Virtual Collaboration and Team Management in an Online Environment

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Abstract: The report presents the role of the collaborative online learning and its aspects, application and main features. It describes also two experiments and comparison between them, made within the European project SOCCES (SOCial Competences, Entrepreneurship and Sense of Initiative). This demonstrates clearly the importance of this innovative way of learning and team management, the effect of their application in a real business case.

Key words: E-Learning, Collaboration, Online Environment, Teamwork, Team management

INTRODUCTION

E-learning is a way to implement next generation technologies in the standard training methodologies. Generally, it is an environment where information can be exchanged asynchronously, which allows optimal use of resources. This additional alternative method of acquiring knowledge has more positives, namely the possibility to create discussion groups, forums, self-help programs available to everyone in the system.E-learning (e-learning) in itself summarizes all types of online learning as mobile (m-learning), virtual (v-learning), distance (d-learning) and ubiquitous learning (u-learning) training.

Following the dynamic development of the alternative training, the virtual and distance learning became very popular and used. The difference is expressed in the presence of a binding link between learners and teachers in teaching, evaluation, and discussion. The modern type of e-learning is an upgrade of the mobile learning, as the ubiquitous learning includes context-oriented and adaptive methods to provide training as close to the normal environment of the learner. It is available to anyone, its content can be modified, and it offers interactivity of the process, an important aspect in the modern education systems [1] [2] [3].

The collaborative learning is a learning process where more than one student (a small group or entire community) desire to study a given learning material, but rising the learning process up to another level, namely learning together as a team. Fundamentally it is different from the usual way of acquiring knowledge through direct contact with the source of the information (the source submitted information to one student or group of students who aim only to assimilate the information submitted).

In the collaborative way of building knowledge, the process becomes dynamic and is directed to each student within the team. In this situation, the attention falls exactly on them because the main subject in collaborative learning is the contact between participants - how they learn /do analysis /work together to a problem, how they develop their way of thinking [4, 5, 6].

The collaborative learning can be both face-to-face and online. Due to the dynamics of the 21st century even this method goes into a new dimension, continually looking for new ways the process of acquiring knowledge to be most convenient and innovative. This requires the development of new generation platforms for e-learning. The more the popularity of the effect of collaborative learning is growing, the more the existed and new designed platforms provide functionalities for collaboration online.

Such innovative platform is the FairShare environment, which not only provides access to all kinds of teaching materials, but also the aforementioned features for collaborative learning, there is a module for discussion and webinars [7].

Consisting all aspects of e-learning and collaboration, the FairShare become an essential tool in conducting the European project SOCCES (SOCial Competences, Entrepreneurship and Sense of Initiative), held in two pilot case studies.

The description of the two business cases and comparison between them will be presented below.

I. FIRST BUSINESS CASE DESCRIPTION: Helsinki Central Library Project

The pilot case was conducted between four European countries: The Netherlands, France, Finland and Bulgaria [10].

The challenge

The role of a library is changing. It is no longer just a stock of books – all kind of digital content is already available in modern libraries and the selection of services ranges from lending things to supporting active citizenship. Helsinki wants to find its own model for the libraries of the future. However, the main focus is on the library's core competence. Versatile reading skills and the ability to evaluate media critically are the foundations of active citizenship, and the Central Library will do its part to support them. Moreover, it is to be a public space where people work, meet and interact. Helsinki Central Library 2018 is a new kind of project, whose contents and operation models are being sought in co-operation with the library, city residents, and partners. The Central Library project is based on the idea that more than architects are needed to create a new, functional library at the Helsinki City centre: the needs and wishes of city residents are incorporated into the design process.

In this case, the Library invites the student groups to participate in finding solutions to the question: *What new services and opportunities of active participation could be incorporated into the Central Library in order to best support the creation of an open, active, and equal society?*

The student groups will find out and suggest concrete solutions to the question by choosing one of the following ways:

1. Benchmarking what libraries in their own city or country have done;
2. Brainstorming ideas in a group (student team and/or invited participants);
3. Collecting ideas by interviewing relevant people.

