

Tutorpoly - A Real-time e-Learning Marketplace

Extended Abstract

Pedro Miguel Garcez Palha Pessoa Vaz

Thesis to obtain the Master of Science Degree in

Information Systems and Computer Engineering

Supervisor: Prof. Alberto Manuel Rodrigues da Silva

Examination Committee

Chairperson: Prof. João António Madeiras Pereira

Supervisor: Prof. Alberto Manuel Rodrigues da Silva

Member of the Committee: Prof. Luís Miguel Veiga Vaz Caldas de Oliveira

November 2015

Introduction

In this project we describe a new platform that corresponds to a real-time e-Learning marketplace. By using our platform, users will be able to find an online tutor capable of providing immediate assistance, regarding the specific academic problems they are facing, using technologies such as videoconferencing or collaborative sketchpads. The motivation behind this platform resides in a series of identified unmet customer needs that nowadays might be solved by integrating into a single platform various market-validated working-principles and by exploring recent technological possibilities.

In this context, our research goals can be summarized as follows:

- **G1:** In-depth study of Web-based businesses. Our analysis will focus on a non-technical perspective, such as, problems and solutions, markets, business models or marketing strategies;
- **G2:** Identification and analysis of competitors;
- **G3:** Development and description of the most important issues of the platform's Business plan;
- **G4:** Software Requirements Specification of the corresponding product;
- **G5:** Completion of the first iterations of the prototype's software development process, namely, design and component testing.

Business models in the Internet Industry

In order to allow a reasonable assessment of the platform's viability, we studied how general business concepts apply to businesses of the Internet industry and compared possible alternatives concerning each business strategy and planning decision, with a particular emphasis in business models.

The *business model* concept [1] can be interpreted according to two related but distinct perspectives: As a business' revenue sources [2] or as the whole dynamic structure that generates value to its customers [3]. According to the first interpretation, the most common Web business models can be divided into several major categories, namely, Free, Paid, Mixed, and Revenue Sharing. From our analysis, we concluded that *Free* business models, which typically are Ad-supported, have serious weaknesses and, therefore, other types of models should be pursued whenever possible.

The e-Learning market

The e-Learning market is filled with innumerable platforms with different characteristics that, nonetheless and for several reasons, do not meet the needs of our target customer segments.

These platforms can be divided into Desktop or Web-based and trends in the Internet industry and customers behavior show that desktop-based products are subject to several weaknesses as they do not integrate with Web 2.0 business processes. In turn, Web-based platforms are divided into On-premises or Vendor-hosted solutions and it is important to note that the former are highly inaccessible as they exclude non-IT SMEs or individuals (e.g. private, often ad-hoc, tutors).

The business opportunity

We lay the grounds for implementing and evaluating our platform, by analyzing and defining the major elements upon which early-stage business plans are built, in the context of our solution.

When students need immediate assistance concerning an academic problem, they face several difficulties. We intend to solve the problems identified in an integrated manner, that is, by developing a proprietary real-time eLearning environment coupled to a C2B2C crowd-reviewed private tutoring market, named TutorPoly, as represented in Figure 1 – Informal depiction of TutorPoly’s architecture.

The live e-Learning environment includes audio, video, and text-based communication, as well as, document and screen sharing or collaborative sketchpads. This ensures Lessons are fully interactive, in consonance with our positioning. Since that there are multiple moderately well-known live e-Learning environments with similar characteristics, we do not further describe TutorPoly real-time components here, focusing in the distinguishing marketplace dimension. Nevertheless, an important feature is the default inclusion of a *code snippet* designed to allow a swift integration of the e-Learning environment into Websites of third-parties.

