Chapter 10
Online Research and Learning Environment to Facilitate the Elaboration of Bachelor's/Master's Theses in Multidisciplinary Teams

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Abstract Usually, the elaboration of a bachelor's/master's thesis is a solitary effort of the student, under the supervision of the coordinating professor. The thesis research idea is the result of the interaction between the same two actors, as such it is being limited by factors like: the student's research capacity; the professor's expertise; the financial and technological resources, etc. A possible solution for the above-mentioned problem is the development of a national or even international electronic research and learning environment, meant to facilitate the connection between all possible stakeholders in the elaboration of bachelor's/master's theses: students, professors, universities, entities interested in innovation/research and publishers. The paper presents an operation model tailored to some basic concepts of modern education, such as: multidisciplinary collaboration, the anchoring in the market's needs or the use of online tools. The online platform outlined in the paper aims to facilitate: establishing and saving research and learning objectives and documents; classic, video and holography conferencing; real-time support from coordinating professors; distance teaching or learning tasks' management. The paper might contribute to the development of new sets of methods, modes of operation, spaces and procedures for the research and learning alleged efforts to elaborate bachelor's/master's theses or even PhD theses.

Keywords Bachelor's/master's/PhD · Theses · Teamwork · Online platform Higher education institutions (HEI) · Interdisciplinarity · Collaboration

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10.1 Introduction

Academia continues to keep open an important question regarding the most efficient way to elaborate a bachelor's/master's thesis: "*Should the effort of elaborating a bachelor's/master's thesis be a loner one or a team one?*" (Kovács and Talpoş 2013). In this sense, it was proposed a project (Kovács 2014).

The controversy deepens even more, under the pressure created by the rapidly changing knowledge-based economy, translated into an unprecedented need of the business environment to rapidly find adaptable, employable, highly qualified graduates (Moldovan 2011). After all, the most valuable resource that a company has is the human resources (Drambe 2014).

A pragmatic analysis of the phenomenon allows asserting that there are small chances of finding graduates with such attributes as the ones mentioned above, in higher education systems that encourage the elaboration of a bachelor's/master's thesis in a solitary effort of the student, under the "classic" supervision of the coordinating professor.

The chances of finding adaptable, employable, high qualified graduates increase significantly if the students are being engaged in a collaborative effort of elaborating their theses, by becoming a part of a multidisciplinary learning environment in which learners work collaboratively with active representatives of different environments (business environment, international academia, publishers, or even public authorities). Such a learning environment can ensure the real transfer of practical, applicable knowledge and skills toward the future employees or entrepreneurs.

A possible effect of the stimulation of the collaboration between higher education systems and the real economy (the working life) could be that the students become contributors (with their theses) in finding efficient and innovative solutions to different real-life or simulated problems (Moldovan 2011).

As such, how to design research and learning environment to facilitate the elaboration of bachelor's/master's theses in multidisciplinary teams, that lead to collaborative and experiential learning becomes the most difficult question to answer (Zitter et al. 2010).

The gap between the labor market and the educational curricula in Romania is considerable (Ţigănaş 2010). Given the fact that there is no institution (public or private) in charge of this issue (Ţigănaş 2010), even for our country, the only solution to ameliorate the gap between the labor market and the educational system would be to stimulate the cooperation between as many as possible of the stakeholders involved: universities, private companies, public institutions, publishers, grants offering entities, etc.

10.2 Requirements for a Research and Learning Environment

A modern research and learning environment for elaborating bachelor's/master's theses that would contribute to the amelioration of the disparities between the education system and the labor market should be:

(a) **International and cross-cultural**
Under the effects of the globalization process, an efficient research and learning environment should be, without doubt, international. Only such an environment could prepare the future employees or entrepreneurs for the challenges of interculturality. It is known the fact that the relations between different organizations, companies or even states involve the interference and interaction of different cultures (Cojocaru 2010). That is why, a modern research and learning environment should embrace a cross-cultural approach. In such a cross-cultural environment, the relationships between the three levels of collaboration: macro (national), meso (organizational), and micro (individual) should be formed on the strong interdependencies existing within them (Cojocaru 2010).

