



# ENTREPRENEURIAL CURRICULA

*Pedagogical Methodology  
Approach*



Co-funded by  
the European Union



## ABOUT THE PROJECT

The project **NGOE – Next Generation of Entrepreneurs** aims to develop entrepreneurial skills among young people currently enrolled in secondary schools, but also among youth workers in order to integrate new skills and tools into their entrepreneurship teaching. The project is implemented with five organisations from Austria (ÖJAB), Estonia (Nooruse Maja), Italy (RUANA), Romania (Asociația Se Poate) and Spain (PROJUVEN).

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# INTRODUCTION

Entrepreneurship is a vital component of the global economy, driving innovation, creating jobs, and promoting economic growth. However, the path to success for entrepreneurs is often challenging and uncertain. Entrepreneurs must be able to continuously adapt and innovate in order to succeed in today's fast-paced business environment. The ability to continuously learn and acquire new skills and knowledge is crucial for entrepreneurs to navigate this dynamic landscape.

**Entrepreneurship education** has been recognised as a crucial aspect of education in the 21st century. It helps students and young people in general to develop the skills and knowledge needed to be successful in today's rapidly changing business environment.

In order to capture the required knowledge, it is necessary to identify the most efficient approaches and methodologies that will ensure the successful development of young people in the context of entrepreneurship.

With this idea in mind, various existing teaching methodologies were identified in a needs analysis conducted within the project NGOE - Next Generation of Entrepreneurs. In order to choose the most appropriate basic method to ensure effectiveness in developing entrepreneurial skills among young people but also proper development of the non-formal teaching method and tools, thorough revisions of the identified approaches were conducted.

This process eventually led to the selection of one innovative approach, which is identified as the best suitable to develop entrepreneurial skills: **challenge-based learning**.

**Challenge-based learning (CBL)** is an educational approach that provides a valuable tool for entrepreneurs to develop the skills and knowledge needed to succeed.

CBL is a collaborative and project-based approach that focuses on solving real-world problems and is becoming increasingly popular in the field of entrepreneurship education. It is an approach that emphasises on active learning, where students are actively engaged in solving problems through projects, teamwork, and other hands-on activities. CBL provides entrepreneurs with the opportunity to work on projects that are relevant to their business goals and to learn about the latest industry trends. This approach allows entrepreneurs to gain hands-on experience with new technologies and develop key competencies such as critical thinking, problem-solving, teamwork, communication, and creativity.

This document will begin by discussing the background and concept of CBL, followed by an examination of the specific benefits it can provide for entrepreneurs. The various ways in which CBL can be effectively implemented in an entrepreneurial setting will be explored.

Furthermore, the potential of CBL to support the development of entrepreneurial mindset and skills will be examined. The potential challenges and limitations of CBL and suggest ways in which they can be overcome will also be considered.

The challenge-based learning approach follows a specific structure consisting of **three main steps: the Big Idea, the process of developing solutions, and implementation and evaluation**. These three steps will be further detailed in the chapters following the overall concept and benefits of CBL, and will offer concrete suggestions on how to successfully apply this innovative approach.

In conclusion, this document aims to provide a comprehensive overview of the potential of CBL for entrepreneurs, and how it can be effectively implemented to support the development of the skills and knowledge needed for success in today's business environment. CBL is an approach that can help young entrepreneurs develop the ability to learn, adapt and innovate, and ultimately increase their chances of success in the entrepreneurial journey.



# The concept of challenge-based learning

Activities like hackathons, design projects, and coding competitions can be sorted into various categories. They can encourage students to develop their technical and mathematical skills, as well as improve their communication abilities. By tapping into their inquisitive and competitive natures, these kinds of challenges can help them develop their soft skills. These activities encourage a wide range of participants and perspectives to come together to solve problems.

The **challenge** is the core component of the growth mindset. Without it, young people are not able to take risks and learn how to bounce back from their failures. Therefore, it is very important that young people develop a sense of progress. To make a shift in the way young people view themselves, we need an environment that supports their development and encourages them to try new things. This can be done through the introduction of new activities and the feedback that instructors provide. Working with challenges can also inspire students to pursue careers in science and engineering. They can additionally help communities address complex social issues.

Challenge-based learning (CBL) is a framework that enables students and teachers to develop their skills while solving real-world challenges. It is a collaborative learning experience that encourages participants to identify and solve Big Ideas. It also helps them develop 21st-century skills and knowledge. CBL is built on the principles of experiential learning, which is a framework that encourages students to develop their skills while solving real-world challenges.

## *What is challenge-based learning?*

The CBL process was created by a team at Apple in 2008, and it is used by schools and districts all around the world to think critically about their goals and develop long-lasting learning experiences. Through this process, students can develop the skills and attitudes they will need to succeed in their future careers. The framework for the "Apple Classrooms of Tomorrow" project was created through the ACOT2 design principles. The company worked with educators to develop and implement a variety of challenge-based learning methods.

Through the project, Apple sought to frame learning experiences through challenges, which were inspired by the company's exploration of reality television. The goal of the

project was to create a framework that would allow schools and teachers to improve their teaching and learning. In 2008, the company published a white paper that detailed the project's initial framework. Since then, the framework has been adopted by schools and teachers around the world.

In 2009, the New Media Consortium published a study that analysed the effectiveness of challenge-based learning (CBL) in the classroom. It found that the method significantly improved the performance of students who were most at risk of dropping out. The study, which involved over 300 students and teachers, was conducted in six schools and 29 teachers. Another study was conducted in 2011 to determine if the framework could be used to expand the scope of the project and to look into the 21st century skills that students would be acquiring. This study, which involved over 1500 students and teachers from various countries, was conducted in 19 schools. The results of the study revealed that CBL was effective at engaging students and meeting curriculum standards. It also concluded that it could be used by students of all ages.

In 2016, Apple partnered with Digital Promise to update the CBL content and develop a book. The team that created the framework was also tasked with managing the website and developing a book. The goal of CBL is to improve the learning environment by encouraging students to use technology in their daily lives. This framework can be used to develop effective and engaging learning experiences. There are various challenges that can be addressed, for example promoting the use of tap water in schools.



Through its consulting services, Digital Promise can help schools and districts create a CBL environment that is aligned with their goals and culture. In a CBL engagement, the company's consultants work with school leaders and team members to implement the framework in a way that supports the goals and philosophy of the district. CBL is a proactive approach to helping students develop their skills in a way that is both real and relevant to their environment. It involves engaging them in a variety of activities that are designed to help them improve their academic performance. The goal of this approach is to provide them with the necessary tools and resources to succeed in their studies.

Unlike traditional education, CBL does not require teachers to provide a comprehensive set of learning activities. Instead, it focuses on the students' developing their own goals and experiences. This approach allows them to identify their own challenges and develop the necessary skills to solve them.

## *Why use challenge-based learning?*

Due to the rapid pace of technological change, it is no longer feasible for future graduates to rely on their education to keep up with the changes in the world. Instead, they will need to develop their skills and knowledge to be successful in their careers. Today's problems can be solved by a multidisciplinary approach. This is because they require a deeper understanding of social and technical perspectives. This means that future engineers and scientists will need to be able to identify connections between disciplines.

The CBL approach is designed to prepare students for the future work field by allowing them to work with multidisciplinary teams. This allows them to improve their team working skills. In order to effectively solve today's problems, students will need to develop their own knowledge and skills. They will also need to develop their self-awareness and creativity. Through this process, they will be able to create a solution that is both economically and environmentally sustainable.

As a group of students work on a project, they have a clear idea of what they want to achieve, but the process doesn't always predict the outcome. This is why it's important that they involve the community in the process. The students must also publish the results of their project to the community so that they can learn from their mistakes and improve their performance. Failures are an integral part of the learning experience, as they encourage reflection and creativity.

Challenge-based learning is different from other forms of learning because it doesn't assume that there are always solutions to every problem. Instead, it encourages students to identify and develop new strategies and solutions to their problems.

## *Framework*

The goal of the Challenge Based Learning framework is to provide a variety of global ideas and to develop relevant and age-appropriate solutions. In other words, to create a collaborative environment where participants can identify their Big Ideas and solve challenging tasks. It also helps them develop their 21st century skills and knowledge. It



can be used as a tool for assessing and evaluating the learning process. Besides being able to implement various learning techniques, this model additionally provides a framework for reflection.

A challenge-based learning framework is a flexible approach that can be used to implement various learning techniques. It can be used as a guide for developing a new approach or as an integrated component of other progressive learning methods. A scalable model that can be started small and build big. It allows learners to control their learning and develop their own system without the need for subscriptions or proprietary ideas. It also provides an authentic environment that meets academic standards.

The Challenge Based Learning Framework is divided into **three interconnected phases**:

1. **Engage** (in which the Learners move from an abstract big idea to a concrete and actionable challenge)
2. **Investigate** (in which Learners conduct research to create a foundation for actionable and sustainable solutions)
3. **Act** (in which evidence-based solutions are developed and implemented with an authentic audience and the results evaluated).



The various phases of the programme help prepare students for the next step. There are also opportunities for them to explore their own learning experiences and findings. Throughout the process, students are encouraged to reflect on their learning and share their findings. The Challenge-based learning approach follows a specific structure. Each of the three phases has three sub-steps.

## Phase 1: Engage

The engagement phase starts with a **Big Idea**, which is a broad concept or theme that can be explored in various ways. This concept can be used to develop a deeper understanding of the world and its people. After that, all the participants and teachers work together to develop a set of Essential Questions, which are designed to help the learners ask questions when talking about the Big Idea. After having a discussion about the topic, the

group decides on the next step and then creates an Actionable Challenge. This challenge encourages the learners to get involved and find a solution.

