Deliverable 23 – Initial Piloting Report

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Introduction

Europe faces a number of challenges that can only be met if it has innovative, well-educated, and entrepreneurial citizens who, whatever their walk of life, have the spirit and inquisitiveness to think in new ways, and the courage to meet and adapt to the challenges facing them (EACEA, 2012). It is critical for Europe to maintain a knowledge-based economy and be at the forefront of technological, innovative entrepreneurship to maintain its competiveness. To meet these targets young people should study and seek careers in the scientific and technological fields and understand entrepreneurship. In a discussion entitled: 'Educating the Next Wave of Entrepreneurs' at the World Economic Forum 2011, it was concluded that the earlier an entrepreneurial spirit is encouraged the better the results for society. This project field was chosen to directly address the motivation of entrepreneurship and innovation within European secondary school students.

StartUp_EU is designed to motivate secondary school students by simulating the excitement and creative innovation of a start-up company. The project has created a series of educational games to foster the development of entrepreneurial skills on a Web2.0 technology platform where secondary school students will learn about entrepreneurship through inspiring and thought-provoking videos, online workbooks covering business and marketing plans, and presentation skills. Students are then supported to develop their own business ideas collaboratively, and across Europe if possible. The process mirrors the idea creation, barriers and problems in developing new technology and building a company. The goal is to enable students to understand the problems and rewards of working in the exciting high tech area and inspire students to seek out careers in this vital European sector. Through reflection activities students will have the opportunity to understand what factors influenced their success or failure.

According to the Key Competence Framework, the entrepreneurship key competence refers to an individual's ability to turn ideas into action. It includes creativity, innovation and risk taking, as well as the ability to plan and manage projects to achieve objectives (Brag & Henry, 2011). The Web2.0 platform will provide a mechanism for students to turn their ideas into action and includes: communications, facilities for partner finding, inspirational videos, online materials, competition submission, and online presentation tools. The reality of creating a new idea, analysing its potentials and the real need, will be set against the problems and costs of developing the idea into a virtual product for a market. The students will have the option and ability to play the mini-games autonomously.

Digital computer games have now been around for over three decades and the term games-based learning (GBL) has been attributed to the use of computer games that are thought to have educational value, however there has been much debate surrounding this theory (Pivec, 2009). Hainey, Connolly, Boyle and Stansfield (2011) show that GBL has been applied in a number of different fields such as medicine, languages and software engineering. Further research (de Freitas, 2006; de Freitas & Neumann, 2009; Egenfeldt-Nielsen, 2005; Prensky, 2006; Squire, 2004; Squire & Jenkins, 2003) has shown that serious games can be a very effective as an instructional tool and can assist learning by providing an alternative way of presenting instructions and content on a supplementary level. GBL and Serious Games can promote student motivation and interest in subject matter resulting in enhanced learning effectiveness.

Learning through games offers increased motivation and interest to learners through introducing fun into the learning process. Adding fun into the learning process makes learning not only more enjoyable and compelling, but more effective as well (Prensky, 2002, p. 4). One of the main characteristics of GBL is the fact that the instructional content is presented together with fun elements. A game that is motivating makes learners become personally involved with playing it in an emotional and cognitive way. By engaging in a dual level, learner attention and motivation is increased (Protopsaltis et al., 2011). Systematic literature reviews (Boyle et al., 2012; Connolly et al., 2012) have indicated that playing computer games confers a range of perceptual, cognitive, behavioural and affective, motivational impacts and outcomes where the most frequently occurring outcomes and impacts were affective and motivational followed by knowledge acquisition/content understanding.

Computer games have also had an effect of students learning styles. Beck and Wade (2004) examined a large number of young professionals and found that their approach to learning was deliberately overlooking the structure and format of formal education. Young professionals extensively used trial and error, welcoming contribution and instruction from peers, and emphasising 'just in time' learning to fulfil their needs and complete their tasks. All of these skills are considered essential in the modern world and GBL can assist towards developing and practicing them.

