Immersive VR for developing competences on necessary fields of computer science of university students

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Abstract

We present a virtual reality environment that helps students to improve their skills and competences in some necessary fields of computer sciences.

University students have to use digital devices, they have to have knowledge on various hardware devices. They have to use many online and off-line software elements and applications for gathering, storing, forwarding data and information. They have to know how to create, share, organize and display digital content, how to learn by using various online collections and e-learning systems.

We designed and filled a learning environment on some of these useful issues in a 3D Virtual Reality (VR) MaxWhere space.

Methods

Based on preliminary results and by the collaboration of our students at our faculty, we gathered, classified, organized and grouped those fields of the digital world that are important for students during their studies and chose some of the most important ones.

For these topics we collected learning materials and services and organized them into natural compositions containing collections of coherent pieces of information, various learning contents and services that can help the students in information processing.

We used the MaxWhere 3D collaboration VR platform for developing the e-learning environment. We chose the MaxWhere's SpongeHall because of its structure and organization.

Figure 1. The information collecting part in the MaxWhere space

Introduction

New generations work with computers and computerized devices but during their studies at universities they have to have more and deeper knowledge on digital devices and programs. In a previous work we presented a huge set of fields of computer science that the students have to be familiar with [1]. They have to learn many of these knowledge by themselves outside university courses.
We decided to help those students who have no (enough) courses on computer science. We focused on those students who learn on library and information science major.

We started our work with the design and development of a VR e-learning environment that is going to help the students to live a healthier life [2]. After doing researches on university students' needs, on the institutional side's requirements appearing and the needs that the labor market have concerning the employees [1, 3, 4, 5], we started to elaborate a set of VR e-learning environments that helps those students who want to improve their IT skills in a self-paced e-learning way.

Because of the high number of important topics, we had to chose some of them – we focused on students of library and information science majors on BA level, and chose two topics: the protection of digital content including the rights and technologies; and the information gathering and sharing methods.

Figure 2: Security – GDPR part of the VR space

Discussion

Students at a university level have to learn continuously on computer sciences on every majors. The curricula of the majors cannot always follow and fulfil the needs of the students on this area. We designed and created this e-learning environment for those students who want to learn more about such topics.

The MaxWhere 3D platform offers a VR environment that can be used online an in a collaborative way. It can be used with or without VR glasses. VR environments provide a natural way for information processing that gives opportunity to learn in a quite fast way.

Students can work together in this e-learning VR environment that can improve their collaborative skills, too.

Conclusions

In this research we mapped the needs of university students who learn on library and information science. We compared these needs with the requirements of the trainings. We collected the most important topics that they have to get knowledge for their studies.
As a first step, we chose two topics: Digital data protection, Information searching, gathering and managing.

We used the MaxWhere 3D platform for providing the e-learning system to the students.

We publish the environment on a freely accessible site for disseminating its content. We are working on creating other environments with learning materials about some other topics such as communication, collaboration, problem solving in the digital world. These environments will be linked to each other.

Results

Two important topics have been elaborated:

- Protection of digital contents
- Information searching, collecting and sharing

In the VR space, many types of contents have been inserted on these fields: text and picture documents, such as online journals, library catalogues and other collections and platforms such as Europeana, for making easier to find pieces of information. E-learning course also included

The collaboration will be important on the labor market [5], we included online tools for supporting collaborations, such as task manager for project works, video-conferencing on-line services and shared documents where the students can create and share relevant information and can work together.

The space is ease to use, those pieces of information and online services that belong together can be find next to each other in a natural order and can look through with ease.

Figure 3: The SpongeHall space from the entrance

Figure 4: Information gathering – Journal and library contents

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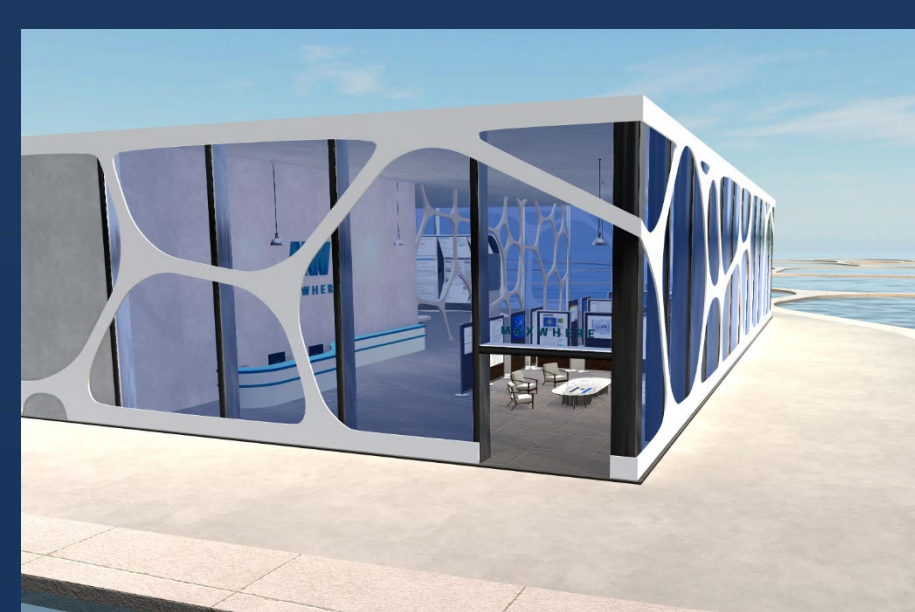5. The Future of Jobs Report 2018. World Economic Forum, Centre for the New Economy and Society, 2018.