The goal of the engage phase is to help students develop a deeper understanding of their academic content and connect with it through the development of a compelling challenge. This process involves identifying a big idea and developing a strategy to implement it. A big idea is a broad concept or theme that can be explored in various ways and is important to the larger community. Examples of these include community, relationships, creativity, sustainability, and democracy.

The concept of the **essential question** is designed to help students develop a deeper understanding of their academic content and connect with it through the development of a compelling challenge. This process can be triggered by various factors such as the importance of the topic or the way it relates to their personal interests. At the end of the process, the students will be able to identify one essential question that has personal meaning.

The challenge is a call to action that students can use to learn more about the subject. It can be triggered by various factors such as the importance of the topic or the way it relates to their personal interests. The next step involves developing a compelling **challenge statement**.

The challenge encourages students to think critically about a global problem and develop a solution that can be used to solve it. It is an immediate and actionable step that can be taken to improve their performance. Setting up the challenge is important to ensure that it is interesting and that it is close to home. This will allow them to feel like they have accomplished something.

The goal of a global challenge is to enhance students' self-esteem and confidence as they tackle important issues. If it is too vague or broad, they will not be able to fully develop the skills they will need to succeed in Challenge Based Learning.

One of the most important factors that you should consider when setting the challenge is the amount of time that your students have to work on it. This will determine how engaged they will be and how quickly they will lose interest. Some challenges can be tackled in a day or a week, while others require a semester or entire year.

Another important factor that you should consider is the type of challenge that will be presented to the students. If it is too vague or broad, they will not be able to fully develop the skills they will need to succeed in Challenge Based Learning.

Here are some examples, just to get the idea. Examples of big ideas are:

- Climate change and its effect on the planet
- Public health threats such as pandemics

Examples of essential questions connected to big ideas are:

- Climate change: What is the impact of my use of fossil fuels on my planet?
- Public health: How does my personal access to healthcare affect global disease pandemics?

Examples of challenges drawn from the big ideas and essential questions above are:

- Climate change: Reduce your family's (or your school's) use of fossil fuels.
- Public health: Increase the availability of flu vaccines to children in your community.

## Phase 2: Investigate

The Investigation phase involves the participants contributing their skills and knowledge to the challenge. It helps the group develop a foundation for sustainable solutions. The group then starts with a set of guiding questions to help them analyse and solve the challenge. They then find supporting resources and activities to complete the task.

Through the Building from the Challenge program, students develop a deeper understanding of themselves and their communities through engaging learning experiences. The group then begins to explore various activities related to the Big Idea. These include simulations, experiments, and projects. They then conduct research and develop a framework for sustainable solutions. During the investigation phase, students develop a set of questions that will help them develop an effective solution to the Challenge. These questions are then categorised and prioritised to help the learners navigate through the process.



The goal of the program is to provide the students with a variety of resources and activities that will help them develop an effective solution to the Challenge. Some of these include

online courses, databases, and social networks. In addition to these, other activities such as simulations and projects can also be used. After the various activities and resources have been completed, the students start the process of synthesis. They then analyse the data gathered during the course to identify the main themes that will help them develop a solution. The investigation phase concludes with the presentation of reports and findings that show that the students have successfully addressed the various challenges.

### **Phase 3: Act**

The Act Phase is a process that involves developing and implementing evidence-based solutions that are designed to improve the quality of education. The learners are then able to demonstrate their mastery of content. Through this process, the teams can develop and implement their solutions with an authentic audience. The teams then use the knowledge they have gained to design and prototype their new solutions. They do this in two steps: the Solution Concepts and the Solution Development. The former involves the learners creating a first draft of their solution, while the latter involves the team testing and designing their prototype.

During the design cycle, new guiding questions often arise. This step allows for further investigation and testing. The evaluation and implementation of the design is then carried out in real life. This process is very important to ensure that the learners can reflect on the design's impact.

A challenge is a type of activity that challenges students to solve problems that are difficult. It can serve as an effective tool for learning and engagement. These activities also encourage students to develop their mathematical and technical skills. There are various formats that can be used for a challenge. The four dimensions of a challenge are the duration, the level of engagement, the scope of the investigation, and the level of action. The goal of a challenge is to provide the students with an opportunity to develop their skills and knowledge.

### **Developing solutions**

After completing an Investigation, it is time to start thinking about solutions. This process can be very challenging, as it involves identifying and developing effective solutions that can be used to solve the issue. One of the most important steps that you can take is to create prototypes. These can help you test the ideas and develop a sustainable solution.

- **Review your research**

Your synthesis should only be as sound as the research. Before you start, make sure that you have started with a set of guiding questions that will explore the Challenge from different perspectives. You can then draw conclusions that support the stories that emerge.

- **Develop a solid synthesis**

A robust research synthesis is the key to successfully completing an investigation and moving on to the Act phase. It provides a framework for developing a case for the proposed solutions. This process involves gathering all of the necessary information and coming up with a conclusion that is both informative and entertaining.

- **Consider the stakeholders**

Keep in mind that your solution will have a significant impact on the needs of all of your stakeholder groups. This is why it's important that you regularly check in with them.

- **Multiple solution concepts**

Although the Challenge will allow you to explore multiple solutions, it will also require you to identify the best one to implement. This could be a campaign to educate or inform school children or communities about improving their quality of life.

- **Prototyping**

After the Solution has been identified, the next step is to develop prototypes to test and experiment. This process will most likely lead to new questions that require further research.

- **Iterate**

Recreating a solution is referred to as iterative development, where the goal is to continuously improve the product based on new information. After gathering feedback from an audience, you can then create a new iteration of the solution. Many great solutions have evolved through multiple iterations.

After the project has been completed, the learners then start to implement the solutions. They then evaluate their effectiveness and determine the impact of their ideas. After the project is complete, the learners can then start working on their next step, which usually involves developing a completion report.

## Reflect, document and share

One of the most critical factors that educators and students need to consider when it comes to learning is the importance of reflection. Unfortunately, in today's fast-paced and content-driven environment, there is often little time and space for students and teachers to reflect on what they are learning. In today's fast-paced and content-driven environment, students often move from one subject to another to prepare for an assessment. They then move on to the next topic without taking the time to reflect on what they have learned. I believe that taking time to consider what is happening in our learning environment can make a huge difference.

Without a framework and structure in place to allow students and teachers to reflect on what they have learned, it will often become one of the items on the checklist that will be neglected. This is why CBL should have a reflection component. This approach allows students to gain deeper understanding of themselves and their learning by allowing them to self-assess and determine what changes they need to make in order to improve their performance. It also creates a forum for them to connect with their teachers and the rest of their lives. It provides a way for teachers to manage their projects by reviewing their own videos.

A crucial part of learning is taking time to reflect on our experiences. Through reflection, we can step back and consider what we learned, how we learned it, and how to apply the knowledge to future learning experiences. As we reflect regularly, we begin to identify patterns in the way we learn. This information can be used to develop personal learning frameworks and become better learners.

- **Create a habit**

In a busy world, finding time to reflect can take commitment. The best way to commit is to develop a habit. A habit is something you eventually do without thinking about it. You just do it. To create a reflection habit, start with identifying a specific time every day, set an alarm, and reward yourself after reflecting.

- **Use a formula**

On the Internet, there are many formulas for reflection. They are designed to help people identify what is important to them, and then they can make informed decisions regarding their future. The goal of these models is to help people develop patterns and improve their learning.

- **Try different mediums**

A traditional way to reflect is through a written diary. However, instead of restricting yourself, try taking a break from writing and doing something different. This can include drawing, taking photos, recording audio, and creating mind maps. Even if you're not comfortable with a primary medium, try something new.

- **Reflect during and after**  
There are two types of reflection: the first is called "reflection-in-action," which is where you take time to reflect on what happened during an experience, and the second is "reflection-on-action," which is where you take a break from the learning to consider what you've learned and how you'll use the new knowledge.
- **Experience, think and feel**  
Being focused and open to the experiences that you're participating in can help you make the most of your reflection. During your time away from home, try to take in everything that's happening around you. This will allow you to reflect on what you're feeling and thinking.
- **Share your thoughts**  
While reflection is often regarded as a private and solitary pursuit, it is also very valuable to share your thoughts with others. Through videos or writing, you can get multiple perspectives on your experiences. These outside views can help you see things through a different perspective and find new meaning.

## *Challenge-based learning in practice*

According to a research report "Challenge-Based Learning. An Approach for Our Time" (2009), both the students and instructors find the challenge-based learning experience to be engaging and effective. Over 97% of the students who participated found it worthwhile. Almost all the instructors reported that the students embraced the challenge-based learning experience and worked well together. Also, most of the students noted that their attitudes and behaviours changed. Even though they were not shown the listing of skills that were identified by the 21<sup>st</sup> Century Skills Partnership, the students still reported that they were improving their own abilities.

The concept of challenge-based learning is being widely used in various disciplines and educational levels. Here is a comprehensive overview of the various aspects of this type of learning, including its benefits and risks.

### **Benefits are:**

- **Promotion of deep learning:** CBL is a replacement for traditional lectures that focuses on providing an environment that encourages students to develop their knowledge through discussions and real-life experiences. This type of learning helps them develop deeper understanding of themselves.

