

**СЕКЦІЯ: ІННОВАЦІЙНІ ТЕХНОЛОГІЇ НАВЧАННЯ В ЗАКЛАДАХ
ОСВІТИ**

**EXPERIENCE OF INTERNATIONAL INTERNSHIP IN THE
IMPLEMENTATION OF PROJECTS WITH ELEMENTS OF VIRTUAL AND
AUGMENTED REALITY**

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During 2023, students and researchers of the Computer Science Department of Ternopil Volodymyr Hnatiuk National Pedagogical University together with their colleagues from Anhalt University of Applied Sciences worked on a joint project to teach children with special needs at the Department of Physics and Mathematics. The jointly planned and developed projects for teaching children with special needs using VR and AR technologies at the STEM Centre of TNPU. Virtual reality sessions were organised for children with disabilities to help them learn about the world around them, socialise and communicate. This helped children with disabilities to overcome social and psychological barriers, understand complex mechanisms of work, and learn about phenomena through their models.

VR technical specification

Motor based VR can support real time interaction with VR controllers. For example, some children can program their scenarios so that they can pick up a 3D object with the VR controllers. But as we know 360 VR content is stored as images rather than 3D objects, so 360 video is normally not interactive, at least, not in the same way as model based VR. However, the boundary between 360 and model based VR could blur in the near future because of emerging technologies in areas of computer vision and image-based capturing and rendering.

For instance, some students want to design a VR application for children with inclusion, they think about how we play or move in real life, and how everything carries over to VR. They have to think that when we play or move with such children, it's important that they're able to move their body around. That's why we will see a VR display with position tracking to make it more natural. So mobile VR would be less suitable. For VR content, we'll need 3D graphics and animation with simple physical simulation of motion. The graphics and animation do not need to be very sophisticated to be effective for different children, so there won't be any frame rate or latency concerns. So, hardware is available on the market to support this.

Examples of the VR applications that describe the apps and provide some explanation. VR applications that help to study and get to know the world: (<https://arpost.co/2018/04/11/best-virtual-reality-apps-children>) [1]; Virtual Reality Apps for Kids: Latest List of Fun: (<https://invisible.toys/virtual-reality-development/virtual-reality-for-kids>) [2].

First we had educational apps used in schools. Now, parents can find lots of VR apps and games that are child-friendly and can keep their little ones busy during commutes or long car trips.

Virtual Reality apps for kids suit a wide range of activities: learning complex concepts, playing fun games, discovering exotic animals and distant locations, and more. Some people might still consider Virtual Reality games for kids as harmful. It does provide more benefits than harm when consumed moderately and under adult supervision.

Rationale for using VR technologies for teaching special children

Our application needs to use VR as opposed to a standard on-screen interface because it will help children with special needs to learn more about the world, better understand it and adapt. Virtual reality glasses help children with musculoskeletal problems to explore the world – virtually conquer the top of a mountain or scuba dive. This is what, in my opinion, is very lacking in Ukrainian schools. It is in the development of inclusion and in providing equal access to quality education that we see the main point of using innovation.

The three illusions in our VR application

The discovery of illusion care products helps children with product inclusion, learn about sea and airspace, especially apply movements to the inner body, specifically change the light and other processes. So place illusion can help to describe the feeling of being in a virtual place, even though you know you are not there. It can occur even if nothing is happening in the environment, I'm just in a virtual world, I look around, I see the virtual reality and the brain says? This is very important for children with inclusion.

And the second illusion, plausibility, which is how real do I take the events to be? And this is separate, because children can really be in a place, they can have the feeling to really be in a place. So a plausible illusion that the events that children are receiving, that they are engaged in, are really happening.

And the third illusion is something very, very, unique to virtual reality, which has to do with your own body. So in virtual reality it can be programmed that when children look down, they see a virtual body completely substituting their real body. And this can give rise to a third illusion, which is the illusion of body ownership.

Description of our target users

VR applications with so many different considerations to balance, having a specific audience in mind will keep you focused when it comes to choosing your VR hardware and software. So, our targeted users for the use of virtual reality in the process of social adaptation and learning will be specialized centers that deal with children with special needs, which will improve their physical, moral, mental and emotional development. How would you try to contact them: through the coordinators working in our inclusive children's center. They are well aware of the peculiarities of children, will help to use technical innovations, facilitate the work and

education of children themselves, and make their world more interesting and accessible to understand.

Summary. We believe that this problem has two stages of solution: on the one hand, the right market can easily access the necessary VR equipment, because today there are many technical innovations that are publicly available. On the other hand, it is necessary to identify any opportunities to further improve the availability of specialized equipment, as this becomes a difficult task under martial law in Ukraine. However, a project team can be created to determine the specifics of ordering virtual reality applications for working with special children to show everyone that such children have the right and opportunity to live a full life.

References

1. The Best Virtual Reality Apps for Children. URL: <https://arpost.co/2018/04/11/best-virtual-reality-apps-children>.
2. Virtual Reality Apps for Kids: Latest List of Fun. URL: <https://invisible.toys/virtual-reality-development/virtual-reality-for-kids>.

SOFTWARE OF DISTANCE EDUCATION

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Several platforms leverage Artificial Intelligence (AI) in education to enhance learning experiences, provide personalized support, and streamline educational processes. These platforms vary in their features, applications, and target audiences. Here are some notable AI education platforms:

Knewton Adaptive Learning Uses AI algorithms to personalize educational content for individual students.

DreamBox K-8 Math Education AI-powered platform that adapts lessons based on individual student progress and learning styles.

Cognii Intelligent Tutoring Provides an AI-powered virtual tutor with natural language processing for grading and feedback.

Quillionz Content Creation AI-powered platform assisting educators in creating content, generating questions, and quizzes.

Pearson's Aida Virtual Tutoring AI-powered virtual tutor providing personalized feedback, guidance, and assessments for learners.

Coursera Online Learning and Certification utilizes AI for personalized recommendations in courses, assessments, and projects.