A3.3, O5: Review Challenge-Based Learning and Teacher Support in Pilot 1

Beneficiaries

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- Kaunas University of Technology, Lithuania
- Linköping University, Sweden
- Tampereen Korkeakoulusäätiö sr, Finland
- Hamburg University of Technology, Germany
- Universidade de Aveiro, Portugal
- Universitat Autonoma de Barcelona, Spain
- University of Stavanger, Norway
- Universita degli Studi di Trento, Italy
- University of Twente, The Netherlands

Abstract

The long-term goal of activity 3.3 in WP 3 is to develop and harmonize educational offerings, structures and policies at the member universities to optimally facilitate Challenge-Based Learning and create a European educational network for all stakeholders involved.

This is the first deliverable report out of three for activity 3.3.5 in WP 3.3. Objective of this report is to summarize and review Challenge-Based Learning and Teacher Support in general as well as within Innovation of Education Labs (IEL) in autumn/winter term 2020/21. All data reported here account to time period November 2019 to April 2021 while the first round of Challenges was running from September 2020 to February 2021. The review and evaluation run from February to May 2021. Since October 2020, all partners of the alliance had set up an Innovation of Education Lab (IEL) as reported in Deliverable Report 3.3.1. (Ellinger and Brose, 2020). Most chosen form of 'initialization' of the IEL were webpages providing information.

We conducted five explorative expert group interviews. Main objective was to identify factors that affect – i.e. support or hinder – the implementation of Challenge-Based Learning (CBL). In addition, the best practice presentation from workshop Basic Principles in January 27th were analysed regarding experiences with facilitating and/or restraining factors. Based on that as well as on publications addressing factors that affect – i.e. support or hinder – the implementation of Research-Based Learning, a survey was set to enrich the picture with some quantitative data.

In summary, based on qualitative and quantitative data we did not identify a single factor being significantly more crucial than the others. Instead a wide range of factors that can be said to support or hamper the implementation of CBL were identified. Those include culture (points of view and policies of the involved parties), rules and structures, personal resources and attitude, working conditions, academic staff/colleagues, as well as student attitudes and competences.

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Symbols, abbreviations and acronyms

AAU   Aalborg University, Denmark

CBL   Challenge-Based Learning

DCU   Dublin City University, Ireland

EC   European Commission

ECIU   European Consortium of Innovative Universities

IEL   Innovation of Education Lab

INSA   Institut National des Sciences Appliquées, France

KTU   Kaunas University of Technology, Lithuania

LiU   Linköping University, Sweden

PBL   Problem Based Learning

PjBL   Project Based Learning

TAU   Tampere University, Finland

TUHH   Hamburg University of Technology, Germany

UA   Universidade de Aveiro, Portugal

UAB   Universitat Autonoma de Barcelona, Spain

UiS   University of Stavanger, Norway

UNITN   Università degli Studi di Trento, Italy

UT   University of Twente, Netherlands

1   Introduction

The long-term goal of activities in activity 3.3 (WP 3) is to **develop and harmonize educational offerings, structures and policies** at the member universities to optimally **facilitate Challenge-Based Learning (CBL)** and create a European **educational network** for all stakeholders involved.

The first focus of activity 3.3 of work package 3 is to set up and implement training and support for teachers to guide the teams working on Challenges.

The second focus is to identify structural and cultural obstacles that limits facilitation of Challenge-Based Education. This will be accomplished through a mix of surveys, workshops and interviews.

The third focus of activity 3.3 is to analyse the pedagogy and to come up with an Innovation of Education Roadmap, which is a Deliverable Report on its own with due date at the end of the funding period and not addressed here.

Innovation of Education Labs (IEL) were defined through the activities they are providing or enabling teacher support. Initially, activities in which teachers, ECIU staff and learners meet each other, discuss, share ideas and solutions as well as getting access to resources (e.g. equipment for Design Thinking sessions or Lego® Serious Play, 3-D printer or CAD-software) were kept in mind. To facilitate Challenge-Based Learning on-site workshops and supervision were scheduled. To review experiences of CBL a research design with site-visits and multiple interviews were planned. The pandemic situation, especially the second and third wave running through Europe, withdrew most of the planning for activities and research design and tumbled timelines. Workshops as well as supervision of teaching sessions were conducted as video conferences, site visits were replaced be interviews in the format of video conferences and anonymous online-surveys. Innovation of Education Labs started mostly as virtual spaces. In summary, all activities to develop and harmonize educational offerings, structures and policies at the member universities to optimally facilitate Challenge-Based Learning and create a European educational network for all stakeholders involved ran in parallel with emergency remote teaching (e.g. for DCU Keogh 2021 and for TUHH Ladwig *et al.*, 2020).

2   Objectives

This is the first deliverable report out of three for activity 3.3's fifth output in WP 3. Objective of this report is to summarize and review Challenge-Based Learning and Teacher Support in general as well as within Innovation of Education Labs in autumn/winter term 2020/21. All data reported here account to time period November 2019 to April 2021 while the first round of Challenges was running from September 2020 to February 2021. The review and evaluation run from February to May 2021.

To extract experiences from the first round of Challenges, expert interviews out of five CBL teaching projects were conducted. Their results are the base of a teacher survey. Preliminary qualitative and quantitative data from in this report were also part of deliverable report 8.1.5 (Pajarre 2021) and were used together with first data from pilot 2 for a workshop titled "Review CBL in pilot 1" on May 20th 2021. Altogether, the joint activities of WP3.2 and WP3.3 aim to identify, review and summarizes best and bad practices, as well as institutional and other hurdles in the implementation of CBL as a pedagogical approach as displayed in Figure 1.