Students who wished to participate in the project were divided into five teams (one from each country and two from Bulgaria [7, 8].

The pilot case aimed to trace how the students improve their capabilities and skills by learning in collaborative way. Also how their previous knowledge and skills could be applied effectively in solving a given task within the team. But the main goal was to demonstrate and develop transversal competences in a real business case.

The pilot case was divided into five stages (in 5 weeks – the first week for building the teams and the other four were structured according the Double Diamond Model)[11].

The British Design Council has developed a so called Double Diamond model for an innovation and development (or design) process. This model visualizes the various steps of development, innovation and design four steps (4 D's): Discover, Define, Develop and Deliver.

DISCOVER: An innovation or development process starts normally by identification of a challenge or gap or on the basis of a new idea. In the Define step the challenge, gap or idea is studied closer for creating understanding of the context and background and get introduced to the eventual previous solutions that have been developed to tackle the challenge and their outcome.

DEFINE: The Define step enables to focus the development and innovation process on the basis of the information gathered in the Discovery step. In the Define step a project specific challenge is developed the initial challenge is defined. These questions are useful for focusing the development work. Moreover they enable in the final step to compare and reflect if the goals of the development process were achieved and to what extent.
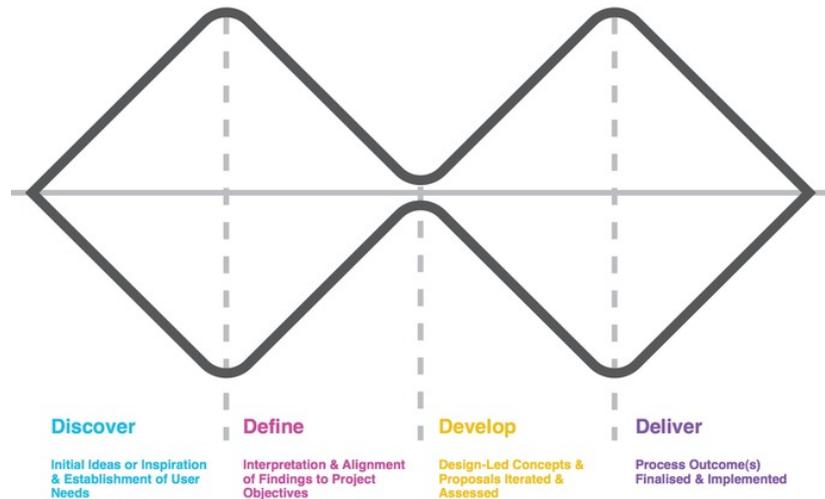
Fig.1The Double Diamond Model

DEVELOP: The Develop step is the one where the main creative, innovation and development activities take place. In this step collaboration with various stakeholders as well as the other development team members is of crucial importance. Several studies have proved that collaboration leads to effectiveness, which makes innovation possible.

DELIVER: Delivery step finalizes the development process. It can consist of final tests and finalization of the prototype, planning of the further development processes or production as well as other means of implementing and disseminating the results. In this phase the results of the previous steps are collected together and collated in a summarizing document, a written report and/or audio-visual documents.

DESCRIPTION OF THE PILOT BUSINESS CASE 1 STAGES (WEEKS) AND THE RESULTS

- **Week 1 – Team Building**

During the first week the teams were formed. Before the course all students (32 in total) answer the pre-test in order to determine the students' skills and behaviour features when working independently and in a team. This test determined their Belbin role. By identifying our Team Roles, we can ensure that we use our strengths to advantage and that we manage our weaknesses as best we can. Sometimes, this means being aware of the pitfalls and making an effort to avoid them [9].

During the first week second experiment (challenge) was held - Marshmallow challenge [13]. Participants had only a few spaghetti, scotch and marshmallow candy. The aim of the experiment was through collaborative work within the team to build the tallest tower in the shortest time, at the top of the tower they had to put a marshmallow candy, which had to stay up, without falling down. This challenge was a very good method of acquiring an overview of the team as a whole, as well as of each member.

