

Novel Technologies in Teaching and Learning towards Enhanced Knowledge Retention

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ABSTRACT

Enhancing teaching and learning with novel interactive technologies has been an endeavor of researchers and industry worldwide. This enables users to interact with and experience learning content in ways not possible before with the aim of enhancing knowledge retention. Research has for example focused on using eXtended Reality (XR) concepts (viz. virtual reality (VR), augmented reality (AR), mixed reality and similar technologies) in order to immerse and engage users in content and experience it in different ways. This study focuses on exploring the novel technologies that look into the efficacy of the combination of e-learning and interactive teaching techniques in enhancing learning and how the use of ICT can make an immediate impact on enhanced knowledge retention. This will be presented through two case studies: interactive documentary and augmented comic book.

1 Introduction

Human knowledge is growing exponentially. There is a great paradox of our time that the more we must learn, the less time we have to learn. So we are faced with a seemingly insurmountable challenge with knowledge retention [1]. Use of interactive tools and technologies in the education field has proven to be effective in assisting the teaching and learning experience. Over the past years the interest in XR technologies has surged [2], whilst XR technologies are gaining momentum with industry projects such as Google Expeditions. Moreover, XR technologies could bring a wealth of teaching and learning resources extending opportunities towards enhanced knowledge retention supporting experiential, adventure and similar types of learning. Here we are presenting two ongoing case studies in the field.

CCS CONCEPTS

• Human centered computing → Human computer interaction; Interaction paradigms

KEYWORDS

Extended reality, augmented reality, virtual reality, learning, knowledge retention



Figure 1: Bobri voz with its smartphone app and comic book

2 Case Study I: Interactive Storytelling

“island” is a cross-media, interactive documentary story built as a web platform. Instead of watching a linear story, users have to move on an interactive 3D island with 13 hotspots of the 13 permanent residents of the Croatian island and their isolated winter lives. This forces users to participate in exploring the island and search for stories themselves [3].

3 Case Study II: Augmented Comic Book

The comic book “Bobri voz” tells a story of the pile-dwelling people and how they invented the wheel with the axis. It combines the traditional comic book with video in place of a particular frame, animatedly. As such, the comic book “Bobri voz” and its smartphone app deliver an enhanced reading experience for the readers by converting frames into visually-rich, interactive digital products as illustrated in Figure 1.

4 Discussion

XR and similar technologies can revolutionize education, making learning immersive and more engaging. We are exploring this new field with how novel technologies can enhance knowledge retention. The two presented prototypes are being evaluated with users of different age groups where we compare different ways of content presentation. Based on the results from these studies we will better understand how such technologies help knowledge retention and what is the best way to design such teaching aids.

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