Chapter 3.1 summarizes how Teacher Training started in first pilot phase in Innovation of Education Labs. In Chapter 3.2 data collected to review first round of Challenges are presented. Interview guideline and survey structure are attached (attachment 1 and 2).
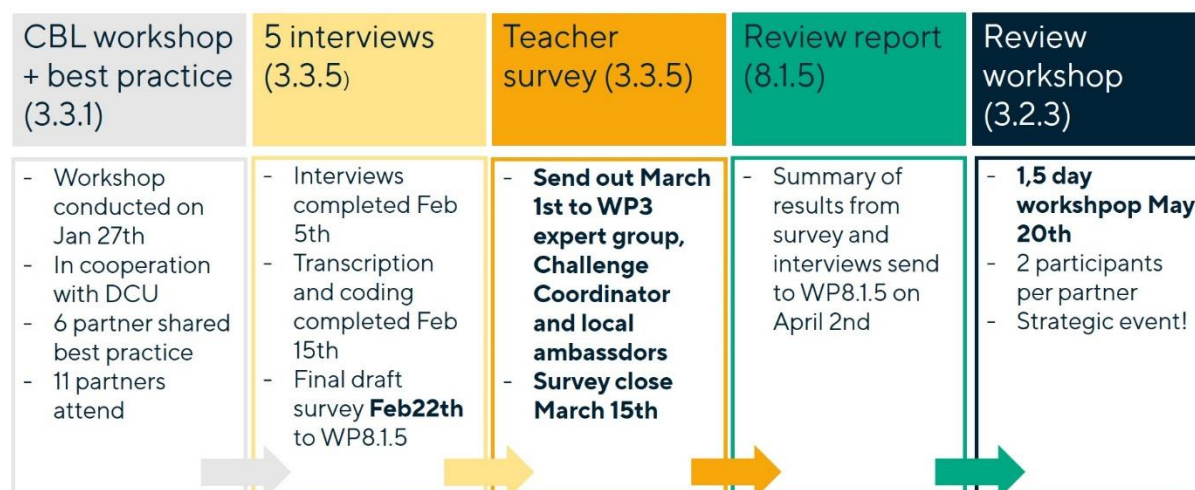
Figure 1: Design to Review CBL implementation in pilot 1

3   Results on reviewing Challenge-Based Learning and Teacher Support in Pilot 1

3.1   Teacher training getting started in Innovation of Education Labs

In October 2020, all partners of the alliance had set up an Innovation of Education Lab (IEL) as reported in deliverable report 3.3.1. (Ellinger and Brose, 2020). Most chosen form of 'initiation' of the IEL were webpages providing information and resources. An overview is provided in Table 1.

Table 1: Websites representing IEL and its activities

	Website URL	**Additional online resources and comments**
AAU	https://www.pbl.aau.dk/?page=1 https://www.learninglab.aau.dk/ https://www.ucpbl.net/	Plus open access courses on a Moodle platform.
DCU	https://www.dcu.ie/teu https://loop.dcu.ie/login/index.php	Central resource for the CBL team is in a Learning Management System (based on a Moodle platform), password needed.
INSA	No website	Course and resources in Moodle, closed to members of INSA, OpenINSA: pedagogical development unit (called ATENA for Lyon or C2iP for Toulouse).
KTU	https://en.ktu.edu/edu_lab/#EDU_Lab https://en.ktu.edu/news/challenge-based-education-will-help-in-the-context-of-low-touch-economy/	Videos about CBL and Challenges https://www.youtube.com/playlist?list=PLaz5QIxmbQoO0J9fGCcX6n6zoESGF2_17
LiU	No website	Consists of several experts on CDIO framework, CBL, Problem- and Project-Based Learning across the disciplines. Also, persons of inGenious - platform are involved.
TAU	https://www.tuni.fi/en/services-and-collaboration/international-tampere-university/challenge-based-learning	
TUHH	https://www2.tuhh.de/zll/cbl-start/ https://eciu.tuhh.de/challenge-based-learning/	

UA	https://www.ua.pt/pt/inovacaopedagogica/challenge-based-learning	https://www.ua.pt/pt/inovacaopedagogica/page/26714 and https://www.ua.pt/pt/inovacaopedagogica/page/25390 and https://www.ua.pt/pt/inovacaopedagogica/incentivo-a-projetos-de-inovacao-pedagogica-edicao-2020
UAB	https://www.uab.cat/web/personal-uab/personal-uab/personal-d-administracio-i-serveis/unitat-de-formacio-i-desenvolupament-professional-1345694527878.html	
UiS	https://www.uis.no/nb/student/lyspaeren-innovasjonshuset-pa-ullandhaug	IEL is integrated in existing structures and offers.
UNITN	A dedicated website is under construction.	https://clabtrento.it/en The UniTrento IEL is collocated in the School of Innovation of the University of Trento.
UT	https://www.utwente.nl/en/ces/celt/toolboxes/Challenge%20Based%20Learning/Challenge%20Based%20Learning/	

Progress in setting up IELs was dependent on already existing structures, resources and frameworks. Some partners did first, tentative steps. Other partner universities, where the IEL is completely established, started offering local online workshops and sharing educational resources within the alliance. Therefore, a mixture of centrally and locally organized workshops in addition to handouts and information resources was offered to all teachers accompanying a Challenge in autumn/winter term 2020/21 as first pilot of ECIU University. Participation of teachers trained in Challenge-Based Learning, mainly to guide the teams working on Challenges in September 2020 – March 2021, is summarized in table 2.

The workshops organized by WP 3.3 as central offers included "Basic Principles in CBL"-Workshops in September 10th and 24th 2020, as described in Deliverable Report 3.3.3 (Ellinger et al., 2021), November 2020 and January 2021 as well as monthly Round Table in CBL starting October 2020. All offers were open to all university members of the alliance interested in Challenge-Based Learning and not restricted to those accompanying students' teams in autumn/winter term 2020/21. This explains the high number of participations in regard to trained teachers, named teamchers since February 2021.

Table 2: Overview of teacher and teamcher training in IEL 09/20-03/21

Partner	Number of Teachers accompanying Challenges in pilot 1[1]	Number of **in IEL trained** Tea(m)chers[1] (11/20-03/21)	Number of participations[2] in **local IEL** workshop,	Number of participations in **centrally organized** workshop,	Sum of participation in workshop, training or coaching

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[1] Starting February 2021 in ECIU project term "teamcher" is used for trained teacher accompanying student teams in a Challenge. Before it was not distinguished between teacher and teamcher. Teachers within the first pilot were trained by central offers or outside ECIU network.

[2] Due to Data Protection Regulations lists with names of participating teachers between locally or centrally offered workshops cannot be aligned to check if one teacher participated in multiple workshops. Therefore, only numbers of participations can be provided.

			training or coaching	training or coaching	
AAU	1	0	9	5	14
DCU	1	1	99	8	107
INSA	2	0	0	14	14
KTU	1	1	97	30	127
LiU	2	0	0	12	12
TAU	2	0	0	3	3
TUHH	5	5	20	11	31
UA	5	5	219	16	235
UAB	7	7	22	2	24
UiS	5	0	100	7	107
UNITN	7	0	103	12	115
UT	13	13	83	8	8
Sum		**32**	**753**	128	**894**

3.2 Review Challenge Based Learning and Teacher Support

In January and February 2021, activity 3.2 and activity 3.3 together (Gesa Mayer, Siska Simon, Dorothea Ellinger) conducted five explorative expert group interviews with a total of 11 participants from four ECIU partner universities (UA, LiU, TAU, TUHH). Main objective was to identify factors that affect – i.e. support or hinder – the implementation of Challenge-Based Learning (CBL). In order to better understand the context that shapes the interview partners' experiences with facilitating and/or restraining factors, interview questions also addressed personal attitudes towards CBL. In addition, the best practice presentation (KTU, TAU, UT, UA, US) from workshop Basic Principles in January, 27th were analyzed regarding experiences with facilitating and/or restraining factors (see Figure 1).