Furthermore, the next generation of jobs will be characterized by increased technology use, extensive problem solving, and complex communication (Levy & Murnane, 2004). These are skills that go beyond typical reading, writing, and arithmetic of years past. It is not only what students need to learn that is shifting, but also *how* and *when* they learn. Students of today are growing up with laptops, tablets, cell phones, and video calls, and

they expect to use this technology in their daily interactions (NCREL & Metiri, 2003). Additionally, the skills required for success in games such as thinking, planning, learning, and technical skills are also sought by employers (Federation of American Scientists, 2006). Games are frequently cited as important mechanisms for teaching 21st century skills because they can accommodate a wide variety of learning styles within a complex decision-making context (Squire, 2006), foster collaboration, problem-solving, and procedural thinking (Johnson et al., 2011) which are important 21st century skills and important aspect of entrepreneurship.

This report provides an analysis of the initial mini-pilot of the StartUp_EU competition that ran from 11 January to 18 March 2013 and involved following schools:

1. Colegio Alcaste-Las Fuentes - La Rioja
2. Colegio Nuryana - La Laguna
3. ISIS Galilei - Gorizia
4. ITC Vittorio Veneto-Giovanni Salvemini di Latina
5. Humaniora Broederschool Sint-Niklaas

Method

Participants

Sixty three (63) participants, between 14 and 18 years of age, were registered on the StartUp_EU platform to participate in the initial piloting, forming 13 groups. The participants were recruited via their schools. The consortium partners contacted schools affiliated with their institutions to invite them to participate to the StartUp_EU pre-piloting. 49 participants filled out the pre-piloting questionnaire and after data refinement, 47 questionnaires were used for the analysis. 14 participants (29.8%) were female and 33 participants (70.2%) were male.

Materials

Different types of material were available to the students and teachers through the Web 2.0 platform. The materials were videos, mini-games, how to guides and examples. Videos are videos of 2 to 3 minutes that set the task within the narrative framework and declare the task's goals and expected outcome. Mini-games are self-contained games to be played for stimulating certain skills to be applied in the challenge at hand and save the

scores within the game. How to guides are short practical guides that assist in solving the tasks. There are three how to guides, one explaining the StartUp_EU competition, the second explaining the challenges and the third explaining how to use the platform. Examples are useful to enhance the quality of student work by modelling the expected output. The examples were taken from real IT companies (Apple, Dell, Microsoft, etc.). The game rules were presented in written documents describing the rules, roles, deadlines and assets. All the materials were made available through the StartUp_EU platform.

Apparatus

Two types of apparatus were used in this study a Web 2.0 Learning Content Management System (LCMS) and five independent mini-games.

Web 2.0 LCMS

The StartUp_EU platform was based on the ILIAS 4.3.0 version. ILIAS is a SCORM compliant LCMS developed at the University of Cologne/Germany and is available as Open Source Software (OSS). The technical characteristics available to the users were the following:

- Integration/upload of text, images, audio, video in various file formats including: (jpg, png, gif, mp3, wav, mp4, avi, pdf, doc).

- File upload, material collection and creation of containers such as folders for topics. Uploads were restricted to a defined maximum size to prevent server overload.

- Group communication enabled by the following facilities: messages that could be forwarded to a personal email account, forum, chat, communication with tutor/mentor/discussion board for individuals or teams to ask questions that could be answered by mentors or peers, a star system allowing students to rate each other's responses and allowing mentors to provide qualitative feedback, group collaboration tools (wiki), links to Google Docs documents to allow collaboration, surveys to decide on questions within groups and a calendar to set deadlines for the submission of documents.

- Group brokerage function - groups can form online or offline, rights and roles are defined to support different users on the platform, groups are able to use a "notice board" to post "job offers" to recruit team members with particular skill sets and mentors/tutors can change the status of an individual's group membership.

Mini-games

A set of educational mini-games have been developed that allows students to practice and enhance their entrepreneurial skills as they develop their own business ideas collaboratively and autonomously across Europe. Mini-games have been created to support a number of challenges including:

- Building your company team

- Sparking creativity

- Understanding your clients

- How to develop your product

- Marketing your product.

Assessment in each mini-game is through the use of quests and how well an individual or team performs determines their final score. Mini-games can be played more than once to increase a player's score (that is, increase their learning). For example, in the mini-game "Building your company team", the player is given a description of a project and a budget and then has to select the roles required for project and, for each of the roles, the skills required for the role. After that, the player is given a selection of possible staff for each role with different combinations of skills and needs to select the most appropriate people to make up his team. Figure 1 provides an illustration of this mini-game.