- **Developing retention of knowledge in the long term:** The goal of a CBL program is to improve students' retention of knowledge. Participating in such activities can help students develop their recall and information retention abilities. It also states that the sharing of ideas and facts can help students recall their lessons. Small group discussions are often beneficial for students as they allow them to participate in a more informal setting.
- **Introduction to open-ended questions:** In the CBL curriculum, most of the problems are open-ended questions. This allows for more discussions and learning about the subject matter.
- **Improved teamwork and interpersonal skills:** The success of CBL challenges depends on the interaction and communication between the students and the group. This is because, instead of memorizing the facts on their own, they get to present them to the group. This allows them to develop their skills in collaboration and teamwork.
- **Opportunity to apply skills in the real world:** Through challenge-based learning, students can develop the skills they will need to succeed in real-world settings. This type of learning can also help them develop their confidence and improve their academic performance.

#### Risks are:

- **Requires a lot of time and effort for implementation:** The implementation of a good CBL curriculum requires a lot of work and time from the teachers. It also requires continuous monitoring and recording of the student's performance.
- **Poor performance in theoretical tests:** Students should not spend too much time in CBL activities to avoid having issues with their performance on standardised tests. This can cause them to not have the necessary knowledge to succeed.
- **Integration of multiple disciplines:** The CBL model should be implemented properly so that students can understand the various aspects of a situation. This can be done through the establishment of multiple disciplines.
- **Varying degrees of applicability and relevancy:** It can be hard to identify a problem that can be easily solved by students in terms of their studies. This makes it incredibly difficult to come up with effective solutions. It's also possible for students to get distracted by the various challenges that are presented by the problem. This can lead to them missing out on important information. Another option is to veer off the focus of the problem and make them run into unexpected obstacles. Although this may have its benefits, it can compromise the initial planning that you did during the course.





Today's children will inherit many problems that will require addressing in their lives. We are not able to predict how these problems will be resolved until they are older. Decades of reform have not provided us with the hope that the skills that our youth need will improve. We need new ideas. One of these is challenge-based learning, which is a new approach that is designed to provide our youth with the skills they will need to succeed in the 21st century. This approach is unique and can be used to address the challenges that will face them in their lifetimes.



# From the Big Idea to the Challenge

Entrepreneurship 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 in order to achieve objectives. This supports everyone in day-to-day life at home and in society, makes employees more aware of the context of their work and better able to seize opportunities, and provides a foundation for entrepreneurs establishing a social or commercial activity.

Two conditions must exist for entrepreneurship to flourish. First, there must be freedom—freedom to establish an economic venture, and freedom to be creative and innovative with that enterprise. Second, there must be prosperity—favourable economic conditions that give an entrepreneurial organization the opportunity to gain and grow. Entrepreneurship is a global phenomenon. Therefore, it is vital that the prospective entrepreneur understands the relationship between the country in which the business will be located and the climate for business success.

Innovations in the way we work and play, travel and eat, start our families, and raise our children all create opportunities for entrepreneurs to build businesses and organizations that will exploit new technology and trends. We can also say that entrepreneurship is a self-perpetuating phenomenon: If a society has it, more is likely to come.

**Big Idea** is a broad concept or theme that can be explored in various ways. This concept can be used to develop a deeper understanding of the world and its people. People use their resources to maintain or increase their well-being. Change affects people's well-being, and recently many find that their well-being is harder to maintain given the rapid pace of change. The uncertainty that comes with change has increased the interest in entrepreneurship. **An entrepreneur sees an opportunity, figures out a way to acquire the needed resources, and acts to turn the opportunity into a reward.** Entrepreneurship often brings to mind a fast growing business started by one or two people with a good idea and a willingness to work hard. However, entrepreneurship can also help individuals, families, organizations, and communities turn opportunities into actions to maintain or increase well-being. The wealth that comes from increased well-being can be cultural, social, environmental, or financial.

An opportunity must pass two tests before an entrepreneur will move forward:

1. Will acting on the opportunity improve my own or my group's well-being in the future? Entrepreneurs will not look around and see problems, they will see opportunities.
2. Am I able to make change happen?

One person will have a difficult time going it alone in today's complex world. **Entrepreneurship that creates a group in which people become a team is essential.** Team members can learn about each other's abilities and have close complementary relationships. Command and control is replaced by **coordination and communication.** The rewards from success go to the whole group, not just those at the top.

**The creative process starts with one good idea.** Most groups can come up with lots of good ideas. The desire to innovate is born in some people. It can be encouraged, especially at an early age. If the leadership does not really want ideas, the group quickly learns this and will not offer them. A willingness to welcome new ideas or to ask for them will bring the inventors in the group forward. Once an idea is found, hard work is needed to turn the idea into reality. **The effort required to move ahead with an idea requires faith, persistence, and communication.** The courage needed to risk failure prevents many from trying, and therefore effort must be rewarded.



## *Opportunity analysis*

Opportunity is the confluence of personal preparation, external circumstances, and sensitivity to change. Different people may have different opportunity analyses. Where do entrepreneurial opportunities come from? How does one get business ideas?

One approach to the answer is **change**. Changes in the business environment offer opportunities for entrepreneurs. Existing firms have their resources, strategy, and organization structure geared for the past or current environment. When a change occurs, the new firm frequently has an easier time spotting it and configuring a set of resources and an organization to meet the new needs and the new realities than an existing organization. Change can occur from market disequilibrium, factors that enhance production possibilities, and the opportunities created from earlier acts of entrepreneurship. Entrepreneurship builds on itself and is a virtuous cycle of economic activity.

## Global and International Issues

Although the entrepreneur may think that his or her business is strictly local, this is true of very few businesses. We are all interconnected in a global economy, and events that occur thousands of miles away can influence our businesses. The main global issues are trade barriers, tariffs, political risks, and bilateral and multilateral relationships. All of these issues are interrelated.

**Trade Barriers and Tariffs.** Trade barriers and tariffs hinder the free flow of resources across national boundaries. They are the result of economic interest groups within a country attempting to prevent transnational competition. The trend today is to reduce trade barriers worldwide.

**Trade Agreements.** Since World War II, and especially since the end of the Cold War, the trend has been toward increased trade agreements. These country-to-country and regional agreements have set the economic rules businesses follow when they are interacting with other businesses within the co-signing group of nations.

**Political Risk.** The potential for instability, corruption, and violence in a country or region is known as political risk. Political risk is an important variable, because in areas where it is high, resources are difficult and costly to procure, protect, and dispose of. Further, the risk of governmental nationalization and the legal appropriation of firms is always present

## One source of opportunities is The Unexpected

When current businesses are surprised by an unanticipated event, they are often unable to adapt quickly enough to take advantage of that event. The event can be an unexpected success (good news) or an unexpected failure (bad news). For example, if war breaks out where it is unexpected, it changes the economics and demand structure of the warring parties and their populations. The war can provide opportunity if it is ethically pursued. Similarly, a breakthrough in a peace negotiation can also provide opportunity, because it can change the economies of the former combatants. Sometimes the unexpected happens directly to the company; The shock can be fatal or it can be the source of new opportunities.



The famous management and entrepreneurship guru, Peter Drucker, believed that a combination of systematic environmental analysis and creativity could lead businesses and entrepreneurs to find new opportunities for entrepreneurship and innovation.

Creativity is the initiation of a product or process that is useful, correct, appropriate, and valuable to the task at hand where that task is heuristic rather than algorithmic. A heuristic is an incomplete guideline or rule of thumb that leads to **understanding, learning, or discovery**. It is a fuzzy map of where we are and where we are going, but the roads are not completely drawn in. Heuristics serve to stimulate a person to learn more; they are similar to determining how to get from A to B on a blurry, indistinct roadmap. Creativity occurs at the dynamic intersection of three forces. These forces are:

1. The individual, with his or her intelligence, experience and dispositions
2. The domain of knowledge within which the particular individual has chosen to work
3. The field or social context within which the merits of the work or product produced are evaluated and judged.

Some of the attributes of creative people, discussed in the literature on creativity, are curiosity, openness to new experiences, tolerance of ambiguity, independence of judgment, sensitivity to problems, flexibility, and originality. One of the better ways to think of individual tendencies is by using the Kirton Adaptor-Innovator theory (KAI). The KAI postulates that everyone is creative in either one of two ways. Some people are good at figuring out how to “do things better.” This is an improvement approach to creativity. People who can do things better find ways to incrementally change what is already in existence. People who are good at the “do-things-differently” approach are creative in finding new and novel solutions to problems. But research has found that this trait approach is insufficient; therefore, we need to consider other variables.

We also need to consider the domain of knowledge. Here we may be referring to arts, like music or painting; sciences, like computer science or biology; or a business area, like finance, marketing, product development, or new venture creation. **People can only be creative if they are prepared to be creative, which means they must have some understanding of a knowledge base and some skills at manipulating this base.** It is also true that one can know “too much” about a domain of knowledge and uncritically accept all of its forms, premises, assumptions, and values. An individual who accepts all of these things might have a difficult time producing divergent thinking—ideas that modify or substitute for the conventional wisdom.

The last force is the field or social context. For an idea or product to be judged creative (as opposed to simply crazy or weird), it must be considered valuable and meritorious. Who does the judging? In the case of fine art, this work is done by critics, curators, and experts. In the case of business-related creativity, the organization and inevitably the market make these judgments. If an idea sells, it was creative; if it does not sell, it was not creative. This sort of retrospective evaluation is part of the paradox of creativity. If there were rules that one could formulate a priori, then one would have developed an algorithm, and its product could no longer be considered creative.



## *Creativity Techniques*

An individual can learn to be more creative by understanding the process of creativity and mastering a few simple techniques. These techniques can be used by a single person working on a problem that calls for a creative solution, or they can be applied within a group setting. The key to using these techniques is to overcome the linear thinking and the traditional linkages between things and events, and employ lateral thinking, which encourages innovation by challenging con- Resources and Capabilities 67 cepts, perceptions, and assumptions, and provoking incongruity.