(b) **Internet based**
An efficient research and learning environment should benefit from the advantages of an online platform. In this way, the research and learning environment can succeed in: overcoming barriers of distance and time; making economies of scale and implementing novel instructional methods (Cook 2007). Another important attribute that derives from the Internet-based character of the research and learning environment is the scalability of the whole system. In order to ensure real scalability of the Internet-based research and learning environment, a decentralized approach to the development of the web-based applications is necessary. Such an approach will consist in creating a logical structuring of collaborating subsystems/applications and a geographically separated structure of replicated servers (Ezhilchelvan et al. 2001).

(c) **Multidisciplinary**
Increasingly less students elaborate bachelor's/master's thesis by addressing all of the current and emerging challenges from a singular disciplinary source (Jacob 2015). Multidisciplinary and interdisciplinary approaches to research and learning are essential underpinnings to best meet the dynamic needs of today's triad: graduates—higher education systems—labor market. As such, an Internet-based research and learning environment should be addressed to as many as possible industries and should work as an ideas' integrator.

(d) **Collaborative**
A modern research and learning environment should be, by definition, collaborative. Creating a collaborative environment is a key method of empowering students to thrive in the real world. Different curricular areas, cooperation, open-mindedness, discussion, different viewpoints, disagreement, higher order thinking skills, and debate are all elements that help students learn how to collaborate

Table 10.1 The main benefits of the stakeholders of a research and learning environment

Stakeholder	Possible benefit/benefits
Universities and other HEI's	• Better absorption rate of the graduates in the labor market
Students	• Better chances of finding a job, after graduation • Better application of the knowledge acquired
Business entities	• A wider recruitment pull and better prepared candidates • Reduced costs in terms of market research or innovation and launching new products and services
Grants offering entities	• A better disbursement rate for the educational grants • Dispersed and reduced risks, if the financing scheme of the research projects includes co-financing from the business entities
Public authorities	• Low rates of unemployment among young graduates
Publishers	• Interesting topics for print, with larger addressability to the public (including the business environment)

with others and thus become better prepared future employees or entrepreneurs (Hetherington 2013).

(e) **Based on incentives and tangible benefits**
The mission of the research and learning environment should include the wish to offer, to all stakeholders, attractive incentives/benefits (see Table 10.1), in a win–win collaboration model.

(f) **Familiar and easy to use**
An online research and learning environment should be developed on the most modern principles of usability and ergonomics and should thus require very little training to use. It should be an application with which, all users: students, coordinating professors, businessmen, publishers, etc., should be familiar.

10.3 Possible Structure of an Online Research and Learning Environment

A possible sitemap for an online research and learning environment to facilitate the elaboration of bachelor's/master's theses is presented in Fig. 10.1.

A possible structure of the online platform integrated in the online research and learning environment is presented in Fig. 10.2.