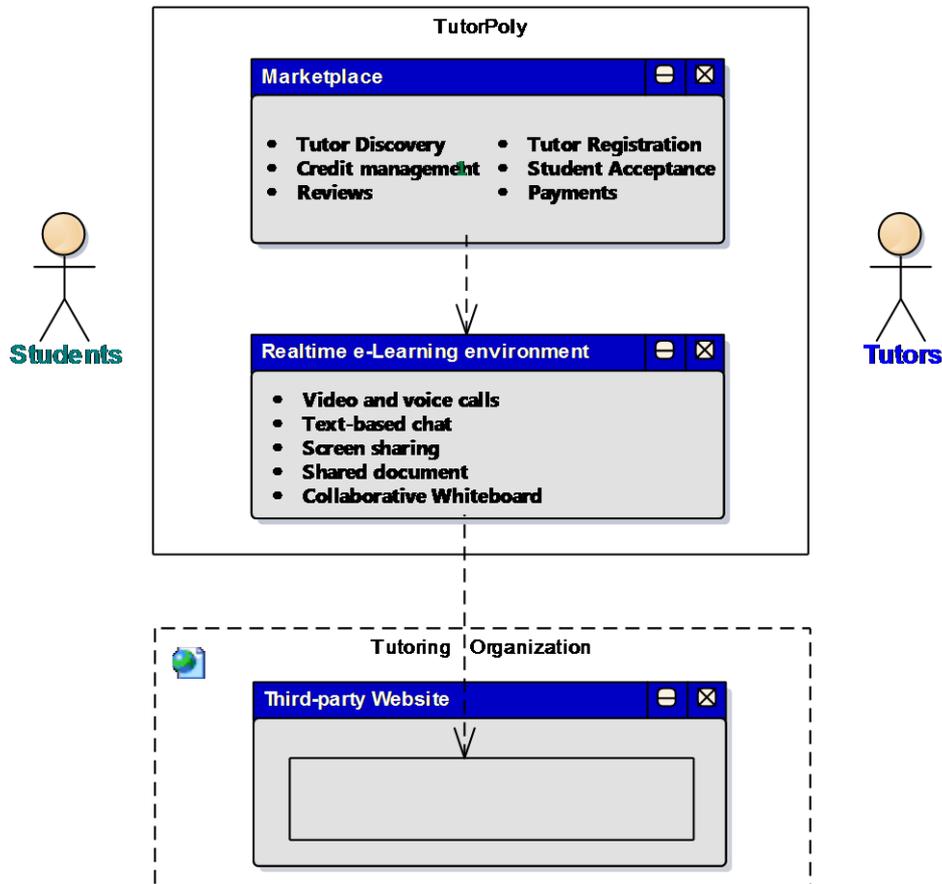


Figure 1 – Informal depiction of TutorPoly’s architecture

TutorPoly’s business model, in the more precise interpretation of a monetization plan, has aspects of several different models: Revenue-Sharing, Freemium and, from our student’s perspective, Pay-as-you-go.

Specifically, Revenue-Sharing has a major role as it fits naturally in our business framework, where one of our customer segments, the tutors, provides a paid service to the other, the students. This model has particular low barriers-to-purchase upon the customer segment that generates the revenue because the price paid is only a small fraction of their own proportional earnings. For this purpose, the platform uses a proprietary credit system to guarantee its transparency over multiple currencies and, at the same time, to allow flexible marketing tactics.