### **The creative pause**

Trying to force a creative solution is impossible, but we can make an effort to find one. The creative pause is a deliberate interruption in the routine flow of work in order to concentrate on a point or process. At what point does the pause occur? It doesn't matter. And there need be no particular reason for that pause at that time. This pause is a technique that makes people aware that they are doing something routine, and enables them to question why they are doing it a particular way, or if they should be doing it at all.

### **Focus**

Simple focus is paying attention and concentrating. There need not be a problem to solve. Such focus simply means questioning the linear thinking embedded in any routine. The target of one's focus can be an object, a process, or a policy. When using specific focus, a person has a defined target, such as looking for new ideas to serve customers, or generating creative ways to reduce the cost of handling materials. Although the specific focus technique requires that the user have knowledge of the domain, it is not dependent on increasing the amount of knowledge, but rather on using existing knowledge in new ways.

### **Challenge**

Using the creative challenge, people question why something is done a certain way, and if there are other ways of doing it. We challenge the historical and traditional processes. Such challenge is not meant to be an exercise in criticism. We may challenge something that works quite well while looking for a better way. The creative challenge does not accept the view that there is one best way to do something, or that the current way is the optimal way.

### **Alternatives**

Generating alternatives is the most basic creative response. However, we usually engage in this exercise only when we feel a need or have a problem. Creative alternatives can be

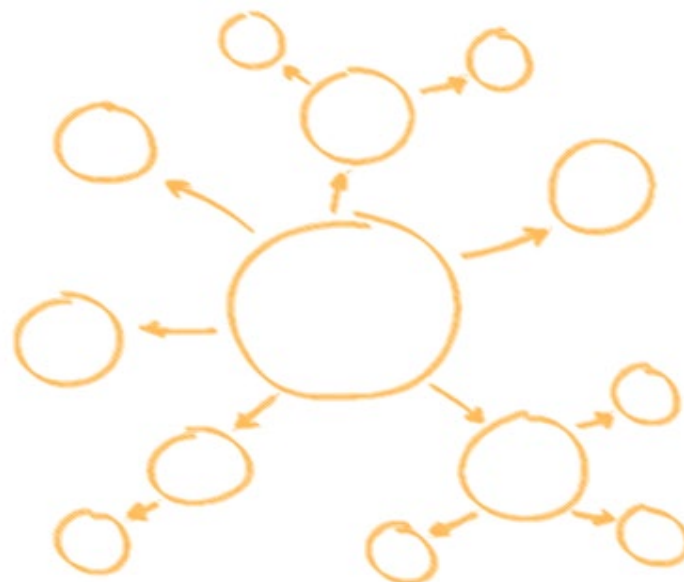
generated at any time and applied to anything, even when there is no crisis. Creating alternatives is a two-stage process: (1) We need to find out what alternatives are already available because there is no sense in reinventing the wheel, and (2) We must design new alternatives or ways to do things. The first stage is information gathering, but the second is about being creative.

### Provocation

Creative provocations are experiments in thought. Deliberate provocations force a person to consider incongruities, discontinuities, and seemingly impossible events and situations. The key to using the provocation technique is the childlike question, “What if?” and working backward from there, to determine the implications of the question. Einstein asked, “What if I could ride on a beam of light? What would I see?” and from this thought experiment, he derived the conditions of relativity.

### Mind mapping

This is a technique that works through mental and linguistic associations. It enables the user to break through the “wall of rationality” surrounding a proposition. Mind mapping is a multistage process that starts with a clear statement of the problem at hand in order to search for a creative approach to that problem. Free association follows as a map of free associations is generated and some arbitrary limit is reached. Then the map is studied for patterns, novelties, and interesting insights. Below is a mind map that helps illustrate how the process works.



1. Mind mapping example

## *Ten qualities that define big ideas*

Ten qualities that define big ideas and differentiate them from "not so big ideas". While an idea may certainly be "big" for some companies without possessing all ten criteria, nevertheless, the more criteria the idea fits, the better it will be and the more likely it will be a really great idea.

- 1. Transformation:** Can the idea change attitudes, beliefs and behaviors? Open up new ways of seeing and thinking? Alter the course of customers, markets and companies and be a "game changer" on a grand scale? If yes, then it's a big idea and the transformation it causes should affect the market (customers, prospects, competitors, influencers) and also your company and its people.
- 2. Ownability:** How tightly can the idea be linked to your brand and only your brand? The idea behind ownability is: "only from us . . . only for you." For instance, you can't own the idea: "We have the best people." Every competitor probably says the same thing. But an idea like, "Our aerospace company was founded by the first two human beings to land on the moon," is hard to copy.
- 3. Simplicity:** When marketers remove the excess and simplify, intuitiveness, clarity and the "I get it" factor emerge. A lack of simplicity goes against human nature. Today all audiences have more choices than ever, so don't risk confusing them and turning them away. Truly creative ideas never confuse. They clarify, reveal and eliminate. Any suspicion that an idea may confuse demands.
- 4. Originality:** Humans are hard-wired to focus on the novel, unique and original. Indeed, we are programmed to habitually and automatically ignore the familiar and direct a laser-like focus to newness and originality as we go about our ordinary routines. That's why a pedestrian in the street, an accident or even a new billboard along your commute will capture your attention without conscious thought. Brand marketers questing for big ideas should always be on the lookout for ways to harness this powerful universal truth.
- 5. Surprise:** A cousin of originality, surprise is unexpected but not absurd. Surprise, as it relates to a brand, could mean hyper-elevating your level of customer service in a tired "the customer is always wrong" industry so that the customer feels appreciated and cared for. Good surprises make people feel special.
- 6. Magnetism:** Magnetic ideas have an allure or an attraction that pulls people toward them. They're easier to stumble upon than to engineer through any specific process. Be attuned to customers' reactions. What do they gravitate to in your office? What words or phrases catch their attention? What topics are generating discussion in online communities such as LinkedIn groups?





7. **Infectiousness:** Big ideas grab you to the point where you can't forget. Maybe it's a song, taste, smell or novel solution, but infectious ideas stick in our consciousness and never leave. Infectious ideas can exist in even the most arcane and complex industries.
8. **Contagiousness:** A brand can infect, and that's good. But an idea becomes even more powerful when it spreads to others. Whether you call it "viral" or "buzz-worthy," big ideas compel people to tell others.
9. **Egocentricity:** People have an innate interest and fascination with themselves. You can empower a brand simply by appealing to the self-interest of people. American novelist John Steinbeck may have captured this idea best when he wrote in *The Winter of Our Discontent*: "For the most part, people are not curious, except about themselves."
10. **Likability:** In advertising communications, one factor contributes to effectiveness more than any other: **likability**. A study that included approximately 300,000 observations of nearly 3,000 print campaigns to identify the factors that account for an ad being effective based on recognition and attribution. No brand names were mentioned. The four factors that most affected the ad's effectiveness were: likability, originality, informative and suited to the environment. Eighty percent of the variation in recognition and more than half of the variance in attribution could be linked to ad-liking.

## *ICT as a tool for improving entrepreneurial skills*

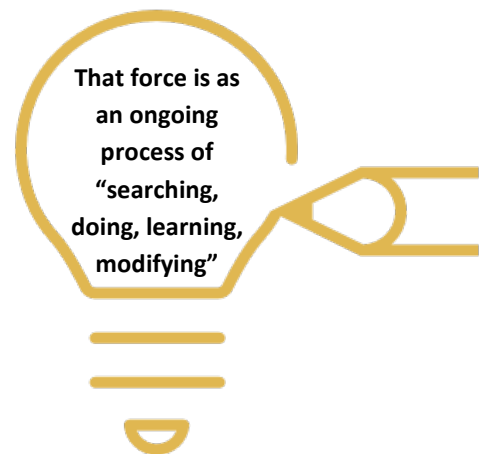
Information and communication technologies are seen as powerful tools that can help young

people improve their entrepreneurial skills. Through the right use of digital platforms and tools, youngsters can develop their leadership, business management, time management, creative thinking and problem-solving skills.

The new strategy system also expands on the eight-step method: establishing a sense of urgency, creating a guiding coalition, developing a change vision, communicating the vision for buy-in, empowering broad-based action, generating short-term wins, never letting up, and incorporating changes into the culture. Strategy should be viewed as a **dynamic force** that constantly seeks opportunities, identifies initiatives that will capitalise on them, and completes those initiatives swiftly and efficiently.

The aspiring entrepreneurs of today are technologically precocious. They are comfortable with new technologies and are not fearful of change and the radical shifts that new technology can bring. Younger people are at home with computers and all sorts of consumer electronics. **“It’s a great time to be an entrepreneur,”** especially an Internet one.

Compared to ten to fifteen years ago, hardware is 100 times cheaper, infrastructure software is free, there is easy access to global labour markets, and SEM (search engine marketing) has changed distribution and selling tactics.



### **Technological Analysis**

**Technology** can be defined as “the branch of knowledge that deals with industrial arts, applied science, and engineering,” and “a process, an invention, or a method.” The first part of the definition tells us that technological analysis is concerned with the “what” of science. Technological analysis, then, requires scanning and monitoring from the time of basic research through product development and commercialization. The second part of the definition implies that technology is also concerned with the “how” of science. Therefore, a complete technological analysis also includes scanning of operations and manufacturing techniques.

Technological change takes place in two ways: (1) through pure invention (and scientific discovery), and (2) through process innovation.




