YESict

Project co-funded by the European Union

Erasmus+

Report – Output 3

Entrepreneurship curricula

ChBL Pedagogical Methodology Approach to foster Entrepreneurship to School aged children

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1. INTRODUCTION

We have already collected some indications in regard to the entrepreneurial curricula to be applied via the YESict methodology. In this sense, the previous reports represent a thorough analysis on what exists relating to entrepreneurship and how to encourage it.

More precisely, the *Output 1 – Existing programs analysis* report gives a general understanding of the subject and provides some recommendations in regard to the type of programme to be designed; whereas the *Output 2 – Entrepreneurial skills* report specifies the skills to be acquired through the programme.

The Challenge Based Learning methodology has been selected to represent the school curricula programme to be designed by the team. It has to be said that following the characteristics of this project, the ChBL model has been modified by integrating some principles of Design Thinking. In this report we analyse its meaning, and the process itself.

In summary, the report is divided in three sections that correspond to 1) the concept of Challenge Based Learning –explanation of what it means and its characteristics-; 2) the method designed for YESict –the step-by-step process to implement the model and some tips for the educators- and 3) conclusions and recommendations for the YESict educational methodology.

2. THE CONCEPT OF CHALLENGE BASED LEARNING

Following the recommendations quoted in the *Output 1 – Existing programs analysis* report the YESict project should focus on developing a school curriculum programme. In fact, this method is the most used one (the 42 % of analysed programmes) in order to develop entrepreneurial skills and encourage entrepreneurial attitude.

In this sense, more and more educators are moving away from traditional teaching and learning models towards student-centered learning. With the technological advancements, students have direct access to massive amounts of information (online social networks), while becoming content generators and publishers themselves. (Ktoridou & Doukanari, 2016)

It is inevitable for educators to target beyond context learning, and develop pedagogically effective learning environments in order to enhance the quality of education and expose their students to a better understanding of the content.

Challenge Based Learning –ChBL- a student-centered, active learning, engaging multidisciplinary approach to teaching and learning can offer to school age students and educators engaging learning experiences.

ChBL is a hands-on experience approach that promotes students' collaboration; with peers, teachers, and experts (entrepreneurs) to discuss challenges, develop questions, communicate possible solutions and action taking as well as sharing experiences. For both educators and students, ChBL is a collaborative learning experience that enables them to work together towards learning about compelling issues, propose solutions to real problems, and take actions. Educators must not only develop students' knowledge but teach them communication skills, develop their confidence and critical thinking, train them to be creative; that is, develop the future professionals using an education through entrepreneurship approach.

This model offers a flexible learning framework with students being responsible for their own learning. The focus of the approach is broad making it appropriate to adjust in any area of study. ChBL encourages students to leverage the technology they use in their everyday lives, developing this way 21st century work skills: work, collaborate and share in diverse groups; utilize the latest trends of technology tools found in the workplace; use multidisciplinary approach to come-up with solutions to real-life problems; implement the solutions with real audience. In general, ChBL encourages deep reflection on teaching and learning.

Ktoridou and Eteokleous in their work provide evidence that for students to develop entrepreneurial skills, a key educational challenge of courses and programmes, which aim beyond context learning, is to implement ChBL environment that will enhance the quality of education and expose them to a better understanding of the practices of being successful professionals. (Ktoridou & Eteokleous, Cultivating Entrepreneurial Skills through Case-Based Learning for MIS Courses, 2012)

Some of the major findings of The New Media Consortium study provide evidence that ChBL is effective in building 21st Century Skills; as 90% of teachers reported these 12 key skill areas improved significantly (in rank order): *Leadership, Creativity, Media, Literacy, Problem Solving, Collaboration, Critical Thinking, Flexibility, Communication, Adaptability, Innovation, Responsibility, Initiative;* basically entrepreneurship skills (Johnson & Adams, 2011).

According to the recommendation of Work Package Output 2, that actually completes the recommendations gathered together in the Output 1, on the selected entrepreneurial skills some of them relate to personal skills while the rest relate to specific entrepreneurial. A final list of 10 key entrepreneurial skills is recommended by the Output 2 report including:

1. Motivation for achievements
2. Autonomous action
3. Creativity
4. Undertaking initiatives
5. Risk taking
6. Opportunity seeking
7. Goal setting
8. Self-awareness
9. Internal locus of control
10. Perseverance/persistence

For the purposes of the YESict project, the focus of attention on the aforementioned entrepreneurial skills (Output 2 and 21st Century Skills) must be relevant to the target age group of primary and early secondary education settings. More specifically, Output 2 suggests the intersection of those 10 skills with specific skills that are usually developed in the above mentioned age groups.