Based on qualitative findings from interviews and best practice presentation as well as on publications addressing factors that affect – i.e. support or hinder – the implementation of Research-Based Learning (Beyerlin et al., 2020, Bulmann et al., 2019 and Feixas et al, 2014), a survey was set to enrich the picture with some quantitative data. The survey was structured into three parts according to three dimensions identified to be relevant for transferring training content into teaching based (Figure 2) on Feixas et al, 2014.

In total 25 people – 3 tutors, 12 teachers, 2 CBL experts, 2 Challenge Coordinators and 6 who did not state their role – from seven partners of the ECIU alliance took part. On this response rate it is not possible to analyse the data in regard to affiliation or role. It has to be kept in mind that the survey addresses CBL as a pedagogical practice but is not limited to CBL experiences related to pilot 1 in ECIU University. Furthermore, due to partial team teaching the 25 respondents do not actually represent 25 different Challenges or CBL settings.
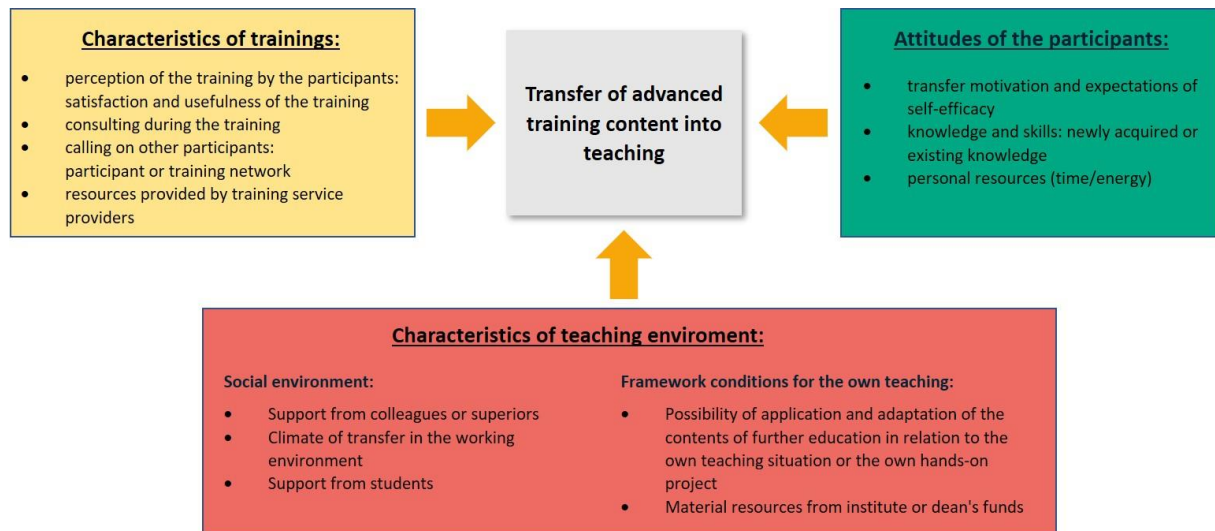
<figure>
Characteristics of trainings:
- perception of the training by the participants: satisfaction and usefulness of the training
- consulting during the training
- calling on other participants: participant or training network
- resources provided by training service providers

Transfer of advanced training content into teaching

Attitudes of the participants:
- transfer motivation and expectations of self-efficacy
- knowledge and skills: newly acquired or existing knowledge
- personal resources (time/energy)

Characteristics of teaching enviroment:

Social environment:
- Support from colleagues or superiors
- Climate of transfer in the working environment
- Support from students

Framework conditions for the own teaching:
- Possibility of application and adaptation of the contents of further education in relation to the own teaching situation or the own hands-on project
- Material resources from institute or dean's funds
</figure>

Figure 2: Dimension identified to be relevant for transferring training content into teaching based on Feixas et al, 2014

3.2.1 Attitudes and personal perspectives

As for their personal approach to CBL, interviewees report a high level of initial intrinsic motivation that led them to start working with CBL. The informants felt CBL could introduce them to a different, up-to-date, and improved way of teaching. Two respondents even praised it as "the future of teaching and learning" (Int 3, B1+2).

In the survey 16 out of 20 totally agreed and 3 partly agreed to the statement "I am interested in new pedagogical practices" (Figure 9, question 2). Also, 16 out of 20 totally agreed and 3 partly agreed to the statement "I was curious about the topic of the challenge." (Figure 9, question 4). Only a minority stated that there has been any kind of incentive to motivate them. Mostly, additional support addressing pedagogical issues of CBL (7 times) or an award to the students for best challenge solution (6 times) were mentioned.

In the interviews, CBL is depicted as being a sophisticated constructivist approach, emphasizing characteristics such as student-centeredness, multi- or cross-disciplinarity, and real-life relevance. In particular, CBL is appreciated for its ability to "let things evolve" (Int 1, B1), encouraging and engaging students to work independently, to construct their knowledge on the basis of their actual interests in non-predefined ways and in "areas where you might not expect it" (Int 1, B1), and thereby fostering "deeper thinking, creativity, and [...] thinking outside of the box" (Int 3, B2). This view is supported by the survey, where CBL is rated as being of high value for students' academic and professional development (Figure 3).

With regards to their implementation practices and their roles therein, our interview partners describe designing and doing CBL as an exciting "experiment" (Int 5, B2) not only for the participating students but also for the teachers themselves, inevitably turning them into learners, too. In relation to the students, teachers try to assume the role of a "guidance person" (Int 3, B1), granting students "much more freedom in all their actions" (Int 5, B2) than traditional learning scenarios do, while at the same time offering support "when they are struggling" (Int 3, B2) and providing tools, methods, and structures that "help to manage the chaos that is supposed to be creative" (Int 5, B2). Depending upon their tasks, profession and self-perception, interviewees also refer to themselves as a "teamcher" or a "challenge coordinator" who is "forming and embedding everything into the ECIU context" (Int 3, B1), or as not actually being involved in teaching but in "train[ing] the facilitators" (Int 1, B2).

