TRAINING GUIDE

Using Problem Based Learning

begin blockchain

enabling new growth for sme's

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CONTENT

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DISCLAIMER

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ABOUT THIS DOCUMENT

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Problem-based learning (PBL) *is a student-centered instructional design method in which students learn through the experience of solving an open-ended problem found in some departure material. The PBL process does not focus on problem solving with a defined solution, but it allows for the development of other desirable skills and attributes. This includes knowledge acquisition, enhanced group collaboration and communication.*

BEGIN embraces PBL as the instructional approach, combined with the Lean Startup methodology for the development of businesses and products. Lean Startup aims at shortening development cycles and rapidly discover if there is a viable business model. Essentially, students that have been previously trained in the Lean Startup method and associated tools (es the popular Business Model Canvas) take a business idea as the problem for a PBL cycle. This requires that the tutor has a previous knowledge of initial business ideas, or even propose them to students, so that she can assess if the problem is adequate.

Due to the inherent complexity of blockchain-based business models, both at a technical and at a business level, specific guidance is provided so that the PBL training guarantees that the students are able to grasp the core technical knowledge required, and understand that decentralization poses challenges to finding business models, since those typically depart from traditional, “centralized” business models, in which business owners control key resources. The realm of decentralization is in itself a challenge to traditional business models, which requires a change in how students identify competitive edges.

ABOUT PROBLEM-BASED LEARNING (PBL)

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A SHORT HISTORY OF PBL

***PBL process** was pioneered by **Barrows and Tamblyn** as an innovative approach for a newly created medical school program at McMaster University, graduating its first class in 1972. This was followed by other PBL curricular approaches in Michigan, Maastricht (the Netherlands) and Newcastle (Australia) in the early 1970s, and then in other medical schools around the globe in the eighties*

The new educational s a reaction to claimed student dissatisfaction with the amount of information to be absorbed and their perception that part of it was not relevant to clinical practice. As a contrast, students were highly motivated to working with patients and solving problems during residency. PBL has developed as a whole curriculum approach in many medical schools, and less frequently in other disciplines. It has also been applied to concrete curricular units as single courses, whilst its origins are in a common approach to an entire curriculum. While the superiority of PBL to traditional approaches is still open, there is evidence that it enhances social skills and problem solving abilities, which are important in many disciplines.

CORE ELEMENTS

The core elements of PBL can be summarized in the points in the following Table, that should be understood as the fundamental, essential elements of PBL rather than a definition of a single methods of instruction.

01 PROBLEMS ARE VEHICLES FOR D EVELOPING PROBLEM-SOLVING SKILLS

This requires presenting the problem as closely as possible as it appears in the real world. Problems are thus open to a certain extent, and in most cases do not have a single or a clearly best solution.

02 PROBLEMS ARE THE ORGANIZING FOCUS FOR THE LEARNING ACTIVITY

In PBL, there is not a pre-established curriculum to be covered, but learning progresses as it is required by solving the problem. In consequence, the problems must incorporate and integrate diverse elements when prepared by the instructor.

03 LEARNING IS STUDENT-CENTERED

Students must take responsibility of their own learning with the guidance of a tutor. Concretely, they must identify what they need to know, where to get the information to solve these needs and evaluate if they managed to advance in that knowledge.

04 LEARNING OCCURS IN SMALL GROUPS

Student groups should be small so that they have the chance to collaborate intensely with the rest of the group. They have organize themselves, and collaboratively decide how responsibilities are split among them to progress in the learning process.

05 NEW INFORMATION IS ACQUIRED THROUGH SELF-DIRECTED LEARNING

Students work together, discussing, comparing, reviewing, and debating what they have learned, as they would do in the real world. They may in some cases ask experts outside of the teaching activity for advice, but not fall back to asking the tutor for direct guidance, there is not an “expert role” as a guaranteed resource for the students.

06 TEACHERS ARE FACILITATORS OR GUIDES

The tutor does not give lectures, or tell the students what they should study. The tutor asks students the kinds of questions that they should be asking themselves to better understand and manage the problem when needed (i.e. if this does not take place among the students themselves). This eventually may require some clues if the group is not progressing adequately, but it is important that the tutor does not fall back to the traditional role of guiding the study.

DESIGNING PBL TRAININGS IN BEGIN

04

01 Understand the overall aims, process and sequencing

02 Tailoring the training path

03 Planning for the experience

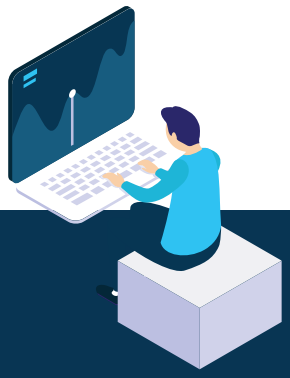
01 Understand the overall aims, process and sequencing

The overall aims, competencies, learning outcomes and related process and sequencing are described in the curriculum guide.

Before designing a BEGIN PBL, the trainer should get acquainted with those and have an overall overview of the process.

PBL is largely open and flexible for students since it relies on student-directed selection of learning goals towards "solving" the problem. However, in our case, the problems are of a single class: developing a business or project using the Lean Canvas method. In consequence, the stages or steps

02 Tailoring the training path



Not all the groups of students are expected to be the same and have the same background. This requires an initial phase of tailoring the training path.

Check that your students have the following pre-requisites:

- They understand the Lean Startup philosophy and master the business canvas. If they do not have these skills, you have to plan for a "pre-course" about them.
- They have an intermediate level of digital skills, concretely: search in the Internet, and be able to critically assess the quality of on-line resources.

