**Metaqampus**

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Aim: To develop an easy to integrate, easy to use “Metaverse” learning platform which uses state-of-the-art virtual reality (VR) and augmented reality (AR) technologies to provide 3D interactive live courses.

The final product is a cross-platform real-time 3D virtual learning platform that can work on VR headsets, Android/iOS tablets and web browser. 3D learning material are stored in the cloud and accessed on demand during live course sessions. A multitude of informative statistics related to live course sessions are calculated on the cloud.

Metaqampus provides a highly customizable and AI supported avatar system, virtual versions of traditional teaching tools such as whiteboard, presentations and videos and a dynamic 3D asset import system that supports AR viewing with mobile phones without requiring a mobile app to be installed. Also, since there were no available voice chat solutions which supports both the native platforms and web browsers, we developed our own WebRTC based voice chat system.

While “Metaverse” and related technologies are very new and there are a lot of things to explore, our responsibility is to make the best of these technologies.

Scientific objectives:

* Development of data gathering and analysis techniques that responds to the needs of virtual learning platforms.
* Proof-of-concept virtual learning system which can be easily integrated into existing e-learning solutions.

Computing objectives:

* Seamless multiplayer interaction between cross-platform clients.
* Developing a voice chat system supported by all platforms.
* 90 frames per second (FPS) performance for the VR client.
* Designing and modeling 3D learning and environmental material.

Currently Metaqampus network infrastructure includes 4 virtual servers that hosts backend/frontend applications, a signaling service and a TURN server for traversing NAT gateways. Also, object-based cloud storage services are used to store data and a content delivery network (CDN) is used to save bandwidth and provide fast service. A more complex cloud infrastructure involving the use of load balancers and reverse proxies with auto-scaling is planned for later stages.