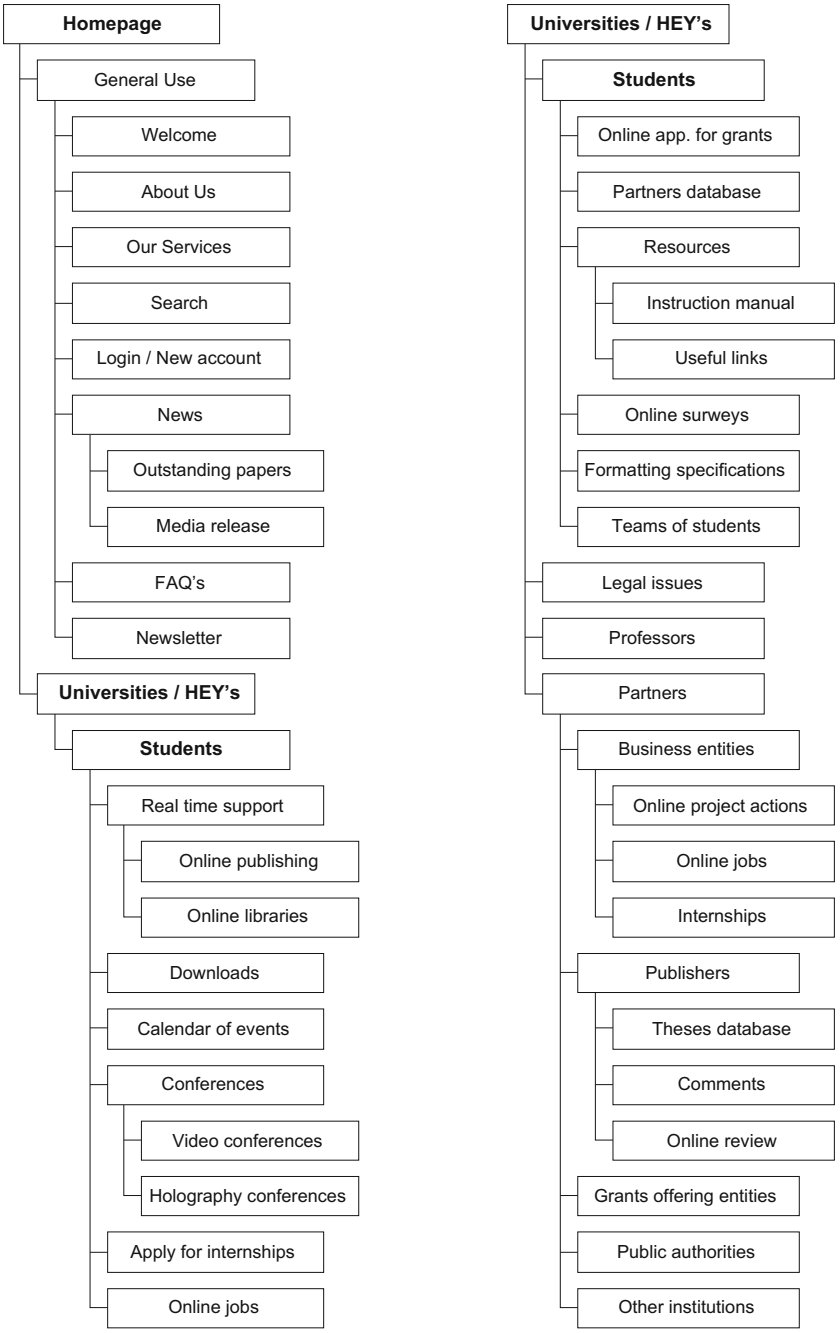

Fig. 10.1 A possible sitemap of an online research and learning environment

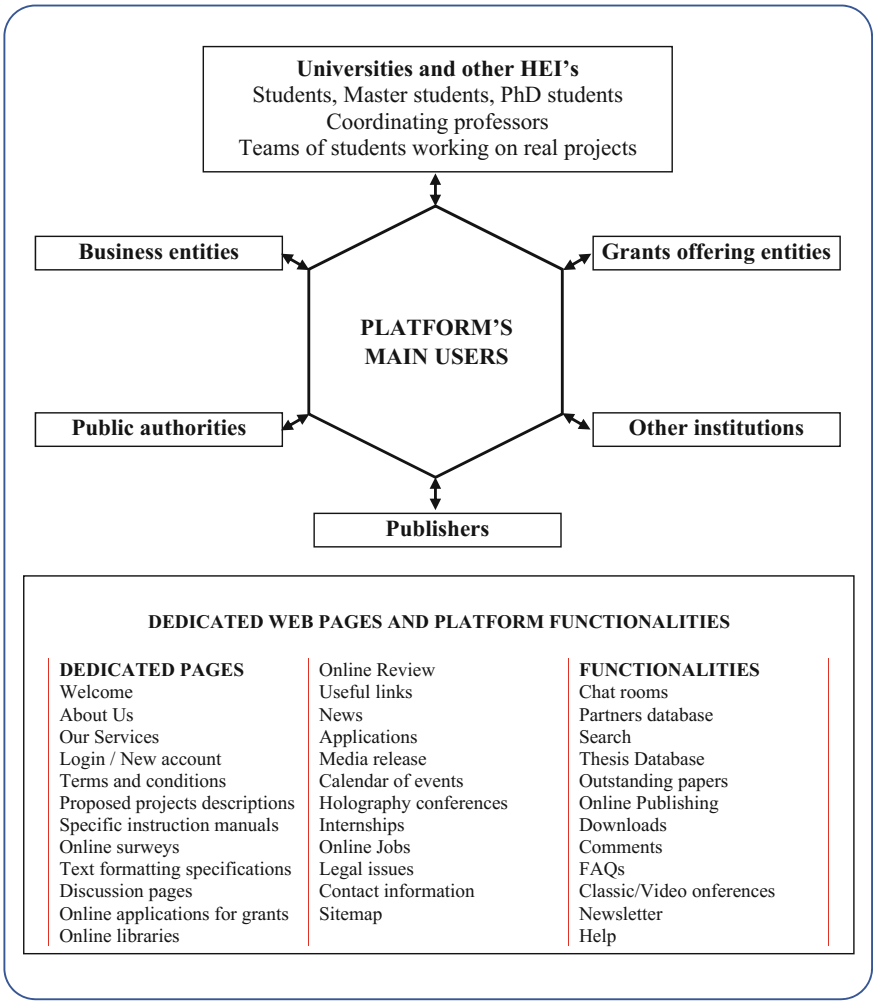

Fig. 10.2 A possible structure for the online platform

10.4 Dedicated Web Pages

Welcome: What will visitors/members find in the site? This page will describe site's structure and navigation philosophy. Links will be used to let the viewers navigate to other sections.

About Us: As this initiative overview, here will be briefly described the online research and learning environment's vision, goals, strengths, and strategies. Also, it will be described the initiative background, how did this initiative get started and what are its roots.

Our Services: This page will provide visitors/members a description of all the services. In addition, it will define each of the top sections and briefly describe what the user will find in each of these sections.

Login/New account: Here will be provided the procedure to get access to the system and the related applications/functionalities with a user ID and a password. If visitors are not registered, this will provide them with reasons to register with their name, affiliation, e-mail address, and other personal data.

Terms and conditions: This page will provide rules by which all registered users must agree in order to use the websites. This typically contains a definition of keywords and phrases, user rights and responsibilities, policy outlining the use of personal data, policy describing procedure for account termination, etc.

Proposed projects descriptions: This page will provide a brief overview of what users can expect to find in this section. There will be described, in separate linked pages, what users need to know about the current proposed projects. Also, will provide links to the archives to find projects that have been completed and to read summaries of each past project.

Specific instruction manuals: This page will provide links to detailed written guidelines informing how something should be done or operated in each specific proposed project.

Online surveys: This page will provide links to resources that facilitate to run online surveys in order to gain a deeper understanding of peoples' tastes and opinions about the online research and learning environment. Permission to associated reports to the surveys is granted by access policy.

Text formatting specifications: Here will be provided all the rules to be followed when formatting the text in a named and accepted wordprocessor.

Discussion Pages: This will allow to create threaded discussions. They are very useful for answering general/specific questions of the project, allowing team students to "meet" or having a discussion on a topic presented by the coordinating professor.

Online applications for grants: This is the page with or without links to specific pages where team of students can apply for grants, given by grants offering entities, to finance totally or partially their project.

Online libraries: This page provides links to electronic libraries or digital libraries, with a collection of resources (text, graphics, audio material, video material) and databases. This collection, stored as electronic media formats, is meant to support student's activities to conduct research or to consult information. The digital content may be stored on the main server, or accessed remotely to other suppliers via Internet environment.