Figure 2 – Mockup of the live interactive e-Learning environment

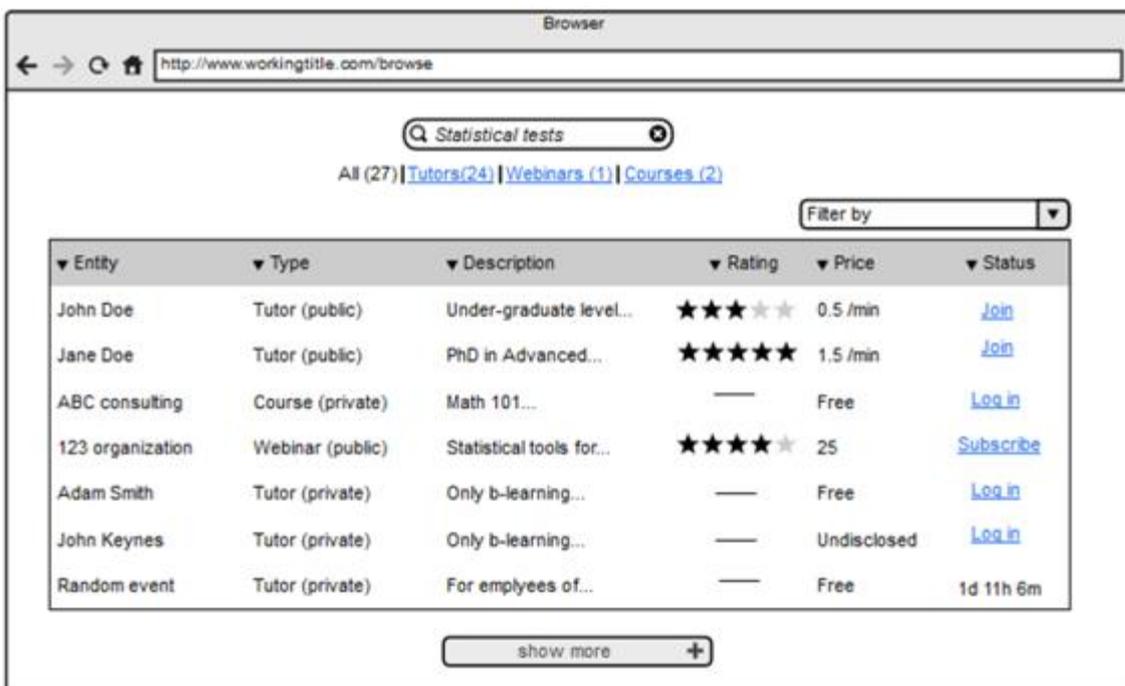


Figure 3 – Mockup of the Marketplace module

Regarding the business model, it is also important to underline that our solution presents several Freemium-like features, which can effectively tackle student's barriers-to-purchase, highly noticeable when purchasing procedures involve internet payment processes.

Figure 2 – Mockup of the live interactive e-Learning environment and Figure 3 – Mockup of the Marketplace module provide an overall intuitive understanding of our platform. It is important to highlight that users may easily embed our platform in their channels for interacting with their own internal customers, a feature that can result in significant dissemination patterns.

Software Requirements Specification

We defined the system's Software Requirements Specification using the modern RSLingo [4] [5] Requirements Engineering framework, which methodologies and documentation practices provide multiple qualities that collectively contribute to assuring the end system's fitness-for-purpose.

RSLingo separately analyses two distinct dimensions of a project: The business level and the system level. Regarding the business-level, one of the concerns covered is the business processes upon which the system's goals can be accomplished. In this regard, Figure 4 – TutorPoly's Business Processes overview presents a general depiction of the major processes involved.

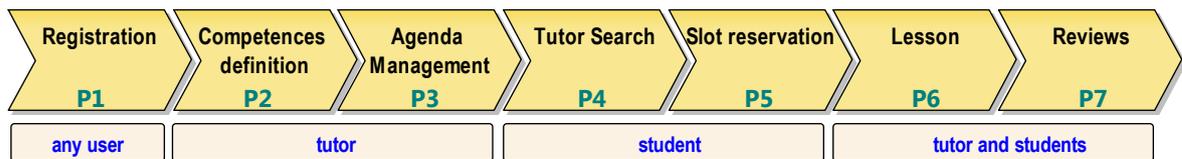


Figure 4 – TutorPoly's Business Processes overview

In terms of the system-level, it includes a complete description of the system's use-cases. As an example illustrative of important system features, Figure 5 – Diagram of the Marketplace Use-Caserepresents the use-case pertaining to the Marketplace module.

