

Training Universities in Palestine about Virtual 3D Worlds

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Abstract. This paper presents TESLA, a Capacity Building, Erasmus+ project that aims to involve Palestinian Universities in the technologies and the research movement of Virtual Reality and Virtual Worlds. We present a first insight about the activities of the project and describe the initial surveys conducted and the content of the training workshops organized and carried out during the first year of the project. Instructional and technical Terms of References were created, and the partners designed a series of courses in a 3D Virtual World. The Virtual Reality courses have been implemented and the Palestinian Universities are currently conducting Piloting activities.

Keywords: Virtual Reality, Palestine

1 Introduction

The TESLA Project: “Virtual Reality as an Innovative and Immersive Tool for HEIs in Palestine” is an Erasmus+ “Capacity Building in the field of Higher Education” project under KA2 - Cooperation for Innovation and the Exchange of Good Practices. It started in December 2017 and is scheduled to end in November 2020. Coordinator of the project is the Al-Istiqlal University (PASS) of Palestine and four (4) other Palestinian HEIs also participate: the Arab American University in Jenin (AAUJ), the Al Quds Open University (QOU) and the Palestine Polytechnic University (PPU). Three (3) European Universities: University of Patras (UPAT), Slovak University of Agriculture in Nitra (SUA) and the University Politehnica of Bucharest (UPB) are also participating as programme countries.

The main aim of the project is to involve Palestinian Universities in the technologies and the research movement of Virtual Reality and Virtual Worlds. More specifically it aims to: (1) Involve Palestinian HEI's in Research Movement related to Virtual Reality in Europe, (2) encourage Palestinian researchers and academics to have an interest to topics related to Ergonomics, Cognitive Psychology, and Human Impact, (3) reduce the cost of material related to experimentation and mobility issues, (4) reduce risks by offering simulated controlled environment and immersive learning experience, (5) involve Palestinian 3D Modelers and Programmers into the VR development process.

The project's objectives are: (1) setting-up a common VR development framework throughout Palestinian HEI's providing excellence in term of instructional design, development, and exploitation of services, (2) designing, piloting, and evaluating courses that integrate VR concepts, (3) Creating an international research network about VR integration into instructional technologies, (4) Implementing immersive learning experience into technical courses with a high - level of abstraction like topography, criminology, and geography. The rest of the paper is structured as follows: In Section 2, we present results from some surveys conducted in Palestinian Universities and the content of the training Workshops organized by the European Partners. In Section 3, we describe the courses designed by the Palestinian partners and the instructional design models that were utilized. Finally, Section 4 concludes the paper.

2 Surveys and Training

One of the first steps of the project was to use a quantitative methodology in order to identify academics and students' needs for using VR in education and learning by using online surveys. Two online surveys were sent to all academic members and students from the Palestinian Universities (Al-Istiqlal, QOU, PPU and AAUJ). In total, 95 academics responded and 760 students too.

Regarding the feedback from the Academics, it revealed Positive Attitudes toward employing VR in learning and teaching (63.0% of respondents think that VR will help them in teaching with new methods. In addition to that, 50% of the academics agree that VR will improve the student's perception and 56.4% realize that VR will enhance the interaction). It also revealed a diversity of VR experiences for Academics (48.4% of the academics used VR in their teaching before and 24.7% of them know about VR and how to use it, but they have some concerns about it). Another issue revealed was the weak technological infrastructure in the Palestinian Universities (30.9% of respondents agree that there is no suitable hardware for VR based learning in their Universities and the results indicated that internet services are not permanently available in the Universities). Finally, it revealed the diversity of Technical skills for using VR (56% of respondents thinking that VR technology is not difficult to use, but 11.7% think that it is difficult to use. 10.6% feel irritable with using VR).