Despite the fact that the complexity of the concept and its implementation pose high demands on students as well as on staff (in terms of personal engagement and time investment, acquisition of new and unfamiliar knowledges and skills, negotiation of tasks, duties, and expectations (see Figure 4 in addition), respondents state that all in all, engaging in CBL has been a decidedly rewarding experience

for them. This impression is highly supported by 22 out of 23 survey participants who think that "it has been worthwhile or rewarding to engage within CBL".
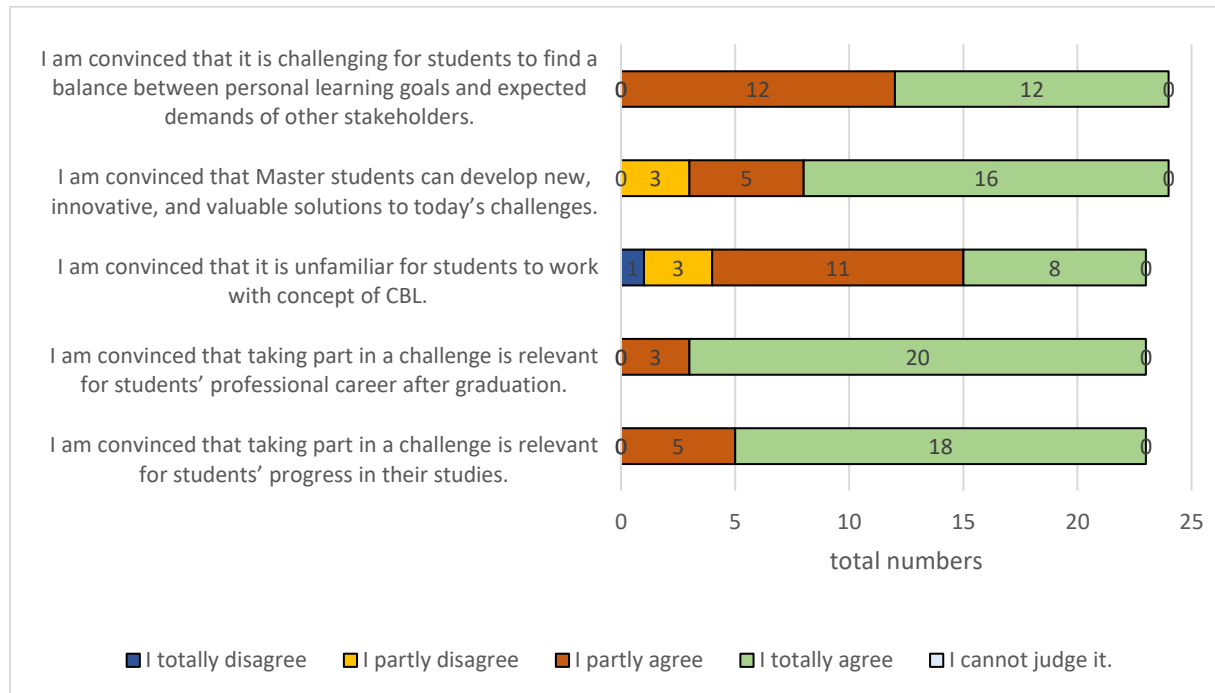

Figure 3: Perspectives on Students in CBL

3.2.2   Affecting factors

Factors that can be said to support or hamper the implementation of CBL include culture (points of view and policies of the involved parties), rules and structures, personal resources and attitude, working conditions, academic staff/colleagues, and student attitudes and competences.

The implementation may be affected in positive or negative ways by the **cultures and agendas of different actors** from within or outside of the university. Looking back to the early days of entering a CBL project some years ago, an interviewee compares the relationship between the "university people" and the project team to "a divorced couple", with the university side strictly insisting on "university goals and the course plans, […] the assignments, all the boring things" (Int 1, B1), while the project part had no sense for those restricting regulations: "The university didn't understand what we are doing" (Int 1, B2) and vice versa. Even though this atmosphere of "fight" (Int 1, B1) and incomprehension has eased since ECIU partner universities have officially committed themselves to include and foster CBL, cross-disciplinarily and the cooperation of academic and non-academic project staff – and the integration of their different knowledges – have not been sufficiently "institutionalized […] yet" (Int 1, B1) in terms of structures and mindsets. Similarly, another interview partner suggests that the notion of what counts as knowledge and the overall **teaching/learning culture** prevailing at Universities of Technology put certain hurdles to the implementation of CBL. Another major issue concerning university culture and regulations is the desired inclusion of students and teachers from ECIU partner universities into joint CBL-projects. Here, some informants report that key administrative prerequisites regarding, for instance, the enrolment and participation of exterior and international students have not been established yet (Int 2, B1). Or, formulated as a wish: "As you know, here we have the consortium of many great universities in the ECIU context and why not open the door and get the credits from other universities and that they can easily be adapted to our course system. That would be very much appreciated at least from my side." (Int 3, B1)
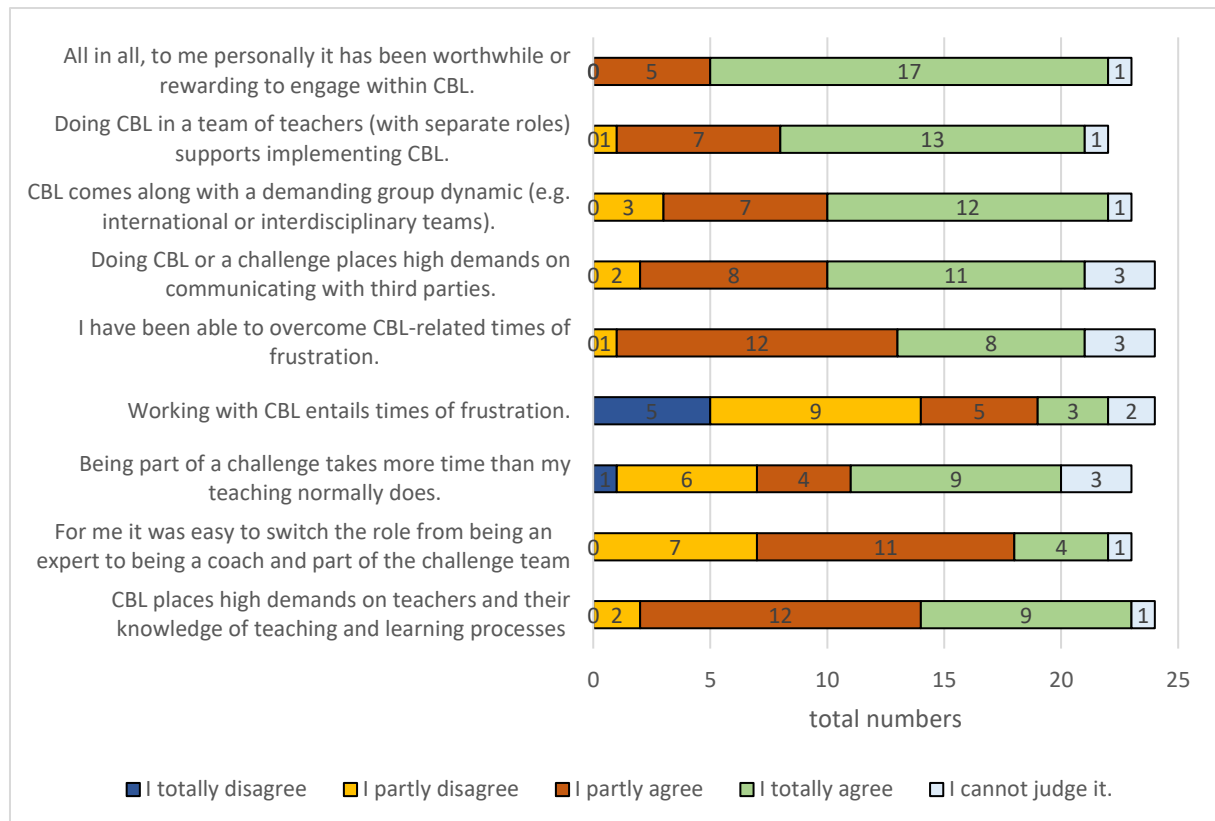
Figure 4: Personal perspective as member of the Challenge Team