To address the above, four skills have been selected to be developed throughout the process of the Pedagogical Methodology developed in Output 3. These skills are: *Creativity, Problem-solving, Collaboration* and *Self-confidence*.

In that way, and following the objectives of this project, a ChBL approach is modified with the integration of Design Thinking –DTh– a methodology used by designers to solve complex problems and find desirable solutions.

For education, DTh can be described as student-centered since the design is done "with" the students instead "for" the students. It is integrated at the stage where students need to identify a variety of possible solutions to meet the challenge and select a justifying solution (Briggs, 2013) Basically, DTh suggests a collaborative, solution-focused approach rather than an individual, problem-focused approach. The investigative and integrative character of the process promotes the development of students' observation, interdisciplinary group collaboration, enjoyable-fast learning, idea visualization, fast prototype development, and contribution to the society skills. Through DTh, the curriculum is reshaped around engaging for students experiences and changes to physical classrooms based on students' responses.

2. 1.   Key Elements

ChBL process challenges students to ask questions; to engage the material in front of them; to think about and discover which process works for them; leverage the technology they use in their everyday lives and enjoy the process. For further reading on ChBL please refer to the Key elements of the process as documented by Apple Inc. (2012). Each Key Element is described on the Table 1.

Table 1. ChBL Key Elements as documented by Apple Inc. (2012)

KEY ELEMENT	DESCRIPTION
The Big Idea	The big idea is a broad concept that can be explored in multiple ways, is engaging, and has importance to students, and the larger society. Examples of big ideas are Resilience, Separation, Religion, Prolusion, Space, Creativity, Health, Sustainability, Democracy, etc.
Essential Question	By design, the big idea allows for the generation of a wide variety of essential questions that reflect the interests of the students and the needs of their community. Each group will narrow their thoughts to one essential question.
The Challenges	From the essential question a concise challenge is articulated that asks the learners to create a specific solution that will result in a concrete, meaningful action.
Guiding Questions, Activities and Resources	Generated by the learners, guiding questions represent the knowledge needed to successfully develop a solution and provide a map for the learning process. The learners identify lessons, simulations, activities, and content resources, to answer the guiding questions and set the foundation for them to develop innovative, insightful, and realistic solutions.
Solutions	Each challenge is stated broadly enough to allow for a variety of solutions. Each solution should be thoughtful, concrete, clearly articulated and actionable in the local community.
Implementation	Implementation allows the learners to test their solution in an authentic environment. The scope of implementation can vary greatly depending on time and resources, but even the smallest effort to put the plan into action in a real-life setting is critical.
Evaluation	During the evaluation process the learners gauge the success of their solution using a variety of qualitative and quantitative methods including surveys, interviews, and videos. Through this process the learners determine the efficacy of the solution and can determine the next steps.
Documentation	At each step of the challenge process the learners should document and publish information about their experience. Documentation and publishing utilizing blogs, videos and other tools creates the resources for ongoing reflection and assessment. These resources can also serve as the foundation for a learning portfolio and communicating the solution to the world.

KEY ELEMENT	DESCRIPTION
Reflection	Throughout the process, the learners should be continuously reflecting on content and the process. Much of the deepest learning takes place by considering the process, thinking about one's own learning, analysing ongoing relationships between the content and concepts, and interacting with other people.
Informative Assessment	Assessment can and should be conducted throughout the challenge process. The results of the formal and informal assessments confirm learning and inform decision making as the learners move towards the implementation of their solution. During the evaluation stage both process and product can be assessed.

3. THE METHOD DESIGNED FOR YESict

In this section it is described the modified ChBL that have been created for YESict (see Figure 1). The process begins with a big idea and follows to: an essential question, a challenge, guiding questions, activities, resources, determining and articulating the solution through Design Thinking, taking action by implementing the solution, and evaluating and publishing the results. The process also integrates important ongoing activities such as reflection, assessment, and documentation.
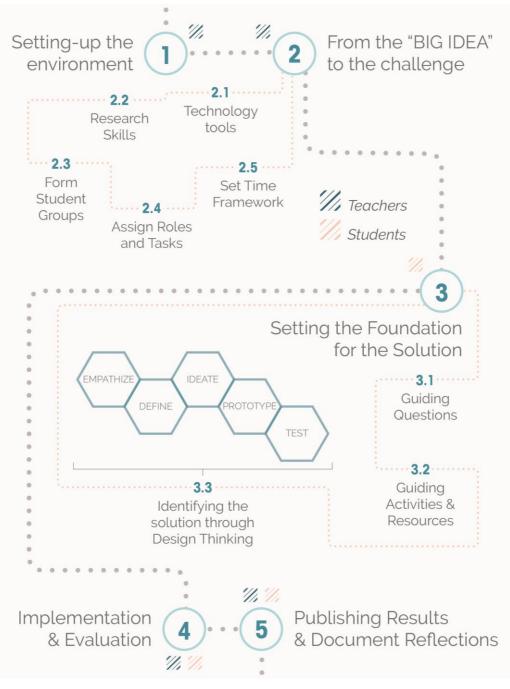