Pure invention is the creation of something that is radically different from existing technologies or products. Because pure invention is different, it has certain characteristics that are economically interesting. An invention may have no competitors at its birth, thereby giving a monopoly to the individuals who hold its legal rights. The disadvantage at this time is that the invention also has no market. Further, there may never be a market for the commercial version of the invention.

The combination of the monopolist upside with the no-ready-market downside makes the economic aspect of invention risky because the outcomes are potentially so variable. New inventions can create new industries. The invention of the semiconductor created the computer industry in all its forms. The scientific discoveries made by geneticists created the biotech industry with all of its niches and segments. In the initial phase of such technologies and discoveries—the creation of products and markets— entrepreneurs play the most important role. Over the product’s life cycle, large organizational units develop to exploit these products and markets as they mature.

Whereas pure invention is radical and revolutionary, carrying with it the potential to create new industries, **process innovation** is incremental and evolutionary. **Its purpose is to make existing industries more efficient.** Process innovation refers to the small changes in design, product formulation and manufacturing, materials, and service delivery that firms make to keep their product up-to-date and their costs down.

After an invention has been successfully commercialised, the second type of technological change, process innovation, becomes dominant. The critical question for the entrepreneur should be: Which innovations have the best chance of success? An academic study of these factors reported the results of 197 product innovations (111 successes and 86 failures). The researchers found that the successful innovations had some or all of the following characteristics:

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1. They were moderately new to the market
  2. They were based on established technology
  3. They saved customers money
  4. They met customer expectations
  5. They supported existing processes and procedures.

The study concluded that the failures were either too cutting edge or too “me-too”; there were no suggestions for how to improve them. The study also looked at the sources for the innovation and found six of them: **need spotting, market research, solution spotting, trend following, mental inventions, and taking advantage of random events**. Of these, the greatest number of failures derived from trend following and mental inventions (no basis in the market). Need spotting accounted for twice as many successes as failures, market research four times the successes, and solution spotting seven times the number of successes. **What was the best source of ideas? Taking advantage of random events!** This process accounted for 13 times more successes than failures. **Why?**

# Setting the foundation for the solution

There are many Challenges that we are constantly faced with: large, short, global, and local. Each of these is unique and can affect us in various ways. We can choose to ignore them or look forward to them. The important thing is to consider how we can respond to these challenges and develop effective solutions. The hectic pace of our lives often prevents us from having time to think critically about how to address these issues. We tend to make mistakes and overlook ideas when we lack an efficient and effective framework to think critically. As the complexity of today's problems become more complex, it is important that we develop a generation of capable and motivated learners to identify and develop sustainable solutions.

As was said before, the Challenge Based Learning framework was created by Apple, Inc. and is used in schools, universities, and other educational institutions all around the world. It enables teachers and students to address global and local challenges while developing content knowledge in subjects such as science, math, social studies, language arts, engineering, and computer science. Through Challenge Based Learning, teachers and students are able to make a difference in the way they learn. It allows them to demonstrate that learning can be both meaningful and deep.

The Challenge Learning Framework is composed of three phases: Act, Investigate, and Engage. Each phase features activities designed to help prepare you for the next step. There are also opportunities for mini-investigations and return to an earlier phase if needed. Throughout the process, participants are supported by a continuous process of reflection, documentation, and sharing. In this chapter, we focus mainly on group process of developing solutions, assessing the results, and selecting the “one” solution.

## Group process

Group work can be a great way to motivate students and develop critical-thinking and communication skills. However, it can be very frustrating for instructors and students if the work is not planned and conducted properly. Teamwork can't just be done once a new team has been formed. It can take time for them to gel and develop their skills. In addition, team members go through various stages as they move from one place to another. Bruce Tuckman's model (2009) of forming, storming, and norming explains these stages. By understanding this model, you can help your new team become more effective.

## Tuckman's group development model and group dynamics

Tuckman's model (1965, 1977) has defined five stages of group development - forming, storming, norming, performing, and adjourning.

- **Forming:** The start of a new phase is a time for members to get used to their new roles and work together. It also provides them with the necessary skills to manage their time and improve their communication. Before the groups start working, they should learn about team processes and conflict resolution.
- **Storming:** This stage also brings a variety of arguments and fights. As the situation worsens, people start to feel frustrated and angry. Their role in the group may be in jeopardy as the problem continues to fester. Supervisors might intervene as they are also concerned about the situation. Members may experience a period of depression or extreme emotional turbulence. Without adequate support and training, the team may experience slow growth. Although conflicts are typically frowned upon in an organization, they are still considered natural and necessary events. It is important for members to handle these situations well so that they can build confidence and skills for the next phase.
- **Norming:** The norming stage is when a group works through social and individual issues. It involves developing its own set of norms and behaviours. As the group develops its interpersonal skills, it becomes more skilled at problem-solving and other related activities. During this time, members also learn new skills and cross-train.
- **Performing:** The group is ready to start working on its assigned tasks. It has become familiar with one another and has a clear understanding of what needs to be done. The next step involves the group being comfortable to perform its duties.
- **Adjourning:** Following the performing stage, the group is then sent to the next stage, which is an adjourned stage. This occurs when the group has completed its assigned task.

In a school environment, they have replaced the adjourning stage with transforming stage. As the team works to improve the school, it will always revisit the earlier stages of development. The members are now comfortable with the process and are eager to continue working on the transformation of the teaching and learning environment.

People can develop healthy identities through social-emotional learning. Through challenge-based learning, students can develop their social-emotional skills in a variety of ways. This process involves learning how to manage their emotions and develop positive relationships. It can also help them make informed decisions. The five competencies are

self-awareness, social awareness, responsible decision-making, relationship skills, and self-management.

It is easy to assume that most students enjoy working together and have the necessary skills to handle conflict. However, it is the teachers' responsibility to teach them how to contribute effectively to a group. This can be done through the establishment of a supportive environment that encourages collaboration. Besides being able to provide a conducive environment, it is also important that teachers instil in their students the necessary skills to develop challenge-based learning.

As adults, we can still recall the positive and negative experiences we had with group collaboration. Some people tend to avoid getting involved with certain team members due to their personalities, while others prefer to complete all tasks themselves. Although there are many factors that can affect a student's ability to participate in group work, there are some common factors that instructors share that can help students overcome these challenges:

- **Help students understand the project goals.** To understand the project's significance, students need to identify the driving question and the project's goals. These goals should help them explore the issue in more depth.
- **Help students celebrate academic risk-taking.** Rather than focusing on the outcome, praise the effort of the student instead. For instance, if a person shows effort by trying to answer a question correctly, then be commended for doing so. Also, remind them that mistakes are a part of the learning process.
- **Help students share their experiences.** After talking about the project's progress, encourage them to come up with solutions that can be improved. They should also serve as a mediator to help their group overcome its various challenges. It's important for students to take ownership of their actions and not blame their peers for their mistakes. They should additionally develop social awareness and relationship skills.
- **Help students reflect.** Through self-reflection, students can improve their performance during the project's challenging phase. They can also use their group contracts as a guide to reflect on their actions. For instance, they can use the contract to determine if they have been following the group's rules.

### Challenge-based learning and teamwork

Through the use of information, the concept of learning has been transformed into a more collaborative environment where all of the stakeholder groups become involved in the creation and implementation of the learning experience. This new paradigm also allows

teachers or youth workers and students to share the workload and responsibility for the learning experience.

The framework does not diminish the role of youth workers or other adults in the schools. They still have the primary responsibility of providing a successful learning experience. The framework allows them to spend more time with their students, and it does so while relieving them of the burden of carrying out all the work. While teachers are still able to teach, students are now expected to develop their own goals and align themselves with the standards.

One of the main differences between traditional and Challenge Based Learning approaches is the roles of youth workers and students. With Challenge-based learning, schools become creative environments where students can develop the skills they will need to succeed in the real-world. Youth workers also become more than information experts as they become collaborators in learning, and they are able to use their power to inspire and motivate students.



As information experts, teachers are also collaborators in learning, taking on new roles that involve seeking out new knowledge and connecting with students. They model positive habits of thinking and learning.

The role of co-learner and collaborator can be challenging for youth workers who are used to being the expert. They may be tempted to rush the process or over-engineer the activities, but it is important to give the students enough time to make mistakes and learn from them. You do not need to have all the necessary knowledge to make informed decisions, but you must be willing to collaborate with them to find solutions. The challenges will be challenging, and at times, they will get messy. The role of the youth worker in Challenge Based Learning is to find the Solutions with the students, not for them. Trust that this will happen and resist the temptation to do take over the process.

## Assessment

The goal of Challenge Based Learning is to measure the process and product through both real-world and conventional assessment methods. These assessments should inform the learners as they move toward a solution and provide feedback on their efforts. In addition to the content knowledge, the other factors that are considered when assessing the products and process are mastery of real-world skills and the ability to meet the requirements of the program.

There should be consideration for two kinds of assessments when it comes to measuring progress: summative and informative. The former involves evaluating the progress at



specific points in the process, while the latter helps guide the learning process. Both types of assessments can be used to evaluate various aspects of a project, such as papers, journal entries, peer reviews, student observations, and more.

Because of Challenge Based Learning, students receive feedback that can help them improve their skills or cause confusion. This type of learning involves working outside the classroom and interacting with other people online. In addition to youth worker feedback, students will also receive feedback through various forms of communication such as text messaging, blog posts, and video and audio responses.

To help students make sense of the feedback they receive, regular checkpoints should be scheduled to help them develop their goals and process steps. This can help them keep track of their progress and make adjustments as needed. While Challenge Based Learning is about the students' responsibility, it is also about the youth workers' role in helping them make the most of it. Having the necessary information about each group can help you make informed decisions and provide a guiding hand.