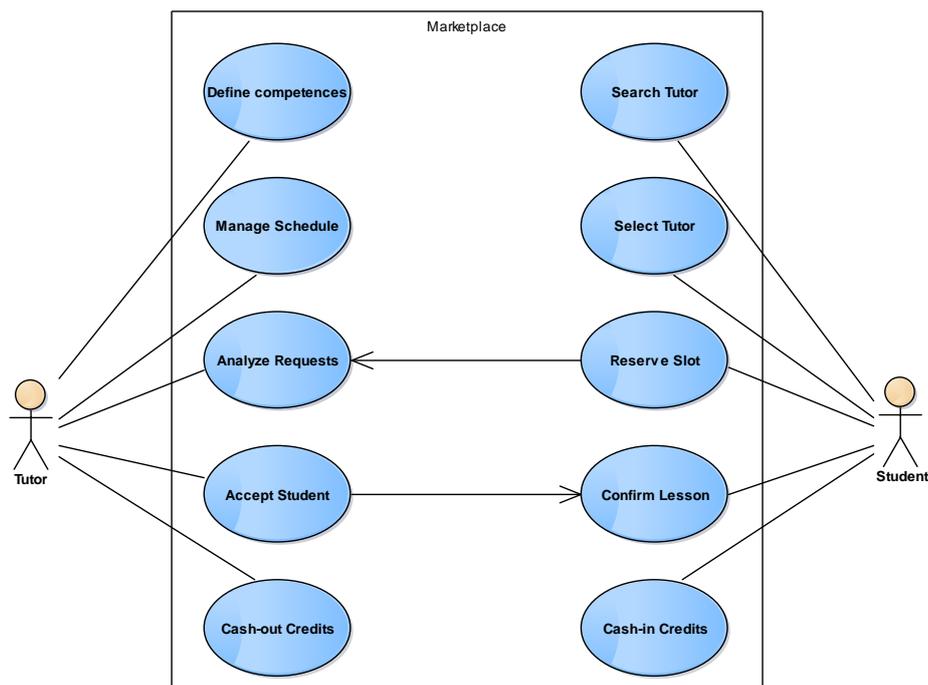


Figure 5 – Diagram of the Marketplace Use-Case

Technology

Finally, we define our system’s architecture and major underlying technologies. In this context WebRTC [6] has singular importance. It is a recent technology that supports several forms of *plugin-free* P2P real-time secure communication between browsers and mobile apps and has multiple advantages, such as, the Javascript API integrated with the HTML5 DOM (Document Object Model), great end-user usability, the device-agnostic interoperability, and its general black-box character.

While WebRTC encapsulates many technical issues concerning real-time communication, it still leaves out some important communication requirements that it does not specify nor provides a high-level implementation. In this regard, the various possibilities range from open source tools (e.g. easyRTC, PeerJS OpenWebRTC) or fully-features media servers (e.g. Kurento, Licode) to commercial SDKs and even WebRTC PaaS vendors (e.g. openTok, Bistri, ooVoo, PubNub).

Considering the implementation, testing and maintenance cost of each of these alternatives, we chose to base our rich-media communication requirements on top of a WebRTC service and infrastructure vendor. Subsequently, after comparing the features, stability, and business model of each provider, we elected ooVoo as our backend WebRTC service, thus encapsulating most of the technical challenges concerning the implementation of rich-media real-time communication.

Conclusions

In this work, we defined and developed the two intrinsic dimensions of a commercial Web platform, specifically: The business structure and the technological implementation. These levels are both fundamental as a single weakness at either of them seriously undermines and

compromises the viability and sustainability of the project as a whole, particularly in such a highly competitive sector as e-Learning.

In relation to business concerns, it was fundamental to identify best-practices and trade-offs by conducting a throughout analysis of both existing and extinct businesses - in particular, their value propositions, marketing strategies, and business models - therefore reducing the multiple risks inherent to products and services in a pre-market entry stage. In this regard, our research allowed us to conclude that the sustainability of *free* business models, in the sense of a monetization strategy that relies on selling advertisement space, is highly questionable as it is unlikely that customer's LTV (Life Time Value) yields a reasonable profit after accounting for the cost-structure (i.e. development, fixed, variable, and Customer Acquisition Cost), leading us to opt by a revenue-sharing model.

Thanks to these activities, we were able to design an e-Learning platform that, from a business planning perspective, has the potential to successfully leverage on the identified business opportunity. Subsequently, we described the software development aspects using RSLingo RE approach, which has an intrinsic capacity to provide a bridge between the business and technical levels of the project.

Currently, our project is in an advanced stage of conceptual development and future activities pertain to the implementation of the actual business structure. Finally, the results of this project are the basis for an early-stage business plan and prototype which, in turn, are indispensable elements to capture the investment necessary to develop a market-ready product.

References

1. **Al-Debei, Mutaz, El-Haddadeh, Ramzi e Avison, David.** *Defining the business model in the new world of digital business.* Proceedings of the Americas Conference on Information Systems : s.n., 2008. pp. 1-11. Vol. 2008.
2. **Stewart, David e Zhao, Qin.** *Internet Marketing, Business Models, and Public Policy.* s.l. : Journal of Public Policy & Marketing, 2000. pp. 287-296. Vol. 19.
3. **Osterwalder, Alexander, Pigneur , Yves e Tucci, Christopher.** *Clarifying Business Models: Origins, Present, and Future of the Concept.* s.l. : Communications of the Association for Information Systems, 2005. Vol. 16.
4. *Rslingo: An Information Extraction Approach Toward Formal Requirements Specifications.* **Ferreira, David and Silva, Alberto.** 2012, 2nd IEEE International Workshop on Model-Driven Requirements Engineering, MoDRE, pp. 39-48.
5. *RSL-IL: An Interlingua for Formally Documenting Requirements.* **Ferreira, David e Silva, Alberto.** 2013 3rd International Workshop On Model-Driven Requirements Engineering, MoDRE, pp. 40-49.
6. *WebRTC 1.0: Real-time Communication Between Browsers.* **Bergkvist, Adam, et al., et al., [ed.].** February 2015, W3C Working Draft.