Figure 1. Modified version of the ChBL Process

ChBL workflow is designed in such a way, so that students can work at their own pace, be creative and responsible for their own learning by determining the direction of their research and coming up with the appropriate solution. Following, students act on their solutions and finally publish their work via social media. The educator plays the role of the facilitator, resource provider, project manager and mentor.

In the next pages it is described the Challenge Based Learning Modified Classroom Guide.

3. 1. Setting up the Collaborative environment

Aim: Set-up an environment to facilitate Challenge Based Learning process for student-groups to communicate, collaborate and share resources

Introduction: ChBL follows a workflow that mirrors the 21st century workplace. Students are given enough space to be creative and self-directed and at the same time are provided with support, boundaries, and checkpoints to avoid frustration.

The workflow structure is modified to meet the needs of the YESICT project. Due to the multiple entry points of ChBL process the educator has the flexibility to create a challenging experience that will develop students' entrepreneurship skills, knowledge and competences.

Setting up a Collaborative Environment: A shared working space, available 24/7 is essential to ensure the success of the ChBL process. Students must have access to needed resources including software, storage, access to PDF, digital, audio and video archives (Vodcasts, Podcasts), activities, a calendar, and communication tools (student-to-student, teacher-to-students, student-to-teacher communication). A wide variety of internet resources for project management and collaboration is available. In addition, the challengebasedlearning.org community also provides an environment for managing challenging proposals and solution groups.

The educator's involvement means a fundamentally different relationship and changes as students' progress throughout the process.

- *At the **very early stages** the educator introduces ChBL to the students and sets up the challenge—actively guides the process by making decisions, communicating information, teaching skills, and answering questions about how the process works and what is expected of the students.*
- *During the **middle stages** the students take control of their own learning by planning and researching their own work. Here the educator serves mainly as a mentor working alongside with the students.*
- *Finally, during the **last stages**, students are deeply engaged in their own work while the educator monitors the mastery of the required knowledge and skills through suitable assessments. Lastly, during this stage, when students need to implement, evaluate, and publish their solutions and result, the educator becomes a product manager.*

3. 2.   From the "BIG IDEA" to the Challenge

Aim: Outline the importance of the "BIG IDEA" to the students and further to the community

The educator must work with students to identify the "Big Idea". The big idea must be of global importance so that students gain the deep multidisciplinary content knowledge and understanding. Good ideas can be found in the latest news articles, e.g. online, Euronews, newspapers, scientific journals. Once the "Big idea" is chosen, students with the guidance of their educator must develop an overview of the big idea and the related essential questions. Then a suitable challenge is acknowledged or presented.

The selection of the challenge is of paramount importance since the challenge must be realistic and meaningful. The challenge should present students with a chance to locally take action on a global problem and come up with an innovative solution for their school, family and society.

3. 2. 1. Technology

Considering a) *Output 1 – Existing Program Analysis* outcome, where the online platform can be the optimal ICT tool: (students familiarity in utilizing online platforms; cost effectiveness; scalability, security, e.g.) and b) evidence from the literature review that the opportunities provided through the Web 2.0n and the chances in users' role, Web 2.0 tools can be applied for teaching and learning purposes towards achieving educational objectives; a cloud learning environment is proved to meet students' expectations and support evolving pedagogical approaches. (Ktoridou & Eteokleus, 2011) Cloud computing and specifically Cloud Applications for Education Ed. is chosen for the delivery of the proposed Pedagogical Methodology. The educator must allocate time for students to get familiar with the technologies to be used. In addition, he/she should provide clear guidelines on technical specifications for videos, web material, or other formats.

3. 2. 2. Research skills

In order to prepare students for the challenge, the educator must help students to develop research skills, not only using keywords to search for information but also guidelines to evaluate information obtained from the Web:

- Who is the author?
- Does the author reference sources?
- Who is the Web page affiliated with? Who pays for it?
- Is the language objective/dispassionate or strident/argumentative?
- What is the purpose of the page?
- Does the information appear to be accurate?
- Is the page current?

