Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 20, Issue 2, 2020
PRINT ISSN 2284-7995, E-ISSN 2285-3952

E-LEARNING PLATFORM FOR START-UP SIMULATION IN LIFE SCIENCE AND BUSINESS FIELD - A USEFUL EDUCATIONAL TOOL

Radu Cristian TOMA[1], **Gabriela MĂRGĂRIT**[1], **Gabriel GARAIS**[2], **Florentina MATEI**[1]

[1]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăști Blvd, District 1, Bucharest, Romania, Emails: radu.toma@biotehnologii.usamv.ro, gabriela.margarit@biotehnologii.usamv.ro, florentina.matei@biotehnologii.usamv.ro
[2]Romanian - American University, 1B Expozitiei Blvd., District 1, Bucharest, Romania, Email: garais.gabriel.eugen@profesor.rau.ro

Corresponding author: garais.gabriel.eugen@profesor.rau.ro

Abstract

During an Erasmus+ KA2 project implementation, an international team has developed an e-learning platform useful as an educational tool for Start-up simulation in the field of Life Sciences A video tutorial is also available for the use of the platform; the tutorial is embedded from YouTube. The Database structure has two main data types called: Simulation Business Game and Company for The Business Model Canvas. Each of the "Simulation Business Game" has many potential "Companies for The Business Model Canvas". The platform offers centralized knowledge management in innovation and entrepreneurship containing reference documents that can be used in specific activities related to simulated enterprise and start-ups, giving also access to located resources according to the national character and specific legislation for each of the users.

Key words**:** *start-up, life sciences, education, e-learning, internet*

INTRODUCTION

Entrepreneurship simulation seminars are used as a consistent method to teach students of different disciplines about business interrelationships to entrepreneurs [7]. While numerous start-up simulation games have been developed by well-known business schools, like Wharton *School* of the University of Pennsylvania, in the field of Life sciences/ Biotechnology, such educational games are missing. Using simulation tools in Life Sciences/ Biotech education is quite new [14].
During an Erasmus+ strategic partnership (2017-1-RO01-KA203-037304) project implementation, an international team has developed an e-learning platform useful as an educational tool for Start-up simulation in the field of Life Sciences [12].
The project aimed to improve entrepreneurship through the development of key skills for entrepreneurship, by the use of an innovative tool and methodology. The tool is based on games in an online e-learning platform that allow community building of learning, which combines non-formal activities and informal to improve business skills.
These methodologies, based on a theoretical background tested and realistically, can offer practical experiences in the field of activity of new entrepreneurs [1].
The output was developed as a support tool for the activities of simulated Life Sciences enterprise and entrepreneurship in the frame of the project and can be accessed by registration on the project website [7].

MATERIALS AND METHODS

The tool development has taken into account two different approaches; an on-line version to auto-test personal skills and as a virtual class to be supported by a mentor/teacher.
(1) The autonomous online version - the e-learning platform, where entrepreneurs at the beginning of the road can test their skills and competencies by opening up and running a catering company. This version will provide automatic feedback from the user [9]. A collaborative learning platform that hosts the online version of the game for improving the attitude entrepreneurs, manuals and tools for creation by social networks. This learning environment also contains other items such as

videos, databases [10], online references as well as information about future events, etc., intended to support the study process [5].
(2) The training version to be played in a class monitored and facilitated by an experienced trainer. This version is called Classroom training Face-to-Face (F2F). The F2F version has the same scenario as the standalone one online but the main difference is that the trainer plays an active role in providing feedback and use of scenarios as part of the entrepreneurship training. A F2F version is finally an excellent tool for the trainer because:
-it allows different actions;
-the integration of game scenarios into real situations and facilitating discussions;
-to re-create classroom training as working groups, using an online game as a motivational tool;
-the integration of different training methodologies, to meet various training needs;
-the use of the user handbook as a material training;
-to test different technologies in training by trainers.
By combining F2F learning and online platform learning, you can provide a personalized learning experience for learners.
Here are some other reasons to adopt a combination of F2F learning and online platform learning in an academic or corporate training: one can use them to provide learning as a continuum; one can capitalize on other e-learning trends, including gamification and e-learning videos; it helps to simplify the content so that learners gain knowledge faster.