**Examples of prompts to use during the checkpoints:**

- Where are you in the process?
- What new knowledge or skills have you acquired?
- What has been your biggest success?
- What has been your biggest Challenge?
- How is your group doing as a team?
- What are your top priorities for next week?

A summative assessment is a type of evaluation that is used to measure the academic achievement, skill acquisition, and learning of students at the end of a course or project. It is typically performed at the end of a semester or a certain period of time. There are three main criteria that are used to define these assessments:

- The goal of an assessment is to determine whether or not a student has learned what they were taught. This is different from the design of the assignment, test, or self-evaluation. Instead, the way it is used is the determining factor.
- A summative assessment is given at the end of a certain period, and it is generally evaluative rather than diagnostic. This type of evaluation can be used to measure the student's progress toward their goals or to make course-placement decisions.
- Results of a summative assessment are typically recorded as grades or scores that are included in a student's permanent academic record, such as on a report card or the test results used in the admissions process. While these types of

assessments are commonly used in the grading process in schools and districts, they are not always evaluated.

Although summative assessments are typically given at the end of a course, some can still be used as diagnostic tools. For instance, the availability of student data through online databases and grading systems can help teachers identify their students' performance. Teachers can identify students who are likely to struggle in certain subjects or concepts by reviewing the data collected. Students may also be allowed to take multiple tests, and these results can be used to prepare for future assessments.

Traditional assessments can be used to determine the level of knowledge that students have about subjects and content. A formative assessment is a process utilised by teachers to evaluate the academic progress and comprehension of their students. It can be used in combination with other methods to identify areas of concern and develop strategies to improve the learning experience. These types of assessments help teachers identify the learning styles and concepts that their students are struggling with.

Formative assessment is a process that aims to collect detailed information about students and teachers so that they can improve their learning. Although it doesn't require the design of a particular technique or test, it is used in a way that informs learning modifications and in-process teaching.

Fostering effective assessment techniques can help improve student learning and teaching. In addition to being able to provide clear instructions, instructors can also help students develop their own knowledge by encouraging them to self-assess.

It is important that the planning process includes the development of summative assessments, as well as the expectations of the students. Including real-world assessments can help prepare students for the workforce.

The goal of the challenge is to focus on the product and **the process. The journey to the solution is valued as much as the solution.** Throughout the Challenge Based Learning experience there are opportunities to evaluate and assess both process and products.

## *Solution development*

As said before, when setting the foundation for the solution, students have to identify ways for process and solution assessment. The role of the teachers is to meet with the groups of students and discuss with them which measures they will be using to assure the success of their solution. It will be very important that assessment is conducted throughout the process not only by the students, but also by the teachers.

In this phase, it's important that there will be some well-defined guiding activities. For example, students can engage in web research, relevant case studies from the specific industry, interview with experts, games, etc. The proposed guiding activities can guide students to the acquisition of the required knowledge. This will happen when students come up with answers to the guiding questions and develop an innovative and realistic solution through creativity and teamwork.

The role of teachers in this phase is very important because they can support students by suggesting them various related resources such as websites, podcasts, videos, contact information for entrepreneurs from the industry. In some cases, study visits can also be very helpful for developing students' imagination and for inspiring them with new ideas and solutions. Such visits can be very useful and bring motivation to youngsters, and they are seen as a wonderful instrument in non-formal education as students get immersed into the atmosphere of the place, see how it works and have a unique opportunity to ask questions they would not normally find information about online.

However, when selecting the guiding activities, teachers must take into consideration the students' age and skills. The age-appropriate activities can help students develop a variety of skills such as critical thinking, problem solving, imagination and creativity. School education undoubtedly plays an important role in moulding a student's personality, as well as when students have multiple avenues to learn from, they become confident and independent individuals. They can easily develop entrepreneurial skills when they receive holistic education, and with the latest technology that enables audio-visual learning, interactive and smart classrooms, students stand a better chance to become more competent.



Moreover, for expanding their research students should be encouraged to use online social tools such as social networks, online communities, forums, etc. Although social media is often seen as a deteriorating tool in academics, we all need to learn how to take the better part of it and learn how to make an opportunity of it, because social media is here to stay.

It can be a great place for quick ways of interacting, learning, and solving problems. Platforms such as YouTube, Instagram, Facebook are the go-platforms for students learning, especially in the form of video format. Also, when used in the right way, Facebook and Instagram can help students to exchange their knowledge and support their research.

After a careful investigation of the guiding questions, multiple solutions are usually identified. Teaching multiple ways to solve a problem helps students to develop flexibility and might support conceptual understanding of the procedure.

Traditional schools may offer solutions to students rather than providing them the opportunity of developing their own solutions. However, student-led approach allows them to identify and solve problems independently or with guidance. They are encouraged to find any solutions that works, which allows them to enhance creativity in their learning. When students are allowed to find their own answers, they not only increase their problem-solving skills and a higher level of thinking ability, but they also learn how to find solutions when other cannot provide solutions for them.

Problem solving is very important when it comes to entrepreneurship. Specifically, entrepreneurial problem solving is the process of using innovation and creative solutions to close that gap by resolving societal, business, or technological problems. Sometimes, personal problems can lead to entrepreneurial opportunities if validated in the market. The entrepreneur visualises the prospect of filling the gap with an innovative solution that might entail the revision of a product or the creation of an entirely new product. In any case, the entrepreneur approaches the problem-solving process in various ways.

The two more popular problem-solving models are: **adaptive and innovative**.



The first and more conservative approach entrepreneurs may use to solve problems is the **adaptive model**. The adaptive model seeks solutions for problems in ways that are tested and known to be effective. An adaptive model accepts the problem definition and is concerned with resolving problems rather than finding them. This approach seeks greater efficiency while aiming at continuity and stability.

The second and more creative approach is the **innovative model** of entrepreneurial problem solving, which uses techniques that are unknown to the market and that bring advantage to an organization. An innovative problem-solving style challenges the problem definition, discovers problems and avenues for their solutions, and questions existing assumptions—in a nutshell, it does things differently. It uses outside-the-box thinking and searches for novel solutions.

Coming back to the solution development, after discussing, analysing and experimenting, students need to select one solution that will be widely investigated, documented, developed and finally implemented. In this stage, students usually develop different skills and knowledge.

Following, they will:

- **Find simplicity in complexity:** Students can recognise an opportunity where others see chaos and confusion. They are two ways to recognise opportunities, by discovering or by creating them. Creating opportunities is a social process and it relies on the ability of students to interact, while discovering opportunities relies on the ability of students to recognise patterns and connect the dots.
- **Learn to be practical:** Practical skills typically refer to the abilities that individuals acquire to perform their duties efficiently. Students can learn many of these skills without undertaking formal education or certification. They may include interpersonal, physical, creative, hard or soft skills. Examples of practical skills are problem solving, digital literacy, leadership, writing, public speaking, communication, creativity. All these skills can be gained by studying, working or training.
- **Gain better experience:** Students can learn from others with different opinions, experiences, being able to evaluate options from multiple perspectives. Hearing different perspectives that challenge our own has great and multiple benefits, because it helps us broaden how we think about things and how we approach problems. By listening to different perspectives, students not only get simple feedback, but they also gain better experience and learn how to deal with difficulties in a more efficient way.
- **Create innovative solutions:** The creativity component becomes a dominant element for students when developing possible solutions to a problem. Problem-solving through creativity simply means students are able to find new ways of solving problems. When designing learning experiences, teachers have to plan and frame curriculum, as well as provide tools that give students options, voice, and choice in order to enable them to be creative and to find the best possible solution.
- **Learn to work in a team:** Effective problem-solving isn't easy but when students are collaborating, they can easily find solutions to a problem. Moreover, participation in team activities can help students develop essential communication and collaboration skills while preparing them for success inside and outside of the classroom. Teamwork teaches students how to respectfully and confidently express their ideas and opinions effectively in a group setting. In addition, introducing students to collaborative environments early in their school experiences presents

opportunities for them to be more productive and joyful as they work with others in a team-based environment.

- **Contribute to the society:** By trying to find solutions to local or world problems, students are making a difference and contributing to the society and wellbeing of people and the planet. Contributing to society is also correlated to entrepreneurship, because entrepreneurs have much to give to society. During the solution development students develop their entrepreneurial skills as well. The role of entrepreneurship in any economy is critical, as it contributes to the socio-economic development of societies in various ways, including the creation of employment opportunities, contribution to national income, infrastructure development, and contributing to community development.

## *The “one” solution selection*

For the “one” solution selection, students can use a number of tools such as mind mapping, brainstorming, and sketches.

- **Mind-mapping:** it is a way of linking key concepts using images, lines and links. A central concept is linked via lines to other concepts which in turn are linked with other associated ideas. It is similar as a technique to concept mapping and spider diagrams, the difference being that true mind mapping involves constructing a hierarchy of ideas instead of pure random association.
- **Brainstorming:** it is a group activity technique by which efforts are made to find a conclusion for a specific problem by gathering a list of ideas spontaneously contributed by its members. After students write down all the ideas, they carefully evaluate them. In addition, there are some basic rules of brainstorming. It should be done without criticism; students have to welcome wild ideas; the ideas should be combined and improved.
- **Sketches:** After a typical brainstorm session, students will end up with a wall plastered with post-its. Since the ideas will probably be hard to compare, in order to solve this issue, students can use visual thinking to turn the most promising ideas into solution sketches. The creation of rough sketches make ideas tangible and it will stimulate students to draw as many variations of the idea as possible. Afterwards, the team can discuss and choose the best solution to be implemented.