Regarding the feedback from the students, it indicated a diversity of Students VR Experiences in different purposes (36% of Students have experience in using VR in their learning process, 15% have experience in using VR for fun and entertainment, 27.8% know about VR but they don't use it, 21.3% have no experience). Most of the students claimed the belief that using VR will reduce the gap between the learner's knowledge and real-life experience. Furthermore, 91.7% of the student stated that they prefer an environment that provides them with the opportunity to interact with their colleagues

Based on this analysis the partners decided on the following recommendations: (1) Build baseline knowledge for both academics and students, by initiating awareness campaigns about the general VR concepts, types, technologies, devices and VR for education for a successful startup. (2) Promote the VR teaching experience for aca-

demics, by enabling them to integrate VR in the teaching and learning methods and 21st-century skills. (3) Promote the VR learning experience for students, by engaging them in student-centered VR lessons. (4) Create accessible VR environments in the Universities, by establishing VR Labs and enhancing the technological infrastructures, including Hardware, Servers, Internet and so on. (5) Focus on game-based VR content when possible because it is preferable for students. (6) Provide the VR learning content with user manuals, guides and the ICT pre-requirements and skills.

The training took place in the first year of the Project. Members of the Palestinian Universities attended Workshops organized by the EU partners with Instructional and Technical topics. Regarding Instructional Training the workshops focused on the following areas: (1) Instructional Design, I-ToR and Virtual Reality Aspects (2) Learning Scenarios and VR Components, (3) I-ToR and Scenarios Development Guidelines. Regarding Technical Training the workshop included the following topics: (1) Software Engineering, (2) VR Platform Architecture and Configuration, (3) Creating Content in VR Platform, (4) Creating Advanced Content in VR Platform

As a virtual reality platform, the OpenSimulator software was selected. OpenSimulator is an open-source multi-platform, multi-user 3D application server. It can be used to create a virtual environment (or world) that can be accessed through a variety of clients, on multiple protocols. OpenSimulator can be used to simulate virtual environments similar to Second Life. Second Life and OpenSim have been widely used in Education.

Four workshops about the OpenSimulator platform were organized with the following topics:

- OpenSimulator Architecture and Configuration
- OpenSimulator Introduction
- OpenSimulator Scripting (LSL)
- Managing the technical aspects regarding the 3D VW

3 Courses formulation in the Virtual World

The Palestinian Universities created two Term(s) of Reference: The first was an Instructional TOR where the academic staff defined the scenarios, objectives, interactions, and evaluation activities. The document described without technical details what would be the content of the VR components and how it was going to be used by teaching staff and students. It was also a critical input for the technical team because this is what engineers would use afterward to develop the VR component. The Technical TOR was created by the technical teams by defining the functional and non-functional requirements and reflecting that into a more technical language used by developers like UML, ERDs, GUIs).

The Palestinian universities after the training period, designed and started implementing the Virtual Reality courses. Al-Istiqlal University will benefit from this experience to create a virtual crime - scene investigation to introduce students to real-life crime cases before enabling them to use the real tools provided by the DNA Laboratory facility (e.g. DNA extraction kits, PCR and gel electrophoresis apparatus

analysis which are very expensive to afford). The student of the university will also benefit from the geography and topography courses which will use a virtual map of Jericho to teach them how to read and interpret information from a topographic map. Palestine Polytechnic University is planning to utilize VR as a cutting-edge technology to enrich the used methodologies and enhance the quality of the subjects related to geographical information systems. The Arab American University AAUP and the QOU use virtual reality affordances for the instruction of three courses Physics, Biology and GIS courses by a common learning management system using maps and built-in tools. This will enable AAUP students to perform tests and simulate real-life conditions in an instructional context.



Fig. 1. One of the implemented courses about the Dead Sea

Regarding the design of the courses, suitable Instruction Design Methodologies were utilized: The ASSURE Model is functioning as TESLA's basic instructional design model, which acts as an umbrella for the whole project and has the goal of producing well-organized, full and effective training processes. The PACK model is integrated to the fourth step of ASSURE model, specifying the basic elements of the pedagogy, the content, the technology and their combinations, within a layered, multi-faceted, complex, multi-factorial approach and requires more thinking on "how" and "why" – not just "what" that ASSURE model defines. Finally, KIRKPATRICK model is integrated to the final step of the ASSURE model, analyzing and evaluating the results of TESLA preparation phase's

4 Discussion and Conclusions

In this paper, we presented the TESLA project and explained its aims and main outputs. The project aims to involve Palestinian Universities in the technologies and the research movement of Virtual Reality and Virtual Worlds. We have presented the initial surveys and the content of the Training Workshops. We also described the implemented courses and how they were designed. Currently, piloting activities have been scheduled in the Palestinian Universities and it is expected that the courses will be integrated in the institutes' curricula and be.

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