoms while driving a car/bus).

Did you experience any of the symptoms of nausea while testing the app?
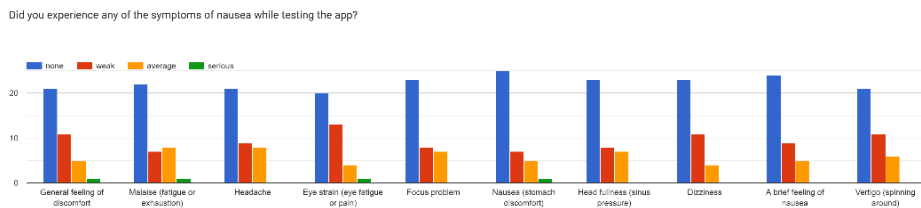


**Fig. 13.** Answers to the questionnaire for symptoms in VR environment

With the question "I felt completely drawn into the virtual environment ", we wanted to ask how realistic the environment was (Figure 14).

I felt completely drawn into the virtual environment
38 odpovedí
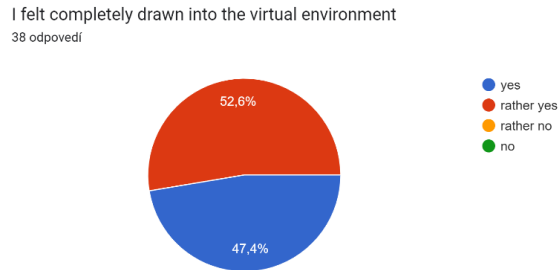


**Fig. 14.** Answers of the questionnaire: feeling of the game

The final conclusion about the game was asked in the question "I like the game" (Figure 15).

I liked the game.
38 odpovedí
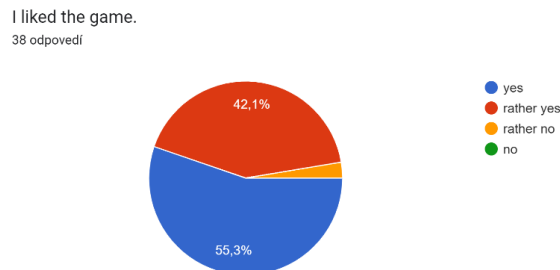


**Fig. 15.** Questionnaire answers: how do they like the game?

Because we wanted to know if testing our VR game could motivate respondents to continue in the future with studying computer science, we asked them the questions: "After experiencing our VR game, do you think it's more motivating for you to study computer science?" Figure 16 shows answers.

After experiencing our VR game, do you think it's more motivating for you to study computer science?
38 odpovedí
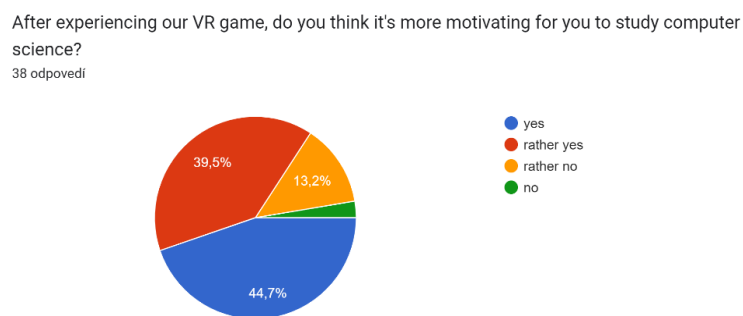


**Fig. 16.** Answers of the questionnaire: motivation to study computer science

The questions "Write what you liked about the game" had the following interesting answers:

- The theme of the game.
- Movement in space and shooting.
- Environment, theme of the game.
- Shooting game.
- Enemy, futuristic environment, various weapons, puzzles.
- It was nice to be in space.
- drawing into another reality.
- Solving logical tasks.
- Shooting, the ability to take things, graphics.
- Large and interesting space. Various interactions with objects. The story of the place. Duel with an alien.
- Graphic design of the game.
- I liked everything.

Our game is available on the website, and everyone can download the source code of this VR game and look how it is developed, or continue with another level. Based on our small research questionnaire and mainly on discussion and observation, we can say that this game can be used as the first touch of virtual reality for students. We will continue to create new levels of this game, so it could be more interesting for students.