After refining the selected solutions through brainstorming, mind mapping, or sketches, students have to develop the “one” solution, or also said, to execute the best plan of action. The teachers have to encourage students to be creative while designing and implementing their solutions as well as to document their actions. As an additional key element of challenge based learning, the design thinking approach can be used by them, because it

can develop the imagination, intuition, and systematic reasoning of students. As a result, youngsters will be able to explore possibilities of which one could be the best solution to be implemented.

As seen in this chapter, for setting the foundation for a solution, it is very important for students to know what is needed in order to meet the challenge topic. Once they organise themselves in a team, students need to begin generating the questions that will help them obtain the necessary knowledge to develop an innovative and realistic solution to their problem. Equally important is that the team work together on common projects and collaborate in diverse groups. Students have to realise that they will need to play a wide variety of roles throughout the learning process, and that the journey to the solution is valued as much as the solution. Throughout



the challenge based learning experience there are opportunities to evaluate and assess both process and products, and this should be done by teachers and students together.

# Implementation and evaluation

Once the investigation phase is completed and the “one” solution identified, students need to execute the best plan of action. The action plan is an essential part of the strategic planning process and can help change makers turn their visions into reality. When created, students must monitor it closely to ensure goals are met on schedule and within the set framework. If the action plan is not meeting expectations, it might need to be revised or re-evaluated to reach the desired outcome. However, students need to remember that action plans can change as needed, but they must always be focused on the goal at hand.

## *Implementation and evaluation*

Implementation involves putting a plan into effect, including the process of monitoring progress, making adjustments, and evaluating impact. Once students have identified the “one” solution for the challenge that needs to be addressed, they must develop the implementation plan and put it into action.

The implementation plan, also known as a strategic plan, outlines the steps that the group should take when accomplishing a shared goal or objective. This plan usually combines strategy, process, and action, and it is seen as a step-by-step guide for how the goals will be achieved.

When putting the plan into action, students have to decide which goal they want to act on first, and make a list of what steps they need to take. But first, they have to think about where they want to go, and after how to get there.

Before to start building out any other part of the implementation plan, students have to devote time to the what and the where:

- What are they trying to accomplish? (the goals)
- What needs to happen to reach those goals? (the objectives)
- What are the intermediate steps or milestones that demonstrate progress along the path towards the goals? (the milestones)

**Goals** are the outcomes students will intend to achieve, whereas **objectives** will be the specific actions and measurable steps that they need to take to achieve a goal. Usually goals and objectives work in tandem to achieve success. If students create goals without clear objectives, they run the risk of not accomplishing the goals. Therefore, the role of teachers and youth workers will be to carefully monitor and guide the student group, so they will be able to set their goals successfully.



Goal setting is a vital skill that we all need to learn and master. When done correctly, goal setting is effective and often critical to success. Goals give us direction by focusing attention on goal-relevant behaviour and away from irrelevant tasks (Zimmerman, Bandura, & Martinez-Pons, 1992). Miner (2005) suggested that goal setting works through three basic propositions:



- Goals energise performance through the motivation to expend the required effort in line with the difficulty of the task.
- Goals motivate people to persist in activities over time.
- Goals direct people’s attention to relevant behaviours and away from behaviours which are irrelevant or detrimental to the achievement of the task.

Exploring goal setting with students is a great way to instil a growth mindset. It can make them believe that they can achieve a goal through persistence and hard work, as well as they will learn to be resilient and that overcoming small failures can lead to larger successes.

Goal setting is a crucial part of the business planning. In particular, entrepreneur goal setting is important because starting a successful business takes time, patience and dedication. Goal setting helps entrepreneurs visualise their thoughts and ideas more clearly, and help them make the necessary adjustments at every part of their entrepreneur journey, improving their efficiency.

One of the most common methods for goal setting in entrepreneurship is the **SMART method**. This method can also help students create achievable goals for their “one” solution, therefore, it will be important to include it in their implementation plan.



According to the SMART method, goals should be:

- Specific – Students have to be as clear and specific as possible with what they want to achieve. The narrower the goal is, the more they will understand the steps necessary to achieve it.
- Measurable – It includes how the action will be measured. Measurable refers to ensuring there will be evidence that can be tracked to monitor progress.
- Achievable – It refers to ensuring the set goal is realistic and possible to complete or maintain within the set time frame.
- Realistic – It states what results can realistically be achieved, given available resources.
- Time-based – It responds to the question “By when will students achieve their goal?”.

For example, if students want to create **an action plan for a student-run composting programme to highlight climate change**, they must follow some steps in order to make their SMART goal a reality.

First of all, students can learn more about indoor vermiculture (using worms to create compost). Vermicomposting is an efficient and enjoyable method for turning kitchen food scraps into a rich compost, as well as composting with redworms is becoming popular because it is easy and inexpensive to get started, can be done indoors in a small place and is odorless. However, in order to start with vermicomposting, students have to figure out how they will do this. They will need to search online and at the library for vermiculture guides, or contact people who already compost, so they can give them some tips. They can contact some local or regional composting association, as well as they can use some advice from relevant online communities. For this, students need to think about who will be responsible for what.

During the implementation of their plan, for achieving their goal, they can also ask for the support from the school administration and recruit a group of volunteers to help them with the plan. They may need support from the teacher who is supervising their project, so he or she can help them in doing so. For the recruitment of volunteers, they can put up posters through the school, publish in some social networks about their ideas or ask friends. Students can be supported by local organizations and their youth workers who are more experienced in the field, therefore, they can do research and select several entities to get in touch with. Students may search for supporters, inside or outside their schools, using all the possibilities that social media networks and digital tools give them.

As said previously, students will need to measure their success through the implementation of their plan. For example, if after talking with the school administration

students manage to receive permission to install the composter and collection bins in the school area, this automatically means that they have achieved some success. Also, they may get financial support from the school or other local entities which can be an indicator that the work is well done. Moreover, if they receive a list of volunteers from the school able to help them in their day-to-day tasks, or some local organizations offer their volunteers and youth workers to help them in their tasks, it will be again an indicator for success.

There will be different challenges that students need to overcome, but when working in a team, for sure they will find a way to keep going for achieving their goals. If there isn't a teacher in the school that can support them, they can find an environmental group or local organization that runs a similar programme and have knowledge in the field. Students have to remember that **being prepared for challenges is a great way to ensure that their plan will be a success!**



A SMART objective is:

- Specific - It describes a specific action, behaviour, outcome or achievement that is observable.
- Measurable - It is quantifiable and has indicators associated with it so it can be measured.
- Audience-specific - It is appropriate and relevant to the target audience.
- Realistic - It is achievable with the available resources.
- Time-Bound - It states the timeframe within which the objective will be achieved.

For example, for students who are trying to raise awareness on the importance of creating sustainable transportation, the SMART objective might be that by the end of the project, at least 5 city councillors will support and sign a sustainable transportation plan in the region. Additionally, the project can also target students, providing useful findings that can help urban planners in adopting policies to make mobility more sustainable. Concrete numbers can be set, as for example “motorised trips could decrease from 60% to 40%”.

For a deforestation project a SMART objective could be the number of trees that have been planted after 6 months of launching the project, or the number of volunteers that support the project and get involved.

At the implementation stage, students will measure their results and check what functioned and what did not and determine whether they have succeeded in addressing their challenge. Once the implementation plan is completed, they should also present their evaluation plan.

The **evaluation plan** is similar to a roadmap and it aims to help students clarify the steps needed to assess the processes and outcomes of their solution. An effective evaluation plan is more than a document of indicators added to the work plan. It is a dynamic tool that should be updated on an ongoing basis to reflect program changes and priorities over time. The evaluation plan serves as a bridge between evaluation and solution planning by highlighting project goals, clarifying measurable project objectives, and linking project activities with intended outcomes.

When writing their evaluation plan, students need to 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 beginning so students will know what types of data they need to collect.



In order to support students, teachers and youth workers have to provide them with examples of the different types of research that exist. They should introduce them to quantitative and qualitative data collection and present to students the advantages and disadvantages of the various data collection tools, because both of them are important for gaining different kinds of knowledge.

Quantitative research is expressed in numbers and graphs. It is used to test or confirm theories and assumptions. This type of research can be used to establish generalizable facts about a topic.

Common quantitative methods include experiments, observations recorded as numbers, and surveys with closed-ended questions.

Quantitative research is at risk for research biases including information bias, omitted variable bias, sampling bias, or selection bias.

Qualitative research is expressed in words. It is used to understand concepts, thoughts or experiences. This type of research enables people to gather in-depth insights on topics that are not well understood.

Common qualitative methods include interviews with open-ended questions, observations described in words, and literature reviews that explore concepts and theories.

Qualitative research is also at risk for certain research biases including observer bias, recall bias, and social desirability bias.

For most research topics students can choose a qualitative, quantitative or mixed methods approach. Which type they choose depends on, among other things, whether they're taking an inductive vs. deductive research approach; their research question(s); whether they're doing experimental, correlational, or descriptive research; and practical considerations such as time, money, availability of data, and access to respondents.

The amount of information students can gather concerning their solution is potentially limitless. Evaluations, however, are always restricted by the number of questions that can be realistically asked and answered with quality, the methods that can be employed, the feasibility of data collection, and the available resources. Useful evaluations are not about special research interests or what is easiest to implement but what information will be used by the student group to improve the plan and make a change.

In addition, the process evaluation will help students describe and assess their plan's activities and to link their progress to outcomes. This is important because the link between outputs and short-term outcomes remains an empirical question. Outcome evaluation, as the term implies, focuses on: short-term, intermediate, and long-term outcomes. Outcome evaluation allows students to document behavioural outcomes and identify linkages between an intervention and quantifiable effects.