Figure 1: StartUp mini-game "Building your team"

In the mini-game "Finding the idea", the player has to use their creativity to connect a series of words together by going through a maze, with each word having to be identified in a hangman-style game. If the player fails to identify a word, he must backtrack and

find another path through the maze to get to the end of the game. Figure 2 provides an illustration of this mini-game.
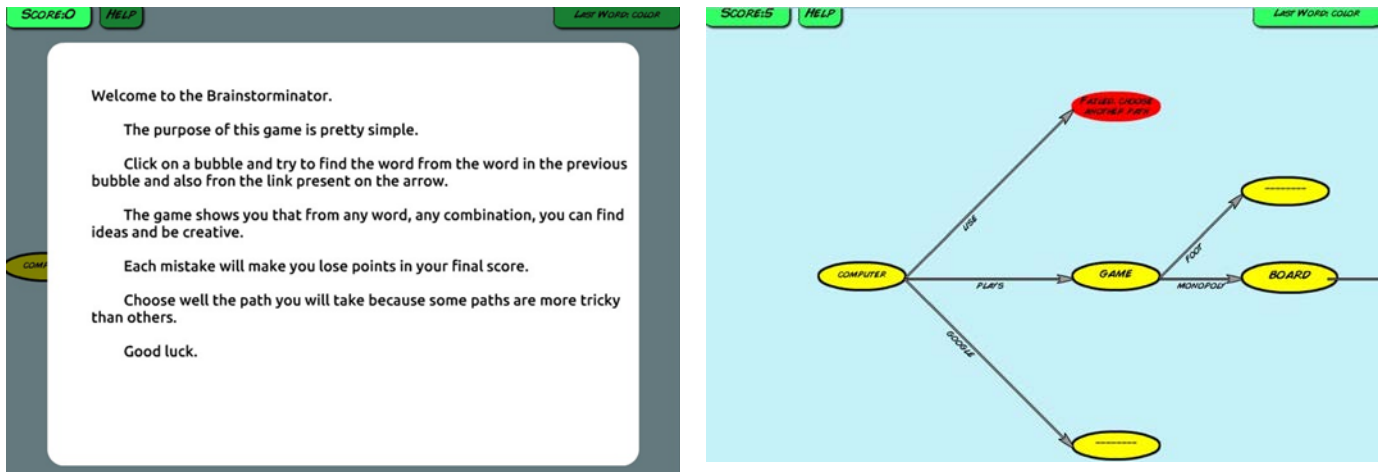
Figure 2: StartUp mini-game "Finding the idea"

In the mini-game 'Understanding your clients' the player plays the role of a salesman who sells a number of products. By driving a car through part of a city, the player has to find potential clients and match them to a suitable product. On finding a client, the player is allowed to ask a number of questions to help select the most appropriate product. Figure 3 provides an illustration of this mini-game.

Figure 3: StartUp mini-game "Understanding your clients"

In the mini-game "Develop your product", the player has to identify the the type of staff required in a team to carry out specific tasks to develop a product. Figure 4 provides an illustration of this mini-game.

Figure 4: StartUp mini-game "Develop your product"

In the mini-game 'Marketing your product', the player is given a marketing budget and has to identify characteristics of his clients that may indicate how the budget should be spent. For example, one client may travel by train and watch TV, while another might travel by train and use the Internet frequently. Given that two clients travel by train, this might suggest that some of the marketing budget should be allocated to train advertising with a lower spend on TV adverts and Internet adverts. Figure 5 provides an illustration of two screens for this game, one where the player is identifying characteristics of a client and the second screen showing an example of how the marketing budget is being allocated.
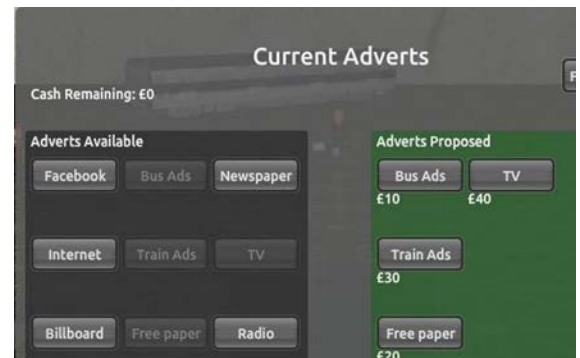
(a)   (b)

Figure 5: StartUp mini-game 'Marketing your product': (a) finding out about the clients; (b) allocating the marketing budget

Procedure

The students were set a series of 8 challenges, a preparation stage and a final stage which replicated the process of arriving at an idea for a business. The process involved building a business plan for taking an idea or pitch to the reality of a real product. Each challenge was related to a real problem or information needed to build the business plan and was introduced by a thought-provoking video accompanied by a mini-game and supportive material which explained in detailed how each challenge should be completed. All the material was uploaded onto the StartUp_EU platform and was accessible online. The pre-piloting assessed three of the mini-games and the StartUp_EU platform.