3. 2. 3. Form research groups and assign roles and tasks

Today's modern workplaces favours multidisciplinary. Departments with employees with diverse backgrounds must work together on common projects or challenges.

Within the same context, ChBL groups of four or five students are formed, with each group being responsible for its own research, solution, implementation, analysis, and final product.

Roles and responsibilities are assigned on a rotation basis in order for them to play different roles (researcher, scientist, writer, interviewer, and information producer and publisher). Some of these roles may be new to them; the educator should make them feel confident that he/she will be their project manager/mentor during the process providing them with:

- answers to their questions,
- examples of guiding questions, activities, and resources,
- lists of possible solutions to the challenge.

For a successful and meaningful group work the educator should provide students with guidelines on how the work is distributed, the time framework as well as the essential tools.

Students must learn to work under supervision, collaborate in a diverse group, work on common projects, and sustain their given role. Students must know that they will need to play a wide variety of roles throughout the learning process.

3. 2. 4. Time Framework

Set a time frame for students to know how much time they have to work on the given task until they deliver their solutions. A solution could be the integrated online Google calendar designed for teams. This is a shareable calendar that integrates seamlessly with Gmail, Drive, Contacts, Sites and Hangouts to help students always know what comes next.

3. 3.   Setting the Foundation for the Solution

Aim: Students identify ways for process and solution assessment

The educator meets with student-groups and discusses with them which measures they will be using to assure the success of their solution.

It is recommended that assessment is conducted throughout the process by both students and the educator. At the end of the challenge both process and product can be assessed.

3. 3. 1. Guiding Questions

Aim: Students know what is needed in order to meet the challenge topic (resources and activities)

After the student groups are formed and directed, students begin the process of generating the questions that will help them obtain the necessary knowledge to develop an innovative and realistic solution to the challenge.

It is important for students to generate multiple guiding questions for better guidance of their learning and finally for the justification of their solutions. During the process of information gathering and concept exploration, new questions may arise.

3. 3. 2. Guiding Activities

Aim: Students identify what they need to know in order to answer the guiding questions (resources and guiding activities)

During this stage students engage in activities (e.g. web research, relevant case studies from the industry, surveys, interviews with experts, games, calculations,) that will guide them to the acquisition of the required knowledge to come up with answers to the guiding questions and develop an innovative and realistic solution.

The educator can support students' work by suggesting various related resources such as websites, podcasts, videos, databases, contact information for entrepreneurs from the industry and other types of helpful content that will assist them to craft the best solution.

The educator should take students' age and skills into consideration while selecting resources. Students should be encouraged to use online social tools (e.g. Social Networks, online communities, forums,) to expand their research.

3. 3. 3. Solution Development

Aim: Students identify a variety of possible solutions to meet the challenge and select a justifying solution.

After a careful investigation of the guiding questions, multiple possible solutions are identified. After discussing, analysing and experimenting, students select one solution that will be widely investigated, documented, developed and finally implemented.

During this stage, students are engaged in DTh. With DTh, students will develop skills such as finding simplicity in complexity (*i.e. recognize an opportunity where others see chaos, contradiction, and confusion*); being practical; gaining better experiences (*i.e. be able to evaluate options from multiple perspectives*); creating innovative solutions (*i.e. be creative*); collaborating towards common tasks (*i.e. be a good team collaborator*); contributing to the society (correlation with entrepreneurship skills).

Student groups can use a number of tools to facilitate their "one" solution selection processes; e.g. mind mapping, sketches, and brainstorming.

DTh process has the following modified stages:

I.   Deeper analysis and discussion of all possible solutions created after the investigation of the guiding questions.
II.   Refining selected solutions through brainstorming, mind mapping, sketches, and prototyping.
III. Selecting and developing the "one" solution (executing the best plan of action)

During DTh issues such as group member assigned responsibilities, time-limit considerations, as well as solution implementation and documentation are of major

importance for the success of the implementation plan that will follow. The educator must encourage student-groups to be creative while designing and implementing their solutions as well as to document their actions. Their solutions must be one step ahead and offer real solutions to their school, families or society. They may have to convince for a need of a change and propose specific actions that can be taken in order to address their challenge on a constant basis, for school or society improvement plans.

Finally, once the solution is selected, student-groups can expand/refine their findings, by verifying/testing them with small groups of classmates, family members or friends in order to move to the final stage; the implementation of their solution.