- **Week 2: Discover**

During the second week the participants had the task to planned, discussed and give advice and opinion on a submitted proposal. As a result of collective thinking and discussions, each team had prepared a plan, set goals and a clear idea of how they could become a reality. The tasks were distributed properly and deadline was set. Within the same week each team presented the result of their work.

The competences addressed during the task were: communication, teamwork, critical thinking, positive attitude and initiative.

- **Week 3: Define**

The main goal was to learn and express competences required in solving real working life challenges. The teams had to present their plan and discuss them with the other teams in the webinar session. Before the presentation each team decided which member would make the presentation on behalf of their team and how other members would participate. At the beginning of each webinar the student participants elected a chairperson.

The competences addressed during the task were: problem solving and teamwork.

- *Week 4: Develop*

This week was the final part for the pilot case. During it the teams summarized their ideas and created all team together a final concept for the future library.

The competences addressed during the task were: teamwork, communication, creativity and innovation, positive attitude.

- *Week 5: Deliver*

The goal was finalization, evaluation and delivery of the work. The teams had to prepare an inspiring presentation of their final solution. Also they had to fill in the post-evaluation questionnaires.

After the pilot there were three questionnaires to fill in:

1) all students answered the post-test on themselves;

2) evaluated peers in their own team;

3) gave feedback in the customer satisfaction questionnaire;

The competences addressed during the task were: teamwork, communication, creativity and innovation, critical thinking, positive attitude.

In order to solve their task well, during the whole pilot case, the students founded support on the virtual platform FairShare in the folder "Material for the piloting students" and had the opportunity to upload the results of their work in the folder "Student return". Tests were made online, and their results were received immediately.

At the end of each week was held mandatory webinar in the FairShare platform. Thus, the decision-makers monitored the tasks, summarized the purpose and the achieved results from the work.

II. PILOT BUSINESS CASE 2 DESCRIPTION: SUSTAINABLE TECHNOLOGIES

The challenge

The second pilot case was conducted between two European countries: Italy and the United Kingdom. This business scenario was based on a real life research project that uses business and their new sustainable technologies that are being developed by and used on real-life buildings.

A substantial share of the building stock in Europe is older than 50 years, with many buildings in use to date, which are hundreds of years old (Building Performance Institute Europe, 2011). Because these buildings were constructed when energy regulations were very limited, to date this represents a huge challenge in terms of heating consumption and related pollution performance. For example, in the United Kingdom, the built environment accounts for a significant 44% of UK emissions, of which 18% is from non-domestic buildings. Although new properties are ever more environmentally friendly, only 2% of the UK's existing stock is less than five years old. Within this context, retrofitting is emerging as a relatively untapped solution that allows reducing buildings' environmental impact, thus satisfying both legislative requirements and general public awareness on environmental sustainability. In addition, retrofitting allows buildings' users to cut running costs and energy bills. To date, while there are a small but growing number of businesses offering services specifically targeted at the emerging domestic retrofitting market, there is a huge

need for retrofitting solutions targeting non-domestic (e.g., industrial or public) buildings. In fact, the emissions from existing non-domestic stock present a specific challenge, because of size and construction methods used.

To this regard, the project RESSEEPE (REtrofitting Solutions and Services for the enhancement of Energy Efficiency in Public Edification) is an innovative project, funded by the European Union that focuses on the refurbishment of existing public buildings in three European cities [12]. RESSEEPE brings together the manufacturer and designers of new sustainable technologies with the aim of assessing the performance of these technologies on real-life buildings. To this extent, the project will be able to technically advance, adapt, demonstrate, and assess a number of innovative retrofit technologies.

While the RESSEPPEE project has been very successful in proving a reduction of around 50% energy consumption, to date it is not clear how this technology can be brought to the market. In particular, since Southern European countries lag behind in this type of technological development, there is a need to target their markets.

The business challenge that the students needed to undertake was the following: How to market the RESSEPPE retrofitting technology to non-domestic buildings in Italy?