Students had to fill in a pre-competition questionnaire at the beginning and a post-competition questionnaire at the end of the competition. The pre-competition questionnaire assessed their own experiences, attitudes, knowledge and skills, and their expectations of the StartUp_EU tools, while the post-competition questionnaire focussed on assessing the usability of the tools, students' motivation, pedagogy and the skills developed by the students. Additionally, both questionnaires assessed their perceptions towards the broad dimensions of entrepreneurship (EACEA, 2012). The questionnaires were completed online and the pre-piloting lasted eight weeks, from the middle of January 2013 until the middle of March 2013.

Results

Pre-competition Questionnaire

Experience with entrepreneurship education

Students were asked to state to what degree they had had previous experience with entrepreneurship education. The metric used included the adjectives "never", "1-2 times per year", "twice in a school term", "once a month", and "more than once a month". There was also the option available not to declare anything as a separate option. The majority of participants (23, 48.94%) stated that they never had any experience of entrepreneurship education and 11 participants (23.40%) stated that they only had entrepreneurship education one or two times in a year. The results are shown in Table 1.

Table 1: Experience with entrepreneurship education

Past experience with entrepreneurship education	Number	Percentage
More than once a month	2	4.26%
Once a month	3	6.38%
Twice in a school term	3	6.38%
1-2 times per year	11	23.40%
Never	23	48.94%
Not Applicable	5	10.64%
Total	47	100%

Students were also asked to describe briefly their previous experiences with entrepreneurship education programs. Some interesting comments presented by the Belgian students included the following:

- "*For economy, we had to create a little company and create our own product.*"

- "For an assignment for the economy class, we had to create a self-made product. We also had to sum up all the costs and profits during the production."

- "'Kinderen van dewindt' game, it was a fun game. You had to buy a building and start a business. Last year we played a game were we had to make our own company (buy a building hiring persons ...)."

- "We made a little virtual company and we made a business plan."

Students were also asked whether they have participated in a competition on entrepreneurship in the past, and if yes, whether they would do that again. Unfortunately only the 8.5% (4) of them had done that in the past, and these four people did not provide additional valuable information concerning their future intentions.

Experience with game-based learning

Students were asked to state to what extent they previous experience with GBL. The metric used included the adjectives "never", "1-2 times per year", "twice in a school term", "once a month", and "more than once a month". There was also the option available not to declare anything as a separate option.

Figure 3: Students past experience with game-based learning

The results in Figure 3 indicate that the 40% of the students have no experience at all with GBL while another 31.91% only had experience once or twice per year.

Self-assessment of entrepreneurship own characteristics

Based on research from the EACEA (2012) students were asked to self-assess their own attitudes, knowledge and skills related to entrepreneurship. The skills included were: self-awareness, self-confidence, sense of initiative, risk-taking, creativity, problem-solving, knowledge on career opportunities and the world of work, knowledge of economic and financial literacy, knowledge on business organisation and processes, communication, presentation, planning, team work, exploring entrepreneurial opportunities, and design business projects. The cumulative results in percentages can be seen are shown in Table 2.

Table 2: Students self-assessment of their entrepreneurship related attitudes, knowledge, and skills