RESULTS AND DISCUSSIONS

The developed tool, as described above, was piloted during a Summer School event (July 2019) for 10 days.
The training was organized UASMV Bucharest, in the IT laboratory of the Faculty of Biotechnology.
In the training were involved 22 international participants (Master and Ph.D. students in Life sciences and Business) from 5 countries: Romania, Spain, Italy, Belgium, Albania. The mentorship support came from 4 teachers trained before for the Canvas Model use and an IT person. The business Model Canvas is a strategic management and lean start-up template for developing new or documenting existing business models [4].
A Business Model Canvas is created on the base of nine issues: (i) Key partners, (ii) Key activities, (iii) Value proposition, (iv) Customer relationship, (v) Customer segment, (vi) Key resource, (vii) Distribution channel, (viii) Cost structure, (ix)Revenue stream[2].
Business plans have been developed based on the Canvas model (Fig. 1) and came to motivate students to learn entrepreneurship [13].

<table>
<tr><td rowspan="2">Key Partners</td><td>Key activities</td><td rowspan="2">Value propositions</td><td>Customer relationships</td><td rowspan="2">Customers segments</td></tr>
<tr><td>Key Resources</td><td>Channels</td></tr>
<tr><td colspan="3">Cost Structure</td><td colspan="2">Revenue Streams</td></tr>
</table>

Fig. 1. A Business Model Canvas
Source: Hixson, C., Paretti, M. C., 2014, Texts as tools to support innovation: Using the business model canvas to teach engineering entrepreneurs about audiences. Professional Communication Conference (IPCC), 2014 IEEE International [6].

The Business Model Design was elaborated corroborate with Osterwalder's 9 point decomposition of a Business Model [11] as presented below (Fig. 2).
At each issue described above, every team needs to answer questions.

For Key partners, essential problems are the identification of key partners or suppliers and what base are a partnership motivated.
Key activities need to be defined as what key activities do the value proposition requires and what activities are the most important and more important in a customer relationship, distribution channels, etc.

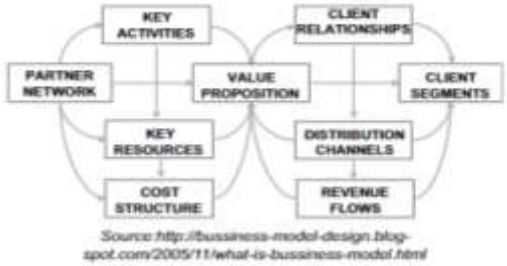

Fig. 2. Business Model Design
Source: Chesbrough, H., 2010, Business Model Innovation: Opportunities and Barriers [3].

The value proposition list is developed on essential value delivered to the customer, followed by a list of customer needs satisfied by-products or services.
What relationship is expected by customers to be established and how can be integrated in terms of cost and type are questions for the customer relationship.
The customer segment defines which customers are targeted (luxury level, middle level and so on) and who is the most important customer.
Key resource responses require what resources are vital to make the idea work, making an enumeration from human resources to intellectual property.
The distribution channel is essential for the question: how are the company reach its customers. From the multitude of channels, every company selects the distribution channels from which channels work efficiently and how much the channels cost.
Cost structure regards all the expenses the company what to make to develop the production of its products or services and with marketing. At the same time, an important issue is which key activities or resources are more expensive.
Revenue stream consists of a make a plan about how much can the company earn in a certain period base on how much are customers willing to pay for the acquisition of products or services delivered by the company. For every major product or line of products, it makes a plan of revenue stream as a part of overall revenue.
The Summer School set training objectives were wider than the e-platform use:

-a good understanding of the business system and knowledge of successful business models;
-the market study, identifying current opportunities and sources of finance for developing a business;
-increasing the ability to implement ideas, plans, and activities;
-better knowledge and understanding of the critical skills needed by entrepreneurs to create successful businesses;
-make the participants aware of ethical principles and values applicable in the context of managerial issues;
-strategic analysis, identifying priorities and choosing the right decisions; time and effort management (how to handle working tasks);
-the development of leadership abilities; elaboration and interpretation of a business plan [8].
Students were grouped in 4 international working team and were allocated tasks and responsibilities according to their affinities. Each student has registered in the platform and virtually have been assigned their role: owner, employee, human resource manager, financial manager, product developer. Each team had to create a virtual enterprise having as backbone a product or service related to the field of Life Sciences.
Fig. 3 shows a Business Canvas in the process of elaboration.

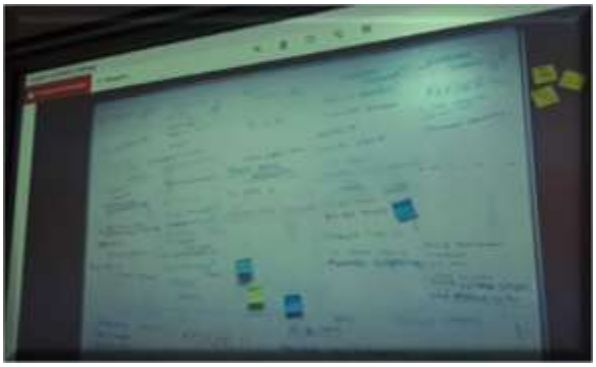

Fig. 3. A Business Canvas in work
Source: elaborated by students.

In the end, 4 start-ups have been designed and simulated in the e-platform; different names and visual identities were proposed by the students: “Enviro Biotech”, “Plantoo”, “PlantPowerOrg” and “PsychoYeast”.).

Fig. 4. "Enviro Biotech" visual identity
Source: elaborated by students.

"Enviro Biotech" (Fig. 4) was built as a company producing CO_2 car filters embedding enzymes able to degrade pollutants. The proposed technological steps were: purifying the enzymes from cell cultures; embedding the enzymes on appropriate support (the future filter); assembling the device according to the car type. An initial investment of 70,000 euros was established and the first production year profit was estimated at 304,000 euros.

Fig. 5. "Plantoo" visual identity
Source: elaborated by students.

"Plantoo" (Fig. 5) start-up has proposed the creation of a package/device for monitoring and bio-ferti-irrigation of horticultural plants. The initial investment reached 176,000 euros and the envisaged profit in the first year was about 80,000 euros.

Fig. 6. "You Grow": visual identity
Source: elaborated by students.

"You grow" (Fig. 6) proposed the development of a mobile application to monitor the indoor plant cultivation for food in very little space, connected to sensors for nutrients, pH, illumination; the application was designed to be expanded for the industrial production system of Green Roofs. The initial investment would be recovered after 3 years with a rate of 5% profit.

Fig. 7."PsychoYeast" visual identity
Source: elaborated by students.

"PsychoYeast" (Fig. 7) aimed to help people suffering from respiratory diseases like COPD and Asthma. It was proposed the development of a cosmetic product, PsychoCreme, made from yeast that purifies the air; by using a super bioengineered yeast will be metabolized the reactive species present around the human face that are potentially harmful for the targeted population; for initial input of 224,000 euro, the 3rd year profit will go close to 400,000 euro.

An external evaluation commission has evaluated the created business according to clear established evaluation criteria (from an economic, technical and organizational point of view).