In the survey, about half of the teachers (including tutors) agreed (totally or partly) that "Regulations limited the implementation of CBL in my teaching". **Regulations addressing teaching quality management** as well as regulations on learning goals and intended learning outcomes and regulations on assessment were chosen most often as displayed in Figure 5. As expected, based on discussions in WP3 and WP7 meetings in autumn and winter, the regulations on how to enrol as an international student in own university and the guidelines to prevent a Corona infection were often experienced to limit CBL implementation.

According to the interviews, besides from factors that are located within the university, **external stakeholders** play a crucial role. Not all of the described CBL settings involved external partners or challenge providers. However, those who worked with external partners do not only report the difficulty to negotiate one's own and the students' ideas and expectations with those of the external stakeholders, but that too little presence and engagement of the Challenge Provider may disrupt the process, too. As a result, it is recommended that when discussing the implementation of CBL, the relationship with the Challenge Provider should be considered as critical.

In the survey, we asked for more detailed information about how the involvement of different stakeholders was experienced. Results indicate a positive atmosphere. Figure 6 shows that persons involved in the ECIU University project are experienced as being actively supporting, and near colleagues or other members of the institute as well as heads of the universities are conceived of as being either supporting or interested in majority.
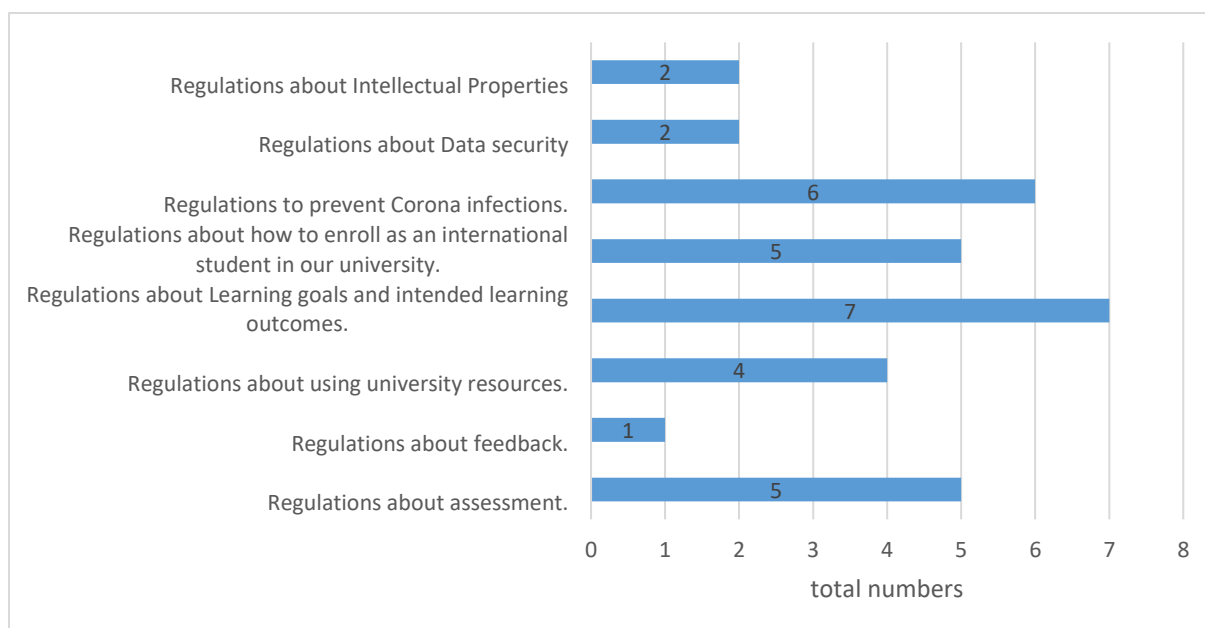
Figure 5: If you chose „I totally agree" or "I partly agree" please state the subject of regulation that limited you. Multiple choice possible

Legend:
- actively supporting
- neutral
- actively against
- interested but not actively supporting
- not interested
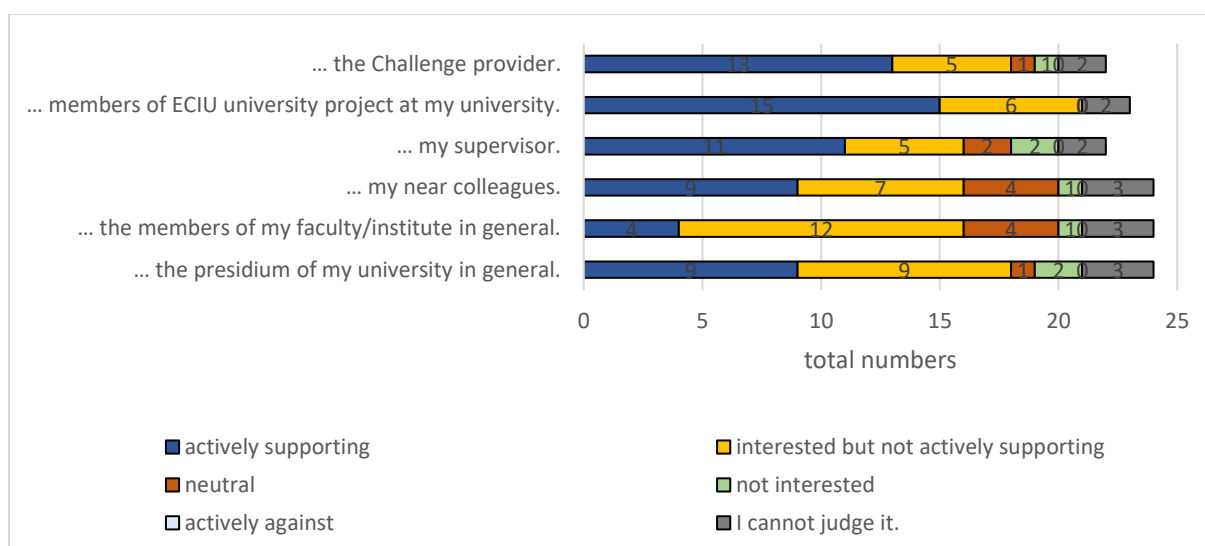- I cannot judge it.