As a program can experience the characteristics of several stages of development at once, so, too, a single evaluation plan can and should include both process and outcome evaluation questions at the same time.

For example, if students want to test the knowledge of a group of youngsters from their school about climate change, they can use some online tools and assessment software in order to collect the data.

Tool such as Mentimeter is a great option for students to make formative assessments while having fun quizzes. Mentimeter is an interactive presentation tool that helps to engage students and enables every voice in a classroom or lecture hall to be heard. The group can use it to gauge student comprehension or test knowledge retention.



They can as well create an attitude scale and measure the feeling of respondents at the time of answering the questions. Likert scale is the most popular. Attitude scale contains a group of statements (usually 10-15) that reflect the opinion on a particular issue. Participant is asked the degree to which he or she agrees or disagrees with the statements. Usually, a five point Likert scale is used to assess the attitude of the student. To avoid any kind of bias, equal number of positively and negatively framed statements is included.

Another scale used to measure the attitude of the student is semantic differential. This tool contains bipolar scales (adjectives) like good-bad, rich-poor, positive-negative, active-passive, etc. Number of intervals between two adjectives is usually odd, like five or seven, so that the middle figure represents a neutral attitude.

However, the interview is the one of the most important techniques used for evaluation in which students participating in evaluation are interviewed. Interviews can help in getting information both quantitatively and qualitatively. Interviews can be conducted in groups or individually. It is a time-consuming process; therefore, it should be arranged as per the convenience of interviewer and interviewee. Interviews should be held in a quiet room and the information obtained should be kept confidential. An interview guide can be created, which is an objective guideline to be followed by the interviewer.

It's highly recommended that teachers and youth workers support students to find the most suitable ways for evaluating their plan, as well as help them formulate questions that can bring them the required data. Moreover, they have to help students analyse and evaluate the collected data.

Data analysis can provide a snapshot of what students know, what they should know, and what can be done to increase their knowledge on the topic. With appropriate analysis and interpretation of data, students with the help of teachers and youth workers can make informed decisions that positively affect their solution outcomes. Thanks to the different measurements done during the implementation period, students can get a better idea of

whether people's habits actually changed as a result of the solution or if something else needs to be done.

Some questions that students need to consider are:

- Did anything change?
- Did it change the way they had hoped?

In addition to comparing the beginning and ending data, the students can look for trends.

- When did the biggest change take place?
- What can they say about how people behaved at different times during the trial?

With the use of this information, students can determine and explain whether the solution had the desired effect.

## *Tips for the implementation and evaluation phase*

### **Use technology**

The rapid expansion of mobile devices, mobile phones and mobile smartphones, makes mobile technology a powerful tool in data collection and survey research. This relatively new method of data collection is much more efficient and effective and it can give timely and real time information, measured by experience sampling and auxiliary data by use of reality mining.

Until last, survey and data collection survey were carried out by use with a vis-à-vis interviews and paper-pen methods, but those traditional methods are not only time consuming but also the interview paper which is handwritten, has to be separately transcribed which can possible lead to data mis-entry during the process.

The incredible usage of mobile phones opens new opportunities for gathering information easier from almost anywhere and it makes it possible to retrieve data from online resources and send data through mobile phones immediately.

Moreover, the introduction of technologies has changed the way people communicate and search for information, making work easier and giving the possibility to reach out to as many people as possible in order to get the best results. In addition, social media has gathered people together making it easy to use mobile technologies to collect data easily, timely and without wasting resources.

Following this, teachers and youth workers must discuss with students the potential benefits of adopting mobile technology in their survey research because it has many potential benefits compared to traditional methods. The ability to gather qualitative and quantitative information in an efficient manner using mobile technology is an important revolution in today's research whether educational or in business.

Indeed, learning how to evaluate data with the use of technology is a crucial skill also for entrepreneurs. Thanks to the data analysis they can predict customer trends and behaviours to identify breakdowns in the customer acquisition path, improve conversion rates, and increase the customer's lifetime value. Moreover, they can develop innovative new products and services by analysing data to understand the desires and needs of the business's target audience. Also, it can help them identify trends and patterns that inform decision-making, drive optimal operational performance, and cut costs by accessing information contained in log, machine, and sensor data.

In addition, data analytics is important for businesses worldwide because data-driven choices are the only way to be truly confident when making business decisions. The main purpose of data analysis is to find significance in data so that the resulting knowledge can be used to make informed business decisions.

The use of technology to promote teamwork and collaborative projects have to be considered as well. There are plenty of online collaboration tools that can help students communicate between each other, manage different tasks, monitor task progress, and keep their track objectives.

*Slack* is a popular and well-crafted platform offering instant messaging, file transfers and powerful message search. It has many features and dozens of integrations with other tools like Trello and Intercom.

*GoToMeeting* is an online video conferencing software that allows users to schedule meetings and share screens. It's one of the most popular video tools with millions of users.

Cisco's *WebEx* provides personalised video meeting rooms where users can host and join meetings. People can use WebEx for team collaboration, webinars, training and customer support.

*Asana*, one of the most well-known project management tools, allows users to assign tasks to other members, add followers to projects and monitor deadlines. It's very useful as a to-do list or calendar for strategic planning.

*Redbooth* is an easy-to-use project management tool that allows users to plan and collaborate through many functions from video conferencing to creating Gantt charts.



In addition, collaboration tools allow students, teachers, youth workers, and all other teaching assistants to exchange resources in a number of different ways, depending on what is needed for a particular task.

### Keep everyone informed

Most probably, students' solution will involve activities outside of normal classroom hours and beyond the boundaries of the school. It will be good to inform parents on what students are working on, so they will not be surprised if the students need help from them to connect with resources in the community. As said previously, additional resources can be found in students clubs, local youth organizations, or other public or private bodies.

In addition, parent involvement can make a real difference because they can encourage students in working on their tasks at home and motivate their participation and interest in the school tasks.

Parents can become part of the student solution as well. For example, if the students want to conserve energy, reduce air and water pollution, they may opt for recycling as part of their solution. Following, students can teach their family members on how to recycle at home. By getting involved in their mission, parents can show students that recycling is important for them, and that they take simple steps to reduce their household waste.



As seen from this chapter, implementation and evaluation plans are crucial for students and their group success. Implementation involves putting a plan into effect, including the process of monitoring progress, making adjustments, and evaluating impact. Once students have identified the “one” solution for the challenge that needs to be addressed, they must develop the implementation plan and put it into action. The creation of such a plan requires careful planning and attention to innumerable details, but the results are worth the investment.



In addition, the use of technology to promote teamwork and collaborative projects have to be considered as well. There are plenty online collaboration tools that can help students communicate with each other, manage different tasks, monitor task progress, and keep track of their track objectives. Are you ready for action?



## CONCLUSION

**Entrepreneurship education** has been recognised as a crucial aspect of education in the 21<sup>st</sup> century. It helps students and young people in general to develop the skills and knowledge needed to be successful in today's rapidly changing business environment.

In order to capture the required knowledge, a needs analysis has been conducted within the project **NGOE - Next Generation of Entrepreneurs** with a special focus on innovative approaches that are most suitable for developing skills in the context of entrepreneurship. Eventually, one method has been selected: **challenge-based learning (CBL)**.

**Challenge-based learning (CBL)** is a pedagogical approach that focuses on solving real-world problems through collaboration, critical thinking, and problem-solving skills. It is an effective method for providing entrepreneurs with the skills they need to succeed in the business world. Entrepreneurship education programmes that incorporate CBL have been shown to improve students' creativity, innovation, and problem-solving abilities.

In a CBL environment, students work on real-world projects or problems, often in teams, and are given the freedom to explore and experiment with different solutions. This type of learning experience is much more engaging and motivating for students than traditional lecture-based learning. It allows students to take ownership of their learning and to develop the skills and confidence they need to succeed as entrepreneurs.

One of the key benefits of CBL is that it helps students develop the creativity, innovation, and problem-solving abilities that are essential for success as an entrepreneur. By working on real-world projects, students learn to identify and evaluate business opportunities, develop a business plan, and ultimately launch a successful venture. Besides, it helps students develop a deeper understanding of the entrepreneurial process and the challenges they are likely to face as entrepreneurs. It also helps students develop the ability to think critically, communicate effectively, and work collaboratively – all of which are critical skills for success as an entrepreneur.

In this document, the background and concept of CBL has been presented, followed by an examination of the specific benefits it can provide for entrepreneurs. The various ways in which CBL can be effectively implemented in an entrepreneurial setting has also been explored. Furthermore, the potential of CBL to support the development of entrepreneurial mindset and skills has been examined.

The challenge-based learning approach follows a specific structure consisting of **three main steps: the Big Idea, the process of developing solutions, and implementation and evaluation**. These three steps have been elaborated alongside the overall concept and benefits of CBL, offering concrete suggestions on how to successfully apply this innovative approach.

In conclusion, challenge-based learning is an effective pedagogical approach for teaching entrepreneurs the skills they need to succeed in the business world. Programs that incorporate CBL can help students develop the creativity, innovation, and problem-solving abilities that are essential for success as an entrepreneur. Additionally, CBL helps students develop the skills needed to identify and evaluate business opportunities, develop a business plan, and ultimately launch a successful venture. Furthermore, CBL provides students with valuable hands-on experience, allowing them to apply their knowledge and skills in real-world settings, and develop critical thinking, communication and teamwork skills, all of which are essential for the success of any entrepreneur.



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