	Very low	Low	Medium	High	Very high	NA[1]
Self-awareness	0.00	4.26	**53.19**	**25.53**	14.89	2.13
Self-confidence	0.00	2.13	**46.81**	**31.91**	14.89	4.26
Sense of initiative	0.00	4.26	**34.04**	**46.81**	12.77	2.13
Risk-taking	0.00	12.77	**29.79**	**38.30**	14.89	4.26
Creativity	0.00	10.64	**36.17**	**31.91**	19.15	2.13
Problem-solving	4.26	2.13	**29.79**	**53.19**	8.51	2.13
Knowledge - career opportunities and the world of work	0.00	17.02	**48.94**	**19.15**	12.77	2.13
Knowledge of economic and financial literacy	2.13	29.79	**40.43**	17.02	6.38	4.26
Knowledge on business organisation and processes	4.26	29.79	**42.55**	14.89	4.26	4.26
Communication	0.00	2.13	**25.53**	**51.06**	19.15	2.13
Presentation	0.00	6.38	**29.79**	**46.81**	14.89	2.13
Planning	0.00	8.51	**40.43**	**36.17**	12.77	2.13
Team work	0.00	0.00	**27.66**	**31.91**	38.30	2.13
Exploring entrepreneurial opportunities	6.38	10.64	**38.30**	**21.28**	10.64	12.77
Design business projects	2.13	12.77	46.81	**23.40**	12.77	2.13

The results revealed that students generally self-assessed their entrepreneurship related attitudes, knowledge and skills from medium to high, with the only two exceptions being: knowledge of economic and financial literacy and knowledge on business organisation and processes which were rated medium to low.

Expectations from StartUp_EU

Students were asked also to declare their expectations towards their participation in the StartUp_EU "exercise". In particular, they were asked to declare which attitudes, knowledge and skills related to entrepreneurship they were expecting to develop through their participation in the StartUp_EU competition. The results are presented in Figure 3.

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[1] NA: Not applicable OR I don't answer OR I don't want to answer

Expectations from StartUp_EU competition

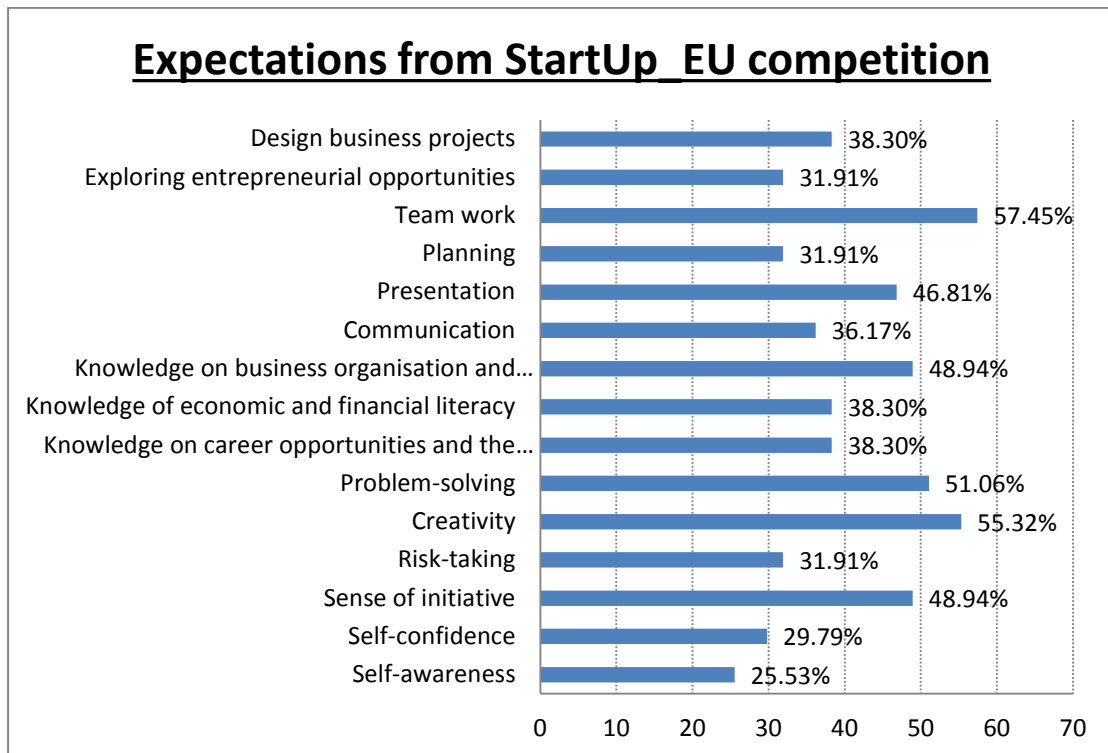| Skill/Knowledge/Attitude	Percentage
Design business projects	38.30%
Exploring entrepreneurial opportunities	31.91%
Team work	57.45%
Planning	31.91%
Presentation	46.81%
Communication	36.17%
Knowledge on business organisation and…	48.94%
Knowledge of economic and financial literacy	38.30%
Knowledge on career opportunities and the…	38.30%
Problem-solving	51.06%
Creativity	55.32%
Risk-taking	31.91%
Sense of initiative	48.94%
Self-confidence	29.79%
Self-awareness	25.53%