Figure 6: In the survey respondents were asked:" Regarding my tasks in implementing CBL, I experienced the following as…"

Related to culture (approaches and agendas of different actors) but also touching on questions of didactic and **personal resources**, some interviewees report experiences of uncertainty with regards to implementing CBL 'correctly'. For instance, two interview partners went through a "phase of frustration" due to being confronted with **conflicting interests and ideas** of Supervisor, International Office and local CBL expert (Int 2, B1). In the survey, 14 out of 22 disagreed (total or partly) and 8 agreed (total or partly) that "Working with CBL entails times of frustration" (see Figure 4, question 6). Especially those who had not worked with CBL or similar formats before deplore a lack of specifications as well as best practice examples that could give orientation and prepare for the new role that differs from traditional teaching. Given the elusiveness of the concept, respondents call for clearer and more binding definitions and vocabulary (i.e. an agreement on what exactly the word "challenge" refers to), supportive didactic resources like a handbook, the opportunity to formalize and transfer the knowledge they have gained throughout pilot 1 (or previous work) in order to pass it on to those who are going to do follow-ups, and a platform or database where Challenges could be published, thus giving teachers as well as their students more vivid and comprehensive examples of what CBL may actually look like. In contrast, in the

survey only 13 out of 21 agreed (total or partly) that there is lack in informational resources and 12 out of 21 agreed (total or partly) that they felt limited in their implementation due to missing knowledge (Figure 7, questions 8 and 9).

Besides from the readiness to adopt the still unusual concept and (some of) the various roles it requires, interview partners make clear that for teachers, implementing CBL brings along an **extra load of labour** (Int 5, B2). Especially when it comes to supporting and supervising the students, but also with regards to negotiating with the university or the Challenge Provider. Furthermore, setting up the right conditions for extended future implementation (such as training more teachers in CBL or convincing more ECIU-students to take part in CBL) "takes a lot of time and it's time consumption" (Int 1, B2).In our survey, 12 persons agreed (total or partly) that "Regarding my duties, the time required for me to take part in a challenge/ CBL was too much" and 8 disagreed (total or partly) as displayed in Figure 7, question 4.

As stated above, all interviews show a great deal of enthusiasm for CBL. This personal engagement can be seen as a major driving force in implementing it, for obviously they are willing to invest a considerable amount of their time and energy. On the other hand, CBL's complexity and costliness can be an obstacle, for if teachers (and administrative staff) are not ready or able to spend that much time on it, it will hardly be implemented successfully and sustainably.

All factors mentioned in the interviews to hinder implementation were addressed in the survey, too and summarized in Figure 8. For nearly each of them a 50:50 distribution on agreement and disagreement was stated. There is not a single factor to be identified as being significantly more crucial than the others. As long as we have no further data, we should try to overcome all of the aspects experienced to hinder implementation.

Another important factor addressed by our interview partners are their **working conditions**. These are composed of the involved cultures (i.e. the university's and other partners' values and policies; see above), the budget allocated to the projects, available teaching/learning spaces and equipment as well as the number of courses or curricular units and students one has to take care of. In addition, precarious working appointments (e.g. short-term contracts, freelance teaching) may contradict the teachers' ability to further progress into CBL. In times of the **COVID pandemic** the issue of digitalization (available resources, IT infrastructure, personal competences) is also an important factor. Some interview partners who taught an all-online seminar did not experience the necessary physical distance as interfering with the quality of communication and team work. In contrast, two interviewees who held a hybrid course found it hard to address both groups simultaneously and difficult to foster this dialogue within and between the teams due to technical barriers.

The academic staff and colleagues that may support the implementation process are another affecting aspect. All interview partners and three out of five best practice examples have worked in teams or tandems. It was stated: "So we really filled each other's gaps let's say in some aspects, and we guided each other as well" (Int 3, B2). Or, as someone else puts it: "(laughing*) because I had another colleague with me, it was much easier. If I did it myself, alone, I was going crazy. (*)" (Int 5, B1) Not only do teaching partners disburden each other, they may also offer different and complementary kinds of expertise and disciplinary knowledges to the students. Plus, they can help providing the high amount of supervision and that is required to navigate the students through the process and "to pick people up. So if you are to work with this type of course, they might need more personal than an ordinary course." (Int 1, B1). In addition, one interviewee utters the wish to "exchange more time with my colleagues within the university. Or with other universities that are implementing [CBL]" (Int 5, B1), while at the same time admitting that sadly, time for taking part in digital round tables organized by ECIU partners is rare due to working conditions. In the survey two thirds stated they had a **colleague supporting them in team-teaching** or **regular meetings** (Figure 9, questions 7 and 10). Team-teaching was highlighted as an important facilitator in the interviews, too. As indicated in Figure 9, question 1, participants of the survey also experience an actively engaged challenge provider (14 out of 20) as well as access to additional information and support.