In education, DTh introduces students to multidisciplinary by reviewing frameworks from other areas, that allows them to plan their own participation and experiences. Using DTh to identify and consider a range of supported solutions before selecting the one that will be implemented is an additional key element of ChBL. DTh will draw upon students' logic, imagination, intuition, and systemic reasoning, to explore possibilities of which "one" could be the solution to be implemented.

For the educator DTh can be an engaging pedagogical approach, since for the generation of new solutions, students need to analyse people's attitudes, preferences/needs/interests, learn about business or the various disciplines; e.g. mathematics, science.

3. 4.   Implementation & Evaluation

Aim: Students develop the implementation plan for their solution and put it into action

At the implementation stage of the ChBL process, students will actually measure their results; mirror on what functioned and what did not and determine whether they have succeeded in addressing their challenge.

Upon completion of the implementation plan, students share their work as well as their evaluation plan, where they decide what to measure and how frequent so that they can be consistent during the implementation phase. The selection of the information collection methods needs to be defined at the begging so as student-groups could collect similar types of data.

Throughout the process, the educator must provide student-groups with examples of the different types of research. He/she should explain the difference between quantitative and qualitative data collection and present to them the advantages and disadvantages of the various data collection tools available (e.g. Apple's iWork includes Pages and Numbers, which is great for collecting and analysing data; Google's Cloud Applications - Google Forms at no cost, the students can create custom forms for surveys and questionnaires, get an automatic data analysis and visualization in seconds).

Whether students will use surveys or questionnaires, they must pre-prepare the questions and decide which tool to use. If they will conduct interviews, they need to develop the questions and make all the necessary arrangement for the interview.

Once students have collected all data, they begin to analyse them. Mainly, they should seek answers to questions such as: Did any change occur? Did they expect this particular change?

Based on the change cycle, students can note at which point of the cycle the biggest change occurred and record people's opinion on the different stages. All this information will contribute to the finalization of the students' solution (determine and explain whether the solution was effective).

3. 5.   Results Publishing & Document Reflections

Aim: Students build their solution video and share it

Throughout the learning process, students should document their experiences using audio, video, and photography. Blogs, video, podcasts, digital storytelling, and photographs are all great ways to document and reflect on the process. Upon completion of the process, they should develop a short, 3 to 5 minute video that will project the initial challenge, a short description of the learning process, the solution, and the results of the implementation. It would be nice if every member of the group could say a few words about the lessons learned during the process. Finally, students are encouraged to share their work using Social Networking sites, web-based communities and challengebasedlearning.org.

It is of paramount pedagogical importance for the educator to discuss with students on an individual basis, in order to get an insight on what they think about the process, what they have learned, how they feel about the content, their collaborative experience with their group and the development and implementation of their solution.

4. CONCLUSIONS AND RECOMMENDATIONS

Based on the objectives of *Output 3 – Entrepreneurship Curricula*:

- Make learning authentic;
- Provide opportunities for students to connect abstract ideas to their real world applications and acquire entrepreneurial skills that have been defined in Output 2 – Entrepreneurial Skills and gain long term knowledge;
- Teach students not only to be passive listeners but discover, process and apply the material learned;
- Design an environment that will motivate students towards learning, promote their active involvement in the learning process and stimulate their thinking;
- Base the design of the curricula on the skills analysis developed in the frame of the YESict project;

the current repost proposes Challenge-Based Learning (ChBL) as the Pedagogical Methodology Approach for the purposes of the YESict project.

More specifically, it provides evidence that the student-centered, active, engaging, multidisciplinary nature of ChBL can offer a flexible learning environment with students being responsible for their own learning. The focus of the approach is broad making it appropriate to adjust in any area of study but more importantly encourages students to leverage the technology they use in their everyday lives, developing this way the 21st century work skills. It is important to note that four of these skills, Creativity, Problem-solving, Collaboration and Self-confidence have been chosen to be developed throughout ChBL approach.

It is significant to note that in order to meet the objectives of Output 3, the ChBL approach model has been modified with the integration of Design Thinking –DTh– a methodology used by designers to solve complex problems and find desirable solutions. The DTh method is integrated at the moment where students, in a collaborative environment, need to identify a variety of possible solutions to meet the challenge and select a justifying solution. A detailed step-by-step guide for the educator is provided.

Finally recommendations, for the O5&O6 are provided:

- The experimentations must be focused on the skills – **Creativity**
- The age of the students to be between 11-12 years
- Expected date for the experimentation – January 2017

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