Figure 3: Students expectations in developing skills, knowledge and attitudes

Interestingly, the results showed that students expect – or would like – to develop mostly team working, creativity and problem solving skills through their participation in the StartUp_EU competition. Presentation skills, knowledge of business organization and processes, as well as their sense of initiative are close to the aforementioned first "group" of expectations with the rest of the skills, attitudes and knowledge.

Post-test Questionnaire

Although a total of 63 students declared their participation initially to the StartUp_EU competition, only 31 of them finally submitted the elevator pitch. Moreover, only 27 of them completed the pre- and post-tests. This means that the analysis can be performed using the group who had filled in the pre and post-test (27 participants) and the group with the additional 4 participants who had only completed the post-test including that 27 giving 31 participants could be used for further exploration. Participants were requested to self-evaluate their participation in the StartUp_EU competition, filling in a questionnaire that included Likert-type questions with the objectives of assessing the following:

1. Their intention to participate again in the StartUp_EU competition

2. Their usability assessment of the StartUp_EU platform

3. Their motivational usability to use StartUp_EU

4. The usefulness of StartUp_EU for learning entrepreneurship

5. The evaluation of the pedagogical model of StartUp_EU in its contribution of developing their entrepreneurial-related knowledge, skills and competences

6. The separate evaluation of learning objects included into the StartUp_EU (videos, mini-games)

Strongly, the assessment of the entrepreneurship-related expectations was only a sub-set of the complete study (analysis), which by nature was and should be more generic. The reason unfolds from the fact that, StartUp_EU employs a new approach to learning in the school-level settings, which is currently applied to entrepreneurship learning. In line, and if effective, this approach could be used also to other key competences, like the social and civic competences. The group of 31 participants consisted of 19 males (61.29%) and 11 females (38.71%) and the group of 27 participants consisted of 11 females and 16 males (59.26%).

Intention to use StartUp_EU

The students were asked whether they intended to use the StartUp_EU service to participate in the competition in the following year, given that they have access to the service for this period. The results were generally positive with the majority of the students from both groups specifying either strongly agree, agree or neutral. The results are shown in Table 3.

Table 3: Intention to use StartUp_EU to participate in the competition in the next 12 months

Answer	27 participant group %	31 participant group %
NA or Empty	0.00%	0.00%
Strongly Disagree	0.00%	0.00%
Not Agree	16.13%	14.81%
Neutral	48.39%	51.85%
Agree	32.26%	29.63%
Strongly Agree	3.23%	3.70%

Usability Assessment

The usability assessment of the service was conducted based on the *System Usability Scale (SUS)* of Brooke (1996). SUS is a ten-item attitudinal Likert scale that provides a global view of subjective assessments on usability. It is typically used after the

respondent had had an opportunity to use the system being evaluated and yields to a single score representing a composite measure of the overall usability of the system being evaluated. SUS scores have a range of 0 to 100. In the case of StartUp_EU, the respective usability score was estimated to 63.87 for the 27 participant group and 63.15 for the 31 participant group out of 100 respectively, which is a generally positive result.

The constituents of the usability score were also looked at to identify potential areas of improvement for the platform. Some of the key findings were the following:

- 6.45% in the 27 participant group and 7.41% in the 31 participant group found the service to be complex and that the functions were not very well integrated.

- 12.90% in the 27 participant group and 14.81% in the 31 participant group did not find the platform easy to use, stated that they did not feel confident using the service and thought that they had to learn a lot of things before they could proceed. Approximately 10% in each group stated that it was difficult to use and that they would like a technical support person to use StartUp_EU.

- 16.13% in the 27 participant group and 18.51% in the 31 participant group believed that most people would not learn to use StartUp_EU platform very quickly.

The results have shown that overall, minor changes are required to make the platform more appealing, less complex and to improve overall usability.

Motivational Usability

The participants were asked to assess the motivational usability of the StartUp_EU service. The respondents were asked to assess whether StartUp_EU service incorporates novel characteristics, whether it stimulated further inquiry and whether it is enjoyable and interesting. The results are generally positive showing that the StartUp_EU platform is generally enjoyable and interesting. The results are shown in Table 4.