In addition, each of the stages are supplemented with a **"PBL resource".** Those resources contain:

- Guidance to the students to conduct their PBL sessions and decision criteria to move to the next stage or iterate.
- Example resources that can be used in the discussion (but are not mandatory).
- Additional notes and guidance for the trainers.

The first three steps in preparing the training for the trainer side are the following:

Know your students

- Assess the level of previous knowledge of the students about blockchain. There are three categories sketched in the curriculum guide: basic, intermediate and advanced.
- Also, the student groups are assumed to enter the training with an initial Lean Canvas yet sketched. You have to understand and analyze those before moving to the next preparation step.

Prepare and tailor the PBL resources

- Each PBL resource comes with notes for trainers. You must remove those notes, make sure you understand the guidance provided, and tailor and make the resources more appropriate to each particular project and student group. In some cases, this may involve simplification, in others including additional elements or resources that are specific to the business ideas already expressed in the canvases.

Decide on the inclusion of optional stages

- The curriculum has optional parts, you have to decide if including them or not.

After the preparation phase, the resources and path should be completed, and the trainer would have a clear picture of the groups of students and their projects. Equipped with this knowledge, the training experience can be planned.

03 Planning for the Experience

The **knowledge obtained** described above will help in determining an **estimated amount of time devoted for the experience**. Take into account that the time to be devoted is estimated as student effort, typically including the following elements:

- Actual time in PBL meetings, with discussion among the group and eventual participation of the training.
- Time of self-directed study between consecutive meetings.
- Time of final presentation or if needed some preparatory meeting to explain the process

Just as a rough example estimation, if a group goes through 4 stages with only one meeting per stage, and an average duration of 2 hours per meeting, and time of self-directed study of 4 hours between sessions, we may end up with roughly 1 ECTS. The scheduling of the sessions then can be determined considering a range of more optimistic to more pessimistic duration, or fixing a maximum of sessions considering time of independent study

Check that your plan for the experience is clearly defined and adequate to the objectives and group :

- The training has a clear start and end date, and an explicitly stated estimations of hours to be devoted by students.
- The mechanisms, frequency and dates of the interaction of the tutor are clearly specified.
- You have developed the resources.

Once the objectives and scheduling are set, the last step before starting is instructing the students in the mechanics of PBL.

Check that the following is clear to the students before starting:

- They understand the dynamics and responsibilities of PBL.
- They understand that the learning objectives are to be set by the group, and assigned to particular members, splitting the tasks, so that cooperative learning trakes place.

GUIDANCE FOR SCAFFOLDING AND TRACKING STUDENT PROGRESS

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01 Progress and the testing of the business idea

02 Deciding on the level of scaffolding and content input

03 Tracking progress regularly

01 Progress and the testing of the business idea

Ideally in **PBL student groups** are able to ask questions or get input from a **real stakeholder for the problem to be solved**. In entrepreneurial education, this fits in the idea that a business canvas is to be tested against customers, which may validate or invalidate the assumptions in the business model.

Integrate if possible real potential stakeholders or users in the progress of the training, so that the assumptions are validated. If this is not feasible, plan for alternative ways of validating with experts

In any case, the validation of the business idea and eventual pivoting needs to be a major decision criteria in the progress of the PBL.

02 Deciding on the level of scaffolding and content input

Since the **level of knowledge of blockchain technologies** and uses may be diverse, the level of **scaffolding may be adapted if the group does not have sufficient progress**, which will most likely be evident in the first sessions.

03 Tracking progress regularly

PBL inherently progresses though a series of meetings in which the **group sets its objectives**. This is the best way of tracking progress and constant monitoring, with the tutor intervening but not biasing the meetings.

Create a map of concepts that each group will need to master depending on their business domain, scope and ambition. That map will serve as a guide for the tutor to check progress.

Note that in PBL the focus is not on memorizing concepts, but on acquiring problem-solving skills, so this map of concepts should not be considered as the learning outcomes of the training, but rather as a set of pre-conditions for them to find their way in solving the problem.

GUIDANCE FOR STUDENT EVALUATION

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01 Meeting Records and Responsibilities

02 Peer Assessment

03 Combining Individual and Group Assessment

04 Pre- and post- evaluations

01 Meeting Records and Responsibilities

In PBL, student meetings are central for learning. Typically, sessions have detailed meetings of the elements discussed or discovered, and these minutes include the learning objectives for the next meeting, with a concrete assignment of responsibilities to individual students. In consequence, the contribution of each student can be tracked and examined from those meetings and their minutes.

Check that the minutes of the meetings are of sufficient quality and detail to allow for an evaluation of the contribution of individual students.

02 Peer Assessment

Note that in **PBL the focus is not on memorizing concepts**, but on acquiring problem-solving skills, so this map of concepts should not be considered as the learning outcomes of the training, but rather as a set of pre-conditions for them to find their way in solving the problem.

03 Combining individual and group assessment

Ideally, the evaluation would combine individual and group elements. The overall "final pitch" would be the main criteria for the evaluation of the work of the whole group, where the "solution" to the problem incorporates all the previous contributions. But it should be combined with a degree of individual evaluation.

Make sure that the students understand how they are going to be evaluated before the PBL starts, and design a detailed rubric with the expectations of the work and level of understanding that should be achieved.

04 Pre- and post- evaluations

Another way to approach evaluation would be a pre/post approach if we aim at measuring progress rather than the overall quality of the work done. In this case, there should be some kind of test before starting the process, or an initial assessment of the input canvas. Then, the progress can be measured by having another test at the end, or comparing the initial and final canvases. This can be done both at individual and group levels

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