Chapter 1. Introduction.

The main idea of this diploma thesis is to bring together the e-learning concept and livestream in order to simulate the exact conditions of a classroom. This project wants to help students that follow a distance studies program, by allowing them to interact with their teacher. Also it will offer teachers who are travelling a lot the possibility to keep their curse even if they are on the other half of the world. An important thing is that usability of this platform may extend without modifications of the source code because even if the main purpose is to serve students and teachers, it can be used for any webinar or training session.

Beside the main feature, which is livestreaming, there are a set of extra features that make this platform more attractive. An important feature is allowing a questions and answers session, where students can put some questions which can be either private, only with the teacher, or in the chat room made with all students that have subscribed for the current curse. To this questions it will be teacher’s choice when to answer to that question, he can respond instantly, or when he thinks is properly to do it.

A feature that is useful for students is that curses are also persisted and they can be replayed any time the user wants. This feature may come in handy when the user wants to recapitulate things that have been discussed at the curse or they cannot be online when the curse is kept. In this case the chat feature will not be available.

In order to increase interactivity of the curse beside the chat, the teacher can initiate a quick quiz, which can have a time limit per question or per entire quiz. The students will not be able to make anything else with the application during a test. The test will be structured as a multiple choice and will be automatically corrected when the user will finish it or when the time expires. Only the teacher will be able to see the results of the test.

In order to keep track of the users that are present at a certain curse, the application will be able mark as present both users that are connected remote to the curse and those who have a smart phone with the mobile application for remote learning installed on it. This information can be used to send quizzes or in statistical purposes.

Another thing worth mentioning is that the platform will contain a Windows Phone 8.1 and a Windows 8.1 application, which will offer students a user-friendly experience, an application on the same platforms for the teacher and a server which will serve applications with requested data.

This chapter will also make a resume for every theme that will be covered by this thesis.

The entire implementation is based on .NET framework, so it is compulsory to talk in the first part after the introduction about this framework considering that all chapters that will follow this one will be strongly related to it. I will try to make a brief presentation of the main concepts that this framework facilitates.

The next chapter, named Streaming, will present the technologies and frameworks used in order to create the livestream environment and also how video data will be persisted. It will explain the smooth streaming concept, will offer an overview of the software development kit that enforces this concept and will discuss about encoding and types of encoding required by smooth streaming. Also this division will refer to Internet Information Services and Media Services extra feature needed in order to make livestream and on demand stream available.

In the chapter Universal Windows Applications we will discuss a little bit about the new concept that Microsoft has brought into developers world. I am referring to the fact that you can create an application that can run on phones, tables, laptops and personal computers. Also it will contain some explanations regarding Microsoft Media Platform's Player Framework and Smooth Streaming Client Software Development Kit. Near field communication will be another theme discussed because it is used to signal the presence of students at a certain curse.

The next chapter is about persistence, relational databases and Microsoft SQL Server 2012, which will be used as database management system. It will explain some terms as store procedure and discuss how SQL injection is avoided using their parameterized version.

Another chapter will refer to web services in order to make persisted data accessible. Here we will talk about Simple Object Access Protocol (SOAP), its benefits and downsides, also about how they are implemented in .NET framework.

If until now we have presented all the technologies used in order to create the application, in the next part a detailed overview of it will be made. Here we will talk about architecture, detailed feature explanation and implementation details. In this chapter will exist the use case diagram of the application and each use case will be explained. For each use case will exist a sequence diagram which will show the flow of data and the execution flow. Also will exist a class diagram which will help as observe what design patterns have been used and make an idea how applications are implemented. A database diagram will be added in order to easily understand how data is persisted. Main algorithms will also be presented in this area and will be explained.

The last chapter will contain the conclusions over this thesis.