Online Review: The online research and learning environment will provide a unique set of services and the partners will be either satisfied or dissatisfied. Partners may take their experience straight to the web. If the partner expresses a positive experience, the review can be amplified on the web and social media to encourage others. Negative reviews should be considered as opportunities to do better.

Useful links: This section of the website will contain links to some very useful resources and valuable information for writing theses. Links should be separated into different categories to make it easier to find what users/visitors are looking for.

News: This page will facilitate to put important announcements. Also, will specify what is the latest news that has value for the visitors/users. It will be a good idea to link this page to the Calendar of events and the Media Releases pages.

Applications: This page will provide links to some dedicated software applications or applications of another nature that help students to work in specific proposed project.

Media release: What are people/press/media saying about this initiative? This page will provide a short statement that describes the article/audio/video and use the data list on this page to link to separate descriptive pages.

Calendar of events: This page will provide short descriptions of each planned event.

Holography conferences: This page will provide a link to a partner that offers this new way of organize a conference.

Internships: This page will announce internships that offer students a period of practical experience in the industry relating to their field of study. In this sense, it is a good idea to encourage business entities to offer such internships, then to publish such opportunities on the website.

Online Jobs: This page will encourage all partners within the online research and learning environment to offer jobs to the students, then publish those opportunities on the website.

Legal issues: The activities within the online research and learning environment have to be legal. In this sense, after a pilot period of experimenting such activities, the partners have to contact the Ministry of Education with the proposal of having this way of elaborating bachelor's/master's theses as a permanent legal offer of the involved universities. The entire process is to be explained on this page.

Contact information: This page will contain the contact information of every active actor of the online platform with some more details for the key persons.

Sitemap: This page will help viewers find their way around and view the entire site at a glance. Users will click on the page titles to quickly navigate to the desired subject.

10.5 Functionalities

Chat Rooms: Chat rooms are great to connect all the team members with the coordinating professors and/or to get an immediate answer to a question.

Partners database: All registered individuals and their affiliation will be stored in this database. In addition to a basic directory, this will include brief biographies about key partners.

Search: This is a standard functionality every website should have and will provide a search button to quickly find information within the website.

Thesis Database: All the theses made in teams within the online research and learning environment's will be stored in this database. Permission is granted by the access policy.

Outstanding papers: All quality projects are to be awarded and/or published electronically or even in printed format. It is a very good way to disseminate the success of the online research and learning environment.

Online Publishing: Because electronic publishing has become very common in scientific publishing, this page will include links to the digital publication of the outstanding projects in e-books format. All other projects may be published in digital magazines format. At the same time, online publishing contributes to the development of online libraries.

Downloads: This section will allow partners, especially students, to take information from the main server and to store it to their computers for immediate access.

Comments: This page will provide the possibility that partners/visitors make written notes intended as explanations, new information, opinions, illustrations, conclusions, judgments, or criticism of any aspect found in the website and/or in the projects.

FAQs: This page will contain FAQs (Frequently Asked Questions) or Q&A (Questions and Answers), all supposed to be commonly asked in some context, and/or refer to a particular topic.

Classic/Video conferences: This functionality will facilitate the simultaneously meeting between stakeholders, either in a physical place or in the online environment.

Newsletter: This functionality will help to distribute regularly/periodically (via e-mail) a newsletter that is generally about one main topic of interest to site subscribers.

Help: This is a standard functionality which provides help/tutorials for each section of the online platform so that students will have what is necessary to accomplish every task of their project activity within a team.

10.6 Conclusions

- In a classical situation, the student might say: "I develop my thesis alone, on a given topic, because I have to graduate!"
- In this new, modern and legal approach the student might say: "I develop my thesis on a complex topic, within a team, because I love and I enjoy it!"
- Is this paper's approach possible? The only possible answer is: YES!

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