## 6    Discussion

The main advantage of using VR in the education process is its huge popularity and also the popularity of playing games among children around the world. During the testing of our game and getting to know VR, these children were excited to be able to use VR to play games. Like other research with ICT or VR, our research has confirmed that ICT devices are suitable for teaching and more motivational for students to continue studying computer science. Conclusions to our research questions:

1. "Could virtual reality increase interest in studying computer science?"

Based on the answers from the questionnaire and also from observation, the respondents were excited about playing our game in VR and they confirmed that they would like to learn how to create such games in the future.

2. "Could our free game "Escape room" be a good game for explaining what virtual reality is and how could be movement in a virtual reality environment realized?"

After testing the games, we talked individually with respondents about what they think VR is. They knew how to explain it in their own words.

3. "Is motion sickness during driving in a car/bus related to motion sickness in a virtual environment."

Based on the answers to questions about motion sickness while driving and symptoms in a VR environment, it could be related. The number of answers when symptoms

appeared sometimes, on average, or often is similar to the number of answers to the question about symptoms while driving a car/bus.

The main disadvantage of this game is that everyone who wants to play our game needs to have a virtual reality device. Due to increasingly favorable prices is this the main disadvantage of our game.

We also noticed that if the teacher is not a sufficient authority, students can spend more time than is reserved. We recommend that the teacher has the glasses connected to the computer/projector and can control what the student is doing in the game.

## 7      Conclusions

Virtual reality truly allows us to experience anything, anywhere and anytime. With the design of the unique multigenre VR game "Alone in Space", we have demonstrated our design approach, which includes an adrenaline adventure in a virtual fictional world with lots of tasks, puzzles, and clues, as well as fighting an enemy, an intruder to be defended by shooting. So, what is the point of such a game? Adrenaline, fun, surprise, experience, training in wit and logical thinking. The game was tested at the university by 15 users, elementary school pupils and students of the Department of Computer Science (unfortunately during the Covid-19 pandemic, we failed to obtain a more relevant sample of respondents) aged 10 to 24 years with very positive feedback. The respondents particularly liked the theme of the game, the atmosphere and the ability to interact with various objects. The players recorded a high level of immersion and spatial presence and an overall positive virtual reality game experience (VRGX). Based on these results, we believe that the expansion of the gaming space in the future will allow us to create engaging VR games that will be sporty, therapeutic, social, immersive, and fun.

## 8      Acknowledgments

## 9      References

[1] Verawati, A., Agustito, D., Pusporini, W., Utami, W., & Widodo, S. (2022). Designing Android learning media to improve problem-solving skills of ratio. Advances in Mobile Learning Educational Research, 2(1), 216-224. https://doi.org/10.25082/AMLER.2022.01.005

[2] Vidakis N., Barianos A.K., Trampas A.M., Papadakis S., Kalogiannakis M., Vassilakis K. (2020) in-Game Raw Data Collection and Visualization in the Context of the "ThimelEdu"

Educational Game. In: Lane H.C., Zvacek S., Uhomoibhi J. (eds) Computer Supported Education. CSEDU 2019. Communications in Computer and Information Science, vol 1220. Springer, Cham. https://doi.org/10.1007/978-3-030-58459-7_30

[3] Maharjan, M., Dahal, N., & Pant, B. P. (2022). ICTs into mathematical instructions for meaningful teaching and learning. Advances in Mobile Learning Educational Research, 2(2), 341-350. https://doi.org/10.25082/AMLER.2022.02.004

[4] Pokorný, M. (2021). E-LEARNING IN MANIPULATIVE GEOMETRY TEACHING. In Conference proceedings of» eLearning and Software for Education «(eLSE) (Vol. 17, No. 01, pp. 247-252). Carol I National Defence University Publishing House.