Acknowledging that CBL seems to be quite **demanding for students in terms of workload** and in terms of adjusting to an unfamiliar methodology, several interview partners are delighted by their students. They are delighted by their "openness" (Int 3, B2), their genuine interest in and enthusiasm for the subject

and the challenge, but also by their patience and aid: "I think one of the things that helped me was the willingness of the students to learn with us. (laughs) They understand that we are all together in this trying the first approach, because they had a lot of doubts, we had a lot of doubts. So, they helped us to improve the templates, they suggested new things to be done, so in some ways also having their help." (Int 5, B1). Nevertheless, sometimes it seems difficult for students to get "the message from the Challenge-Based Learning" and not to "be that insecure about delivering something wrong or something right or what exactly do we have to do here" (Int 3, B1). This becomes particularly relevant when there are external partners involved, for "all the students always would like to make the Challenge Provider or the project partner […] happy. We said, it is not important to make them happy. It's important that you are happy, what you have done. It was hard and it is still hard for the students to actually change the mindset about that." (Int 1, B2). Of course, students may not be used to the assertion "that they are really free, or more or less free [to do] what they would like to do" (Int 3, B1) if they are bound up with an educational system and a society that measure their achievements in the form of grades and titles (see above: culture).
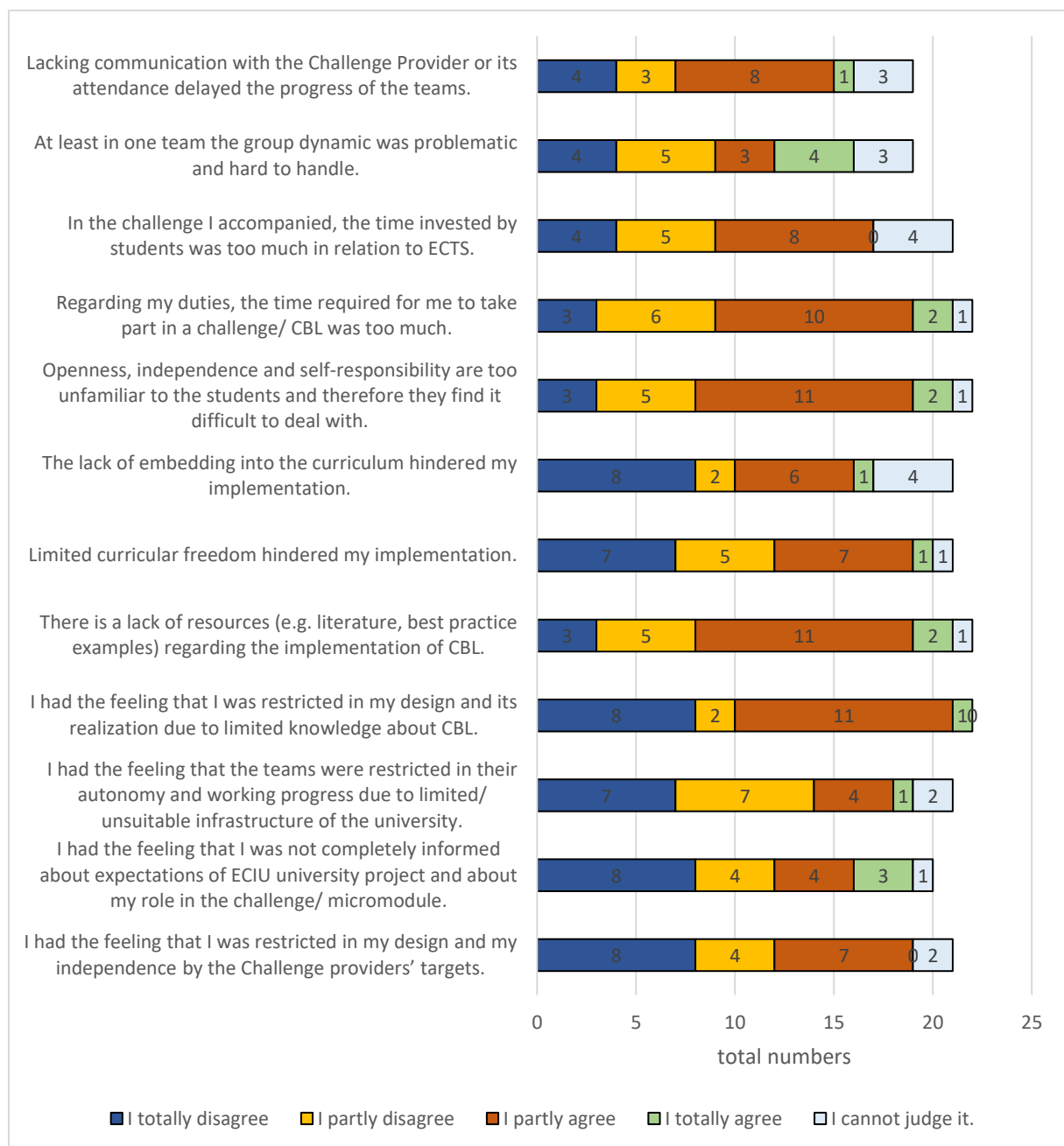
Figure 7: Did you experience the following factors, framework conditions or even circumstances as barriers?