Different learning outcomes were registered:

-knowing the steps of starting a business;

-show in any situation, from a position of leadership, five essential qualities that describe the ethical side of entrepreneurship;

-identify the necessary resources for developing a business;

-organize a business plan, by taking into account market developments and the business environment within which they will function;

-define the potential market for a certain firm;

-knowledge of the characteristics of public acquisitions;

-identify ways to promote a business using electronic trade:

-discover possible sources of finance for certain businesses;

-calculate financial indicators;

-understand various intellectual property rights;

-make decisions and set priorities based on data analysis;

-improved English and communication skills and acting as a member of a team.

Different simulation games have been provided in the virtual environment in the past years, but our tool is adapted to link the business principles to Life Science specificities.

CONCLUSIONS

The platform was successfully piloted by Master and Ph.D. students during the Summer School; having in the team students with complementary background (Life Sciences and Business) the feasibility and potential sustainability of the proposed start-ups were close to real life, as the evaluation committee emphasized.

REFERENCES

[1]Baden-Fuller, C. Morgan, M.S., 2010, Business Model as Models, Long Range Planning, pp.156-171.

[2]Barquet, Ana Paula B., Cunha, V.P., Oliveira, M.G., Rozenfeld, H., 2011, Business model elements for product-service system Functional Thinking for Value Creation. Springer Berlin Heidelberg, pp.333.

[3]Chesbrough, H., 2010, Business Model Innovation: Opportunities and Barriers, Elsevier, Long Range Planning, 43, pp.354-363

[4]Crotty, Y., Kinney, T., Farren, M., 2018, Using the Business Model Canvas (BMC) strategy tool to support the Play4Guidance online entrepreneurial game, The Gruiter, https://doi.org/10.1515/ijtr-2017-0005, Accessed on 23.03.2020

[5]Garais, E.G., Carutasu, G., 2019, Entrepreneurial game simulation e-platform for supbioent Erasmus plus project, Journal Of Information Systems & Operations Management, RAU, Bucharest, pp. 179- 187.

[6]Hixson, C., Paretti, M. C., 2014, Texts as tools to support innovation: Using the business model canvas to teach engineering entrepreneurs about audiences. Professional Communication Conference (IPCC), 2014 IEEE International, doi:10.1109/IPCC.2014.7020368, Accessed on 20.03.2020

[7]Huebscher, J., Lendner, C., 2010, Effects of Entrepreneurship Simulation Game Seminars on Entrepreneurs' and Students' Learning, Journal of Small Business & Entrepreneurship, 23:4, 543-554.

https://canvanizer.com/new/business-model-canvas, Accessed on 23.03.2020

[8]Joyce, A., Paquin, R.L., 2016. The triple-layered business model canvas: A tool to design more sustainable business models. J. Cleaner Production, 135, 1474-1486.

[9]Mărgărit, G.L., Toma RC, Gropoșilă, D., Barba, D., 2016, Satisfaction level of studying through e-learning system at the students enrolled in the biotechnology education, Sci. Bulletin, Series F. Biotechnologies, vol XX; 358-361.

[10]MYSQL Official WebPage https://www.mysql.com/, Accessed on 18.03.2020

[11]Osterwalder, A and Pigneur, Y., 2010, Business Model Generation: A Handbook for Visionaries, Game Changers and Challengers, New Jersey: John Wiley and Sons.pp.18-20.

[12]Portal SupBioEnt, http://portal.supbioent.usamv.ro, Accessed on 10.03.2020

[13]Sudrajat, J., Rahman, M.A., Guzman, G., Ricky, M.Y., 2018, Innovation of Entrepreneurship Learning with Business Canvas Model Game, International Journal of Entrepreneurship, Vol. XX, Issue 3, https://www.abacademies.org/articles/Innovation-of-entrepreneurship-learning-with-business-model-canvas-game-1939-4675-22-3-154.pdf, Accessed on 23.03.2020.

[14]Toma, R.C., Margarit, G.L., Gropoșilă, D., Barba, D., 2016, Benefits of the e-learning platforms and cloud computing in the biotechnology education, Scientific Bulletin, Series F. Biotechnologies, Vol XX, 370-373.