

Abstract

In order to innovate study processes, teachers – be it because of bottom-up or top-down reasons – implement new learning methods, such as Challenge-based learning (CBL), and since the beginning of the global pandemic, it is often done in the distance mode. Since CBL is a relatively new study method, research on its implementation, especially in distance mode, is still scarce. The poster presents a part of the results of a study on teachers' activities when implementing Challenge-based learning in distance mode at eight ECIU alliance universities, namely, Kaunas University of Technology (KTU, Lithuania), University of Aveiro (UA, Portugal), Hamburg University of Technology (TUHH, Germany), University of Stavanger (UIS, Norway), Autonomous University of Barcelona (UAB, Spain), Dublin City University (DCU, Ireland), University of Twente (UT, Netherlands), and INSA Toulouse (INSA, France).

BACKGROUND

The available publications on CBL acknowledge that there is still no one fully established system on how to implement the method, and in general, it offers quite a lot of flexibility. During the pandemic, the ECIU alliance, with the help of distance learning technologies as well as available infrastructure and resources, piloted its CBL methodology. The reasons for why certain teachers at the ECIU's Higher Education Institutions (HEIs) implemented CBL can be seen in the code matrix (Fig. 1).

Reasons for CBL/HEIs	UAB	TUHH	UIS	DCU	INSA	KTU	UT	UA	SUM
Multiple reasons	2	0	0	1	0	1	2	4	10
Teachers seeking to try something new	1	0	0	1	1	1	2	2	8
Teachers open to trying something new	0	2	0	0	0	4	3	2	11
Top-down reasons	0	0	1	1	0	7	3	15	27
Compatible with working style	1	0	0	0	0	0	0	0	1
Developing a new methodology	0	0	0	0	0	0	1	0	1
Advancing in career	0	0	2	0	0	0	2	1	5
Getting involved in the ECIU project	0	1	2	1	0	0	1	3	8
Being part of formal groups	0	1	0	0	0	0	1	1	3
Heard from colleagues	0	3	1	2	1	1	0	1	9

Fig. 1. Code matrix representing reasons why interviewees chose CBL

As is highlighted in the existing scientific discourse on regular vs emergency distance learning, there is too little attention to how teachers implement various methods and modes of learning, how and what they adapt, how learning design is created, and what does (not) work in such mode of learning. At the time of conducting the present study, there are no scientific publications available where the focus is on the teacher and how they organize the implementation of CBL in distance mode. Therefore, the scientific research problem that is addressed in the present study is teachers' activities when implementing CBL method in distance mode.

WHAT CHANGES IN THE CURRICULUM DOES CBL IMPLEMENTATION ENTAIL?

The aim of the study is to analyze the implementation processes of CBL at different Higher Education Institutions across the ECIU alliance, in the context of distance learning. The poster presents a fraction of the results, focusing on the unplanned changes and most prominent activities that teachers had to engage in during CBL implementation.

Teachers had to introduce unplanned changes to the curriculum mostly in the first stage of CBL, namely, Engage (Fig. 4).

They mostly had to change the timeline and outsource different content and experts to support the students in the process of solving the challenge(s).

Unplanned changes while implementing CBL	Engage	Investigate	Act
Content incl. more teachers and trainers	7	4	5
Communication	1	0	0
Pedagogy	1	1	1
Changing technologies	1	1	1
Supervision	3	2	3
Teamwork	1	1	1
Adding more classes/seminars/meetings	3	2	2
Assignments	1	1	1
Workload	3	2	2
Assessment	2	2	1
Adapting tools to make the solution	2	2	1
Following the plan	1	0	0
Process and its timeline	12	7	7
SUM	38	25	25

Fig. 4. Code matrix representing reasons why interviewees chose CBL

Conclusion

Surprisingly, the context of distance mode did not affect the implementation of CBL in any significant way. Teachers did have to provide technical support to their students and stakeholders, but the biggest effort was required in adapting the curriculum to address the issues as they appeared, usually rather unexpectedly.

Teachers mostly had to introduce changes directed at both, individual student(s) and group(s) during the initial stage of CBL, since it includes the highest level of uncertainty, because of which students need more time to ease into teamwork, make decisions, accept the responsibility, and deliver the number of assignments on time.

Implementing CBL requires teachers to take up new roles and responsibilities as well. Instead of knowledge-providers, teachers become process managers, guides and mentors, and they must show their leadership as well as collaboration skills. The latter calls for the educational managers to rethink how their teachers are trained and how to better support them in accepting the new roles and responsibilities in student-centered study methods.

CHALLENGE-BASED LEARNING

CBL is an improved form of the widely known Problem-based learning (PBL) that focuses on a problem that is realistic, open-ended, and complex [1]. Unlike other methods, CBL focuses on sustainability issues and does not contain pre-defined challenges related to them [2]. Moreover, in CBL, students focus on real-life situations, not on fictional cases [3].