[5] Vidakis, N.; Barianos, A.; Trampas, A.; Papadakis, S.; Kalogiannakis, M. and Vassilakis, K. (2019). Generating Education in-Game Data: The Case of an Ancient Theatre Serious Game. In Proceedings of the 11th International Conference on Computer Supported Education - Volume 1: CSEDU, ISBN 978-989-758-367-4, ISSN 2184-5026, pages 36-43. https://doi.org/10.5220/0007810800360043

[6] Papadakis, S. (2020). Evaluating a game-development approach to teach introductory programming concepts in secondary education. International Journal of Technology Enhanced Learning, 12(2), 127-145. https://doi.org/10.5220/0007810800360043

[7] Kalogiannakis M, Papadakis S, Zourmpakis A-I. Gamification in Science Education. A Systematic Review of the Literature. Education Sciences. 2021; 11(1):22. https://doi.org/10.3390/educsci11010022

[8] Greengard, S. Virtual reality. MIT Press, 2019. https://doi.org/10.7551/mitpress/11836.001.0001

[9] Gownder, J., P., Voce, Ch., Mai, M., Lynch, D. (2016). Breakout Vendors: Virtual And Augmented Reality. 2016.

[10] Shen, C. W. Ho, J. T. Kuo, T. C. and Luong, T. H. (2017). Behavioral Intention of Using Virtual Reality in Learning. The 26th International Conference, New York, New York, USA, 2017, pp. 129–137. https://doi.org/10.1145/3041021.3054152

[11] Gouveia, P. (2016). Gaming and VR technologies, powers and discontents. Videojogos'16, Portugal, 2016, pp. 11-20.

[12] Yen, J.-C., Tsai, C.-H. and Wu, M. (2013). Augmented Reality in the Higher Education: Students' Science Concept Learning and Academic Achievement in Astronomy. Procedia - Social and Behavioral Sciences, vol. 103, pp. 165–173, Nov. 2013. https://doi.org/10.1016/j.sbspro.2013.10.322

[13] May, D. (2020). Cross Reality Spaces in Engineering Education – Online Laboratories for Supporting International Student Collaboration in Merging Realities. International Journal of Online and Biomedical Engineering (iJOE), vol. 16, no. 03, pp. pp. 4–26, Mar. 2020. https://doi.org/10.1016/j.sbspro.2013.10.322

[14] Pirker, J., Lesjak, I. and Gütl, C. (2017). An Educational Physics Laboratory in Mobile Versus Room Scale Virtual Reality – A Comparative Study. International Journal of Online and Biomedical Engineering (iJOE), vol. 13, no. 08, pp. pp. 106–120, Aug. 2017. https://doi.org/10.3991/ijoe.v13i08.7371

[15] Hu, Q. Ye, W., Zhou, H., Lei, Z. and Guan, S. (2018). VR Interactive Feature of HTML5-based WebVR Control Laboratory by Using Head-mounted Display. International Journal of Online and Biomedical Engineering (iJOE), vol. 14, no. 03, pp. pp. 20–33, Mar. 2018. https://doi.org/10.3991/ijoe.v13i08.7371

[16] Smith, M., Maiti, A., Maxwell, A. D. and Kist, A. A. (2016). Augmented and Mixed Reality Features and Tools for Remote Laboratory Experiments. International Journal of Online and Biomedical Engineering (iJOE), vol. 12, no. 07, pp. pp. 45–52, Jul. 2016. https://doi.org/10.3991/ijoe.v12i07.5851

[17] Voštinár, P., Horváthová, D., Mitter, M. and Bako, M. (2021). The look at the various uses of VR. De Gruyter, Open Comput. Sci. 2021; 11:241–250. https://doi.org/10.1515/comp-2020-0123

## 10 Authors

**Patrik Voštinár** is a lecturer, who is working at the Matej Bel University, at the Faculty of Natural Sciences, Department of Computer Science. He teaches subject such as programming web pages (HTML, CSS, JavaScript), creating mobile applications (programming Android, iOS application), discrete mathematics, Virtual Reality, etc.. He is member of two national projects aimed to using information and communication technologies in the education process (mLearning and eLearning) (email: patrik.vostinar@umb.sk).

**Aleksandr Mandrichenko** is a software engineer. He gained his master's degree at the Matej Bel University, at the Faculty of Natural Sciences, Department of Computer Science. He is very active in preparing teaching materials for primary school children (email: aleksandr.mandrichenko@student.umb.sk).