Table 4: Motivational usability of the StartUp_EU service

	Question	Strongly Agree	Agree	Neutral	Not Agree	Strongly Disagree
n=27	Incorporates novel characteristics	7.41%	18.52%	59.26%	11.11%	3.70%
	Stimulates further inquiry	7.41%	37.04%	44.44%	7.41%	3.70%
	Is enjoyable and interesting	3.23%	58.06%	29.03%	9.68%	0.00%
n=31	Incorporates novel characteristics	6.45%	16.13%	58.06%	16.13%	3.23%
	Stimulates further inquiry	6.45%	38.71%	45.16%	6.45%	3.23%
	Is enjoyable and interesting	3.70%	55.56%	29.63%	11.11%	0.00%

Usefulness of StartUp_EU

The results indicate that approximately 77% of the students from both groups believed that the service is useful for learning entrepreneurship. Overall, the 51.62% from the 27 participant group and 48.15% from the 31 participant group believe that StartUp_EU is identical for entrepreneurship education.

Evaluation of Entrepreneurship-related characteristics

The students were also asked to assess particular characteristics of the pedagogical model used that are related to entrepreneurship. The reader may remember that these characteristics were also assessed in the pre-pilot phase (pre-test questionnaire). The researchers decided to use the same measures so as to identify potential tensions in increase of these self-assessment measures.

To create more coherent results and identify the potential tensions, only the data from students having completed both the pre-competition and the post-competition questionnaires are presented at this stage. The results are shown in Table 5.

The results suggest that participants became more hesitant towards entrepreneurship, however there is an increase in creativity, knowledgeable of economic and financial literacy, business organization and processes, inclination to explore entrepreneurial opportunities and design business projects. The decrease in scores of some of the characteristics was possibly due to lack of entrepreneurial experience of participants.

Table 5: Ratings of self-assessed entrepreneurship characteristics in the pre and post-competition

Attribute	M before	M after	Difference
Self-awareness	3.59	3.19	-11.14%
Self-confidence	3.81	3.00	-21.26%
Sense of initiative	3.70	3.33	-10.00%
Risk-taking	3.63	2.85	-21.40%
Creativity	3.37	3.44	+2.07%
Problem-solving	3.81	3.56	-6.56%
Knowledge of career opportunities/world of work	3.30	3.19	-3.33%
Knowledge of economic and financial literacy	3.11	3.19	+2.57%
Knowledge on business organisation and processes	2.89	3.56	+23.18%
Communication	3.78	3.11	-17.72%
Presentation	3.74	3.15	-15.78%
Planning	3.70	3.04	- 17.83%
Team work	4.19	3.56	- 15.03%
Exploring entrepreneurial opportunities	3.19	3.33	+ 4.39%
Design business projects	3.30	3.44	+ 4.24%

Evaluation of learning objects

The participants were asked to assess the learning objects on the StartUp_EU platform, particularly, to assess whether the videos introducing each challenge were highly motivational, whether the mini-games improved their learning of entrepreneurship, whether they were complicated, and whether they were useful in learning entrepreneurship.

In terms of the videos, results indicate that participants did not agree whether the videos accompanying StartUp_EU were highly motivational or not, however slightly more of the participants indicated that they strongly disagreed or disagreed that the videos were motivational. The results are shown in Table 6.

Table 6: Ratings of the introductory videos

Rating	Strongly disagree - disagree	Neutral	Agree - strongly agree
Videos are highly motivational (n = 27)	45.16%	16.13%	38.71%
Videos are highly motivational (n = 31)	44.44%	14.81%	40.74%

Overall, there is a positive attitude towards the contribution and usefulness of mini-games towards learning entrepreneurship and a quite clear opinion that the mini-games are not complicated. The results are shown in Table 7.

Table 7: Ratings of the attributes of the mini-games

Group	27 participant group			31 participant group		
Question	**SA**	**A**	**N**	**SA**	**A**	**N**
The mini-games improved my learning of entrepreneurship	25.92%	37.04%	37.03%	32.35%	32.26%	35.49%
The mini-games are useful for learning entrepreneurship	33.33%	29.63%	37.03%	29.04%	32.26%	38.71%
The mini-games are not complicated	40.74%	40.74%	18.51%	41.94%	41.94%	16.13%

Discussion and Conclusion

This study focused on the assessment of the pre-piloting use of the StartUp_EU service in school education. The objective was to acquire early input from the students so as to refine appropriately both the service and the evaluation tools. Interestingly, no major amendments to both questionnaires proved necessary. Though, interesting findings were surfaced for the StartUp_EU approach, despite the small sample (which hinders the generalization of the results).