CBL entails three stages, namely, Engage, Investigate, and Act, all of which include smaller steps that depending on the scope of the challenge, unexpected barriers or other reasons, might be excluded (Fig. 2). More details about the method and its success stories can be found at www.eciu.eu.

After coding the data with MAXQDA software, a map that represents code co-occurrence according to their proximity was created (Fig. 2). As can be seen from the figure, the interviewees mention the three phases and their steps in a rather balanced manner, albeit most of the attention is directed towards the first two phases of implementing CBL.

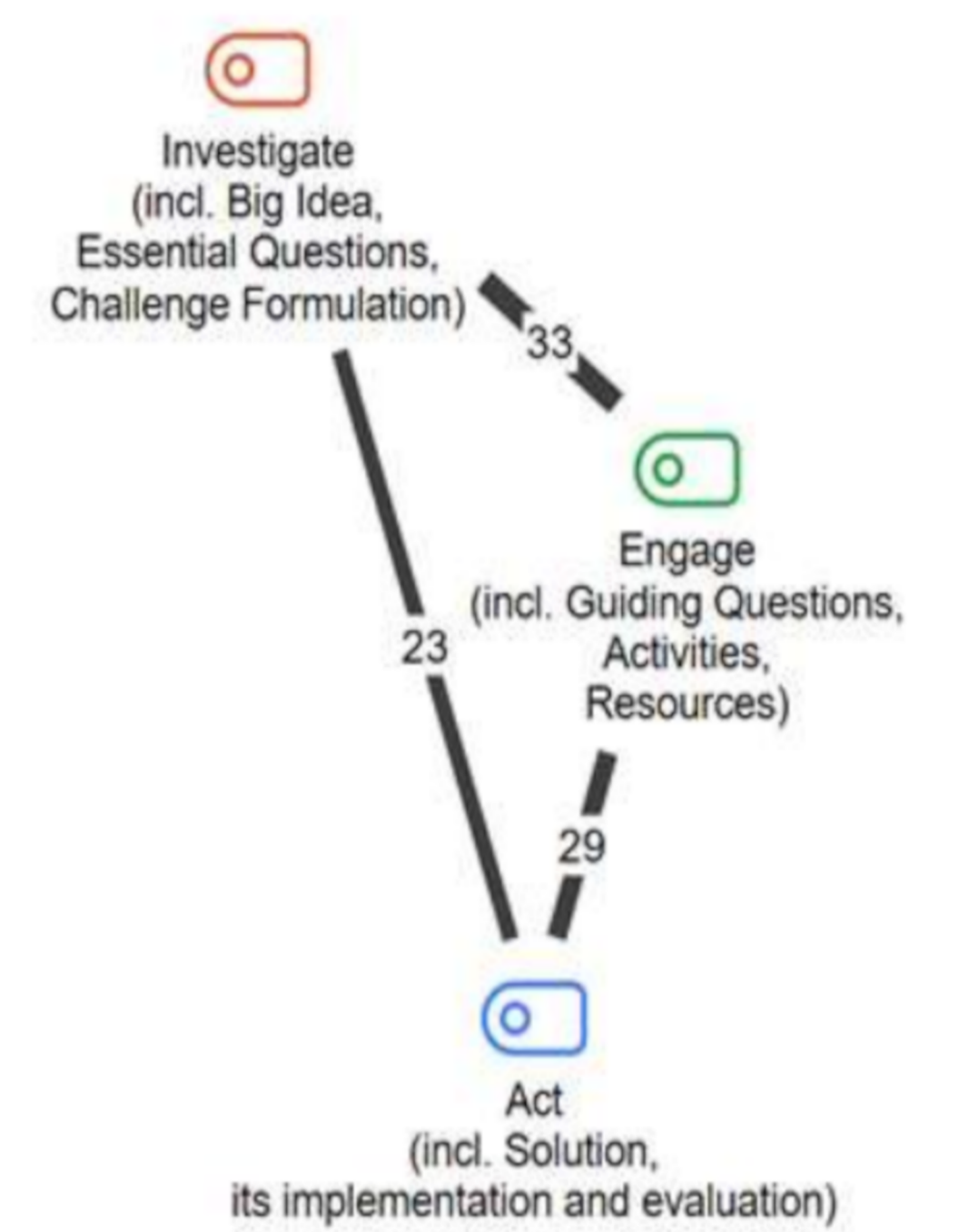


Fig. 2. Code co-occurrence map according to proximity, based on the CBL phases

METHODOLOGY

The present study is based on qualitative research methodology, more specifically, case analysis. The data set consists of 17 qualitative retrospective semi-structured interviews that allow to identify what activities were performed in order to implement CBL in distance mode at different ECIU alliance members (Fig. 3).