To answer this challenge, Coventry University (Cov) construction students were working alongside management students from the University of Bologna (Unibo) on the following activities:

1) Presenting an outline of the technologies used within the RESSEPPE project

2) Presenting an outline of a business idea to market the technology

3) Finalizing a business idea to market the RESSEPPEE technology in Italy

Due to high interest in the project in both universities, COV managed to enrol 19 students and UNIBO enrolled 20 students. Both groups were divided into 3 groups and matched to collaborate internationally.

DESCRIPTION OF THE PILOT BUSINESS CASE 2 STAGES

Activity	Assessment and Competencies
Team Building a. Prior to the start of the project students undertook a self-assessment asking you to rate their current transversal competencies. This was a formative process and was therefore not assessed.	• Self-assessment questionnaire (on-line) • *The competences addressed during the task were: Teamwork, communication, critical thinking and positive attitude.*
b. Team identify presentation Each group prepared a group PowerPoint presentation about their team. The presentation needed to have the following: o Team identity (name & Logo) o 1 slide per team member that must contain an image or drawing that represents you as a person o 1 slide representing the whole team which must contain an image or drawing that represents you as a team	• The PowerPoint presentation was uploaded onto Fairshare. • *The competences addressed during the task were: Teamwork, communication, creativity and positive attitude.*
c. During the next week the teams reviewed the team presentations from their paired corresponding institution, i.e. Cov group 1 reviewed Unibo group 1 presentation and visa versa.	• *The competences addressed during the task were: Teamwork, communication, creativity and positive attitude.*
Discover d. Technical presentation 1	• The PowerPoint presentation was uploaded onto Fairshare.

Coventry teams then needed to produce a PowerPoint presentation outlining two of the technologies being used in the RESSEEPE project. The teams needed to present the technical details to the Bologna teams remembering the target audience were postgraduate management students. RESSEEPE technologies: - • Isolation strategies for energy conservation; • Solar photovoltaic technology in buildings; • Solar thermal technology; • Radiant surface heating and cooling; • Heat Recovery of ventilation air; • Heat pump with total heat recovery and short term storage; • Lighting • Information technology&communication	• *The competences addressed during the task were: Teamwork, critical thinking, problem solving, communication, creativity and positive attitude.*
e. Technical presentation 2 The Bologna students, having reviewed the Coventry teams' technical presentation produced and upload a presentation outlining the business model to be used to market the RESSEEPE technologies.	• The PowerPoint presentation was uploaded onto Fairshare. • *The competences addressed during the task were: Entrepreneurship, teamwork, critical thinking, problem solving, communication, creativity and positive attitude.*
Define f. *The groups reviewed their corresponding teams technical presentation and generated5 questions that need to be answered*	• Questions were to be uploaded through Fairshare • *The competences addressed during the task were: Entrepreneurship, teamwork, critical thinking, problem solving, communication, positive attitude.*
Develop g. *The teams needed to respond to the questions raised and answer them through the forum. In addition, they posted supplementary questions to their corresponding team through the forum.*	• At the end of the week the discussion on the Fairshare forum allowed the Bologna students to finalize a business idea in relation to the use of the RESSEEPE technologies in Italy. • *The competences addressed during the task were: Entrepreneurship, teamwork, critical thinking, problem solving, risk assessment, communication, creativity and positive attitude.*
Deliver h. *The Bologna students co-ordinated and upload a final presentation on the business idea based on both groups presentations and the forum discussion.*	• The teams needed to vote as to whether you think the business proposal should proceed based on feasibility and innovativeness. • *The competences addressed during the task were: Entrepreneurship, teamwork, critical thinking, problem solving, risk assessment, communication, creativity and positive attitude.*
i. *At the end of the project the students individually completed a self-assessment asking them to rate their current transversal competencies having undertaken then project. This was a formative process and was therefore not assessed but for the Cov students feed into their next coursework.*	• Self-assessment questionnaire (on-line) • *The competences addressed during the task were: Critical thinking and positive attitude.*

III. COMPARISON BETWEEN BUSINESS CASE 1 AND BUSINESS CASE 2

When comparing the two pilots, which were developed separately it is interesting that they both used a process linked to the double diamond model, though the activities that the groups went through differed they both followed the same informal structure.