Pre-competition questionnaire

The majority of the participants in the pre-test (88.94%) stated that they had never had any experience of entrepreneurship education before or only experienced it once or twice a year. This education seemed to take place primarily in the context of an economy class, in a game to start a business or company and constructing a business plan. Only 8.5% of the participants had taken part in an entrepreneurship competition before suggesting that the StartUp_EU competition presents a novel learning opportunity for the participants. The majority of the participants (72.34%) also had never experienced or had only experienced GBL once or twice a year. This again indicates that the StartUp_EU platform presents a number of novel learning opportunities.

Student self-assessment of their entrepreneurship related attitudes indicated that they rated their skills from medium to high. Knowledge of economic and financial literacy and knowledge on business organisation and processes were the only exceptions to this and were rated medium to low. The results indicated that the students were relatively confident in terms of their knowledge and skills and had positive attitudes towards entrepreneurship. The participants expected to develop a number of skills from participating in the StartUp_EU competition including: team work, creativity, problem

solving skills, presentation skills, knowledge of business organisation and processes and sense of initiative.

Post-test questionnaire

Students were generally positive about using the StartUp_EU service to participate in the competition in the following 12 months. The majority of the participants stated that they strongly agreed, agreed or were neutral indicating that the StartUp_EU service is appealing enough to get participants to use it in future competitions.

In terms of usability of the service, the System Usability Scale score for both groups was approximately 64%, which is a generally positive result. Approximately 7% of the participants found the service to be complex with functions that were not well integrated. Approximately 14% did not find the platform easy to use and stated that they did not feel confident using the service and thought that they had to learn a lot of things before they could proceed. Approximately 10% in each group stated that it was difficult to use and that they would like a technical support person to assist to use StartUp_EU. 17% of participants believed that people would not learn to use the StartUp_EU platform very quickly. Overall, minor changes are required to make the platform more appealing, less complex and to improve overall usability. These results will feed into the next phase of platform development iteration. Participants generally found the platform to be interesting and enjoyable with regards to motivational usability. 77% of the participants believed that the service was useful for entrepreneurship education and approximately 50% of the participants believed that was identical for entrepreneurship education.

With regards to participant self-evaluation of entrepreneurship related characteristics, the results indicated that the participants became more hesitant however there was an increase in creativity, knowledge of economic and financial literacy, business organisation and processes, inclination to explore entrepreneurial opportunities and design business projects. The decrease in scores of some of the characteristics slightly concerning, however, the partners will look closely into it and will try to identify its causes. One possible explanation for this decrease might possible be the lack of previous entrepreneurial experience of participants which might led the participants to realize that entrepreneurial education and/or entrepreneurship was more complex than originally anticipated. However, the increase in self-confidence regarding other entrepreneurship related aspects can offer a light of optimism since these characteristics are vital in today's working environment and an integral part of entrepreneurship.

In terms of the video learning objects, the results indicate that participants did not agree whether the videos accompanying StartUp_EU were highly motivational or not, however slightly more of the participants indicated that they strongly disagreed or disagreed that the videos were motivational. These results show us that additional or alternative videos are required. The Web 2.0 platform will be updated with more relevant videos in an effort to increase motivation and inspiration. These videos can be for example videos of well-known successful entrepreneurs or motivational couches. Overall, there was a positive attitude towards the contribution and usefulness of mini-games towards learning entrepreneurship and a quite clear opinion that the mini-games are not complicated and the majority of participants believed that the mini-games improved learning of entrepreneurship and that they were useful for learning about entrepreneurship.

This report has presented some of the results of a pilot study of a competition run on the StartUp_EU platform along with the learning objects presented on that platform in the form of accompanying material and mini-games. The results of the mini-pilot have been analysed and were used to improve the platform and learning objects for the main-pilot that ran from April to June 2013. Future research directions will involve completing the main pilot and analysing the results on a much larger scale to ascertain if the initial findings are consistent.

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