The research instrument, namely, the semi-structured interview questionnaire is based on [4], [5] and [6]. The interviews were conducted via the communication platform Microsoft teams. The transcripts were coded with the qualitative and mixed methods research software MAXQDA.

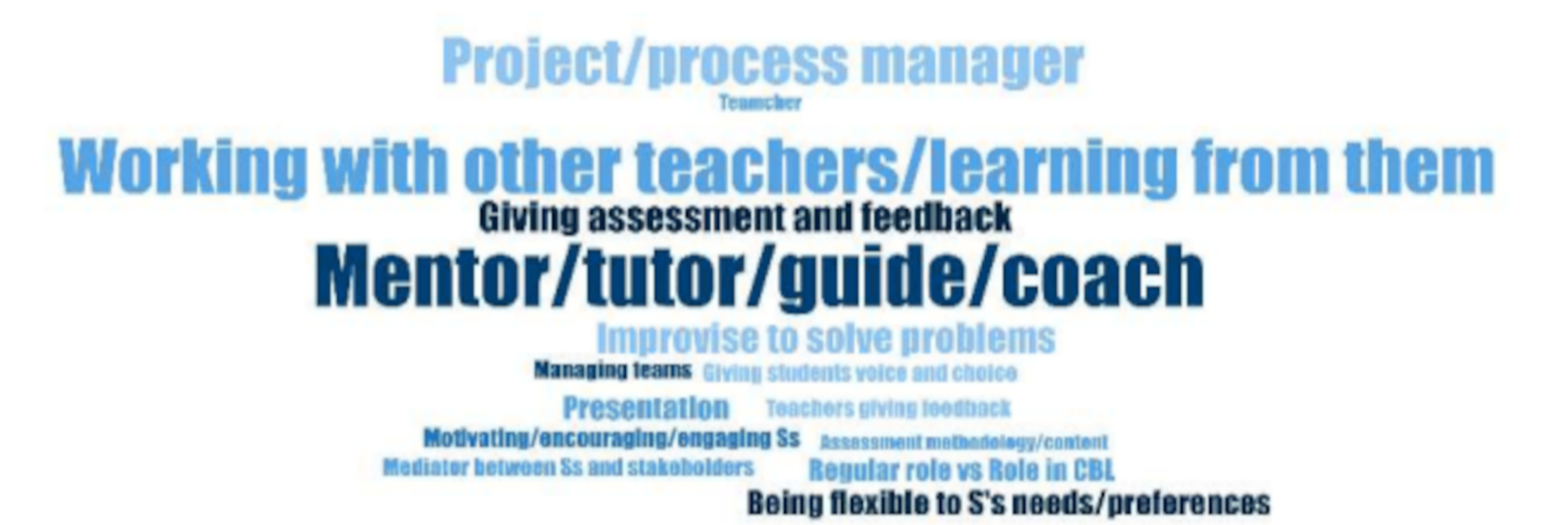


Fig. 3. Code cloud of 15 most frequent codes under code cluster 'Teacher's activity'

ENGAGE

Teachers' most prominent role(s) and activities

- + **CURRICULUM DESIGN.** Designing, redesigning, and transforming the curriculum to strengthen students' technical and non-technical skills and competences.
- + **TRANSPARENT PEDAGOGY.** Introducing students and stakeholders to Challenge-based learning pedagogy and learning process.
- + **TEAMWORK.** Teambuilding and monitoring team dynamics.
- + **COLLABORATION.** Acting as a team member, (co-)learner, and collaborating with other teachers, connecting stakeholders and students.

INVESTIGATE

Teachers' most prominent role(s) and activities

- + **SOLVING PROBLEMS.** Addressing various problems and finding effective solutions.
- + **TIME-KEEPING.** Making sure that the milestones are achieved on time.
- + **GUIDING, ADVISING, MENTORING, AND COACHING.** Assuming new roles in the teaching and learning process.
- + **TECHNICAL SUPPORT.** Enabling students and stakeholders to use the necessary technologies and infrastructure.
- + **MOTIVATION AND ENGAGEMENT.** Finding ways to engage and motivate students, experts, stakeholders, etc.
- + **MANAGING EXPECTATIONS.** Understanding what all involved parties expect from the experience, its process, and challenge solution.

ACT

Teachers' most prominent role(s) and activities

- + **MEDIATION.** Mediating between students and stakeholders.
- + **LEADERSHIP.** Taking an active role to involve stakeholders, provide students with the necessary resources and infrastructure to build the solution, invite experts to (assess) final solutions.
- + **FEEDBACK.** Providing and organizing feedback in various formats.
- + **ASSESSMENT.** Establishing new assessment criteria and rubrics, organizing different types of assessment.
- + **CURRICULUM REDESIGN.** Redesigning the curriculum after the students' feedback and personal reflection (for future implementation).

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