Team Building

The process that the two pilots went through for this stage was different, but had the same goal of building the team. Whilst the Helsinki Library project focussed on defining and identifying Belbin team roles, followed by a marshmallow team building activity, the Sustainable Technologies took a different approach, in terms of the groups producing a team presentation introducing themselves to an opposite team. The competencies developed at this stage of the pilots are detailed below:

Helsinki Library Project	Sustainable Technologies
Teamwork, communication, and positive attitude.	*Teamwork, communication, critical thinking and positive attitude.*

Discover

Again, the underlying approach was the same for both pilots, in terms of research. The teams in both pilots needed to work collectively to make decisions within a set timescale. The audience of their work was also a key factor. The competencies developed at this stage of the pilots are detailed below:

Helsinki Library Project	Sustainable Technologies
Communication, teamwork, critical thinking, positive attitude and initiative.	*Teamwork, critical thinking, problem solving, communication, creativity and positive attitude.*

Define

Again there are similarities between the two pilots in terms of presenting the work produced. There were differences in the communication method used, with the Helsinki Library project using a webinar and the sustainable technologies pilot choosing a forum approach through Fairshare. The competencies developed at this stage of the pilots are detailed below:

Helsinki Library Project	Sustainable Technologies
Teamwork, communication, creativity and innovation, positive attitude.	*Entrepreneurship, teamwork, critical thinking, problem solving, communication, positive attitude.*

Deliver

Both pilot projects again took a similar approach in terms that the teams needed to produce a final presentation based on the prior work defined and developed.

Helsinki Library Project	Sustainable Technologies
Teamwork, communication, creativity and innovation, critical thinking, positive attitude.	*Entrepreneurship, teamwork, critical thinking, problem solving, risk assessment, communication, creativity and positive attitude.*

What can be seen from comparing the two pilots that by following a double diamond approach: a similar learning experience was developed. The two pilots had differences between them but followed the same structure of discover, define, develop and deliver. By

following this similar approach, the competencies addressed through the pilots were very similar; making the data obtained from the student's comparable.

CONCLUSIONS AND FUTURE WORK

Despite the short time of working on the pilot case, it was a solid base on which future collaborative projects could be build. Each successful project is built on excellent organization, perfect communication, and creative and critical thinking. The ability to solve problems may not be strongly developed in every person, but in the teamwork, not the individual thinking but collective thinking is the key. Numerous experiments have demonstrated the benefits of teamwork and how the possibility of collaborative activities affects the quality of the results. The methods for e-learning of all kinds: virtual environments for visualization, more innovative platforms for collaboration, discussion forums and chats, all in one product, provides the necessary conditions for the development and deployment of potential and modelling of creative ideas.

REFERENCES

[1]. http://elearning-conf.eu/index.php?cmd=dPage&pid=proc-14
[2]. http://elearning-conf.eu/index.php?cmd=dPage&pid=proc-15
[3]. http://www.azbuki.bg/editions/azbuki/archive/archive2011/doc_view/1504-lazarova-lazarov012014
[4]. http://journal.e-center.uni-sofia.bg/site/wp-content/uploads/downloads/2015/03/7_M_Stoytcheva_SUJER_2014_41.pdf
[5]. http://tecfa.unige.ch/tecfa/publicat/dil-papers-2/Dil.7.1.14.pdf
[6]. http://files.eric.ed.gov/fulltext/ED427705.pdf
[7]. https://fairsharetraining.eu/
[8]. https://socces.eu
[9]. http://www.belbin.com/
[10]. https://fairsharetraining.eu/node/13050/tft#term/498
[11]. https://innovationenglish.sites.ku.dk/model/double-diamond-2
[12]. http://www.resseepe-project.eu/
[13]. http://www.tomwujec.com/design-projects/marshmallow-challenge/

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