The **engagement of students** is confirmed by the survey, for 100 % of responders either partly or totally agreed to the statement "The students were engaged and actively contributing to the process." Regarding competencies that students may bring along, our interview partners find it helpful for their implementation if the students happen to have participated in similar learning formats before (e.g. Project-Based Learning), if they already have a certain (common) pre-knowledge of the topic, and/or if they are Master's students and thus (expected to be) already trained to work and think independently.
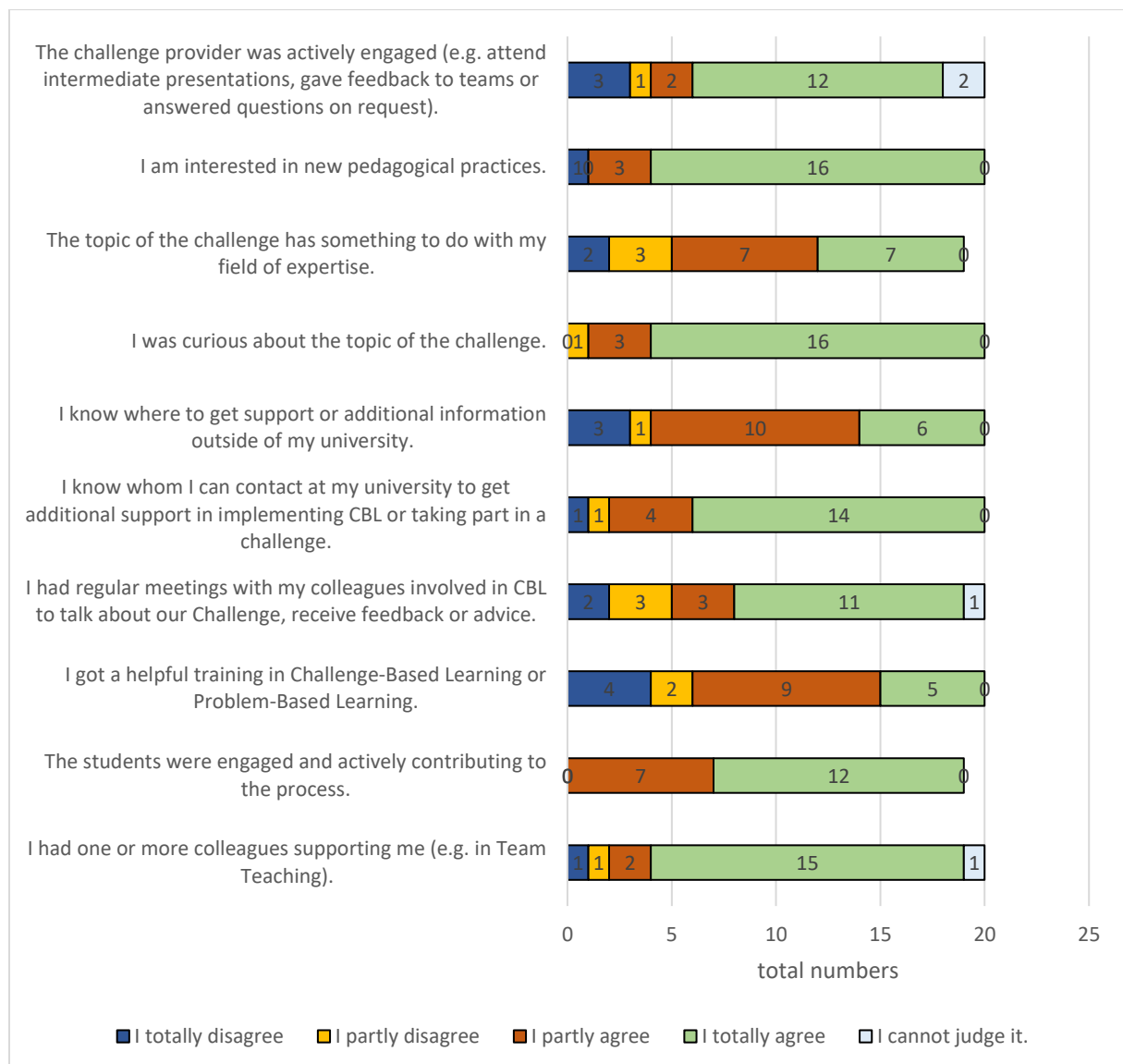

Figure 8: Please share your experience of what factors, framework conditions or circumstances support you in the implementation of CBL/ challenge

4   Summary and Discussion

In summary, based on qualitative and quantitative data we did not identify a single factor being significantly more crucial than the others. Instead a wide range of factors that can be said to support or hamper the implementation of CBL were identified. Those include culture (points of view and policies of the involved parties), rules and structures, personal resources and attitude, working conditions,

academic staff/colleagues, as well as student attitudes and competences. Table 3 summarizes aspects and factors that were mentioned to affect the CBL experience in pilot 1 in a positive or negative manner either in the interview or the survey.

Table 3: Summary of aspects or factors mentioned to be facilitating or hindering CBL and/or its experiences

Aspects or factors mentioned to be facilitating CBL and/or its experiences	Aspects or factors mentioned to be hindering CBL and/or its experiences
High level of intrinsic motivation of teacher and teamcher	Actors within CBL team have a different agenda
Enthusiastic students	ECIU vision is not institutionalized or aligned with university strategy
Expectation of teachers and teamcher doing something valuable for students	Key administrative processes are not fully established
Interest of teacher and teamcher in new pedagogical practices	Challenge Provider is not responsive
Interest in topic of challenge together with feeling prepared for the topic as expert of the field or be educational training	Conflict of interest with Challenge Provider
Incentives for teacher	Limited personal resources in combination with high workload or CBL as extra load of labour
Incentives for students	Missing knowledge about guidelines, best practice or support offers
Team teaching	COVID pandemic situation together with emergency remote teaching
Regular meeting for supervision or discussing CBL practice with educational developer or colleagues doing CBL	Sub-optimal working conditions with precarious working appointments

As long as we have no further data, we should try to overcome at least the most common or, as of our perception now, most crucial aspects experienced to hinder implementation. Especially with regard to tea(m)cher training supportive didactic resources like a handbook, the opportunity to formalize and transfer the knowledge they have gained throughout pilot 1 (or previous work) in order to pass it on to those who are going to do follow-ups, and a platform or database where Challenges could be published were requested. A lot of them are already addressed in Challenges in spring/summer term (pilot 2) starting in February 2021 before reviewing pilot 1 was completed. Some examples are:

- A taskforce 'Assessment 'was set up within activity 3.2 in February of 2021. This taskforce published a handout for assessing and providing feedback on extracurricular Challenges in March of 2021 and for curricular imbedded Challenges in mid of June
- A Teamcher Channel was set up in Microsoft Teams by WP3, which was moderated and equipped with guidelines and materials in April of 2021. It can be used as an instant communication channel of Tea(m)cher for pilot 1 and 2 in addition to monthly Round Table meetings. Recently 49 Tea(m)chers joined the channel. In November of 2021 the ColLab platform (http://collab.web.ua.pt/) is expected to be ready for beta-use and will be launched on February 10th 2022.
- The Challenges database is continuously revised by WP5 based on feedback from operational management team as well as users to give insights into passed and ongoing Challenges. Additionally, in March of 2021 KTU started a video channel in which learners report their Challenges of pilot 1 to inform learners and teachers in pilot 2.
- A Challenge Handbook and glossary also addressing the pedagogical aspects of CBL were publishes by the Operational Challenge Team and Project Management Team in May of 2021.
- A Teamcher toolkit is under currently development within activity 3.1.

All data presented here and all conclusions miss an important perspective: the learners voice. We did not manage to include learners and students in our interviews. Everything addressed here are

descriptions and observations of respondents about learners. To obtain a more complete picture and compile learners' perspectives learners will be included in all surveys of pilot 2.

With regard to Innovation of Education Lab significant changes are expected due to the re-start of campus-life, student and staff mobility as well as on-site teaching and learning in late summer. Because due to the pandemic all data was collected under different circumstances than originally planned as well as envisioned for the project and beyond concrete actions regarding the further development of (among others) Innovation of Education Labs will follow.

5   Outlook

The review of pilot 1 missed the learners' perspective and is based on 25 completely filled out surveys and 5 interviews on a non-representative data set. Nonetheless, the mixed design with best practice description, interviews and online surveys were well chosen and repeated for pilot 2 including the learner's perspective. Figure 9 summarizes the review design for pilot 2 of which data is reported in a second report for deliverable 3.3.5 with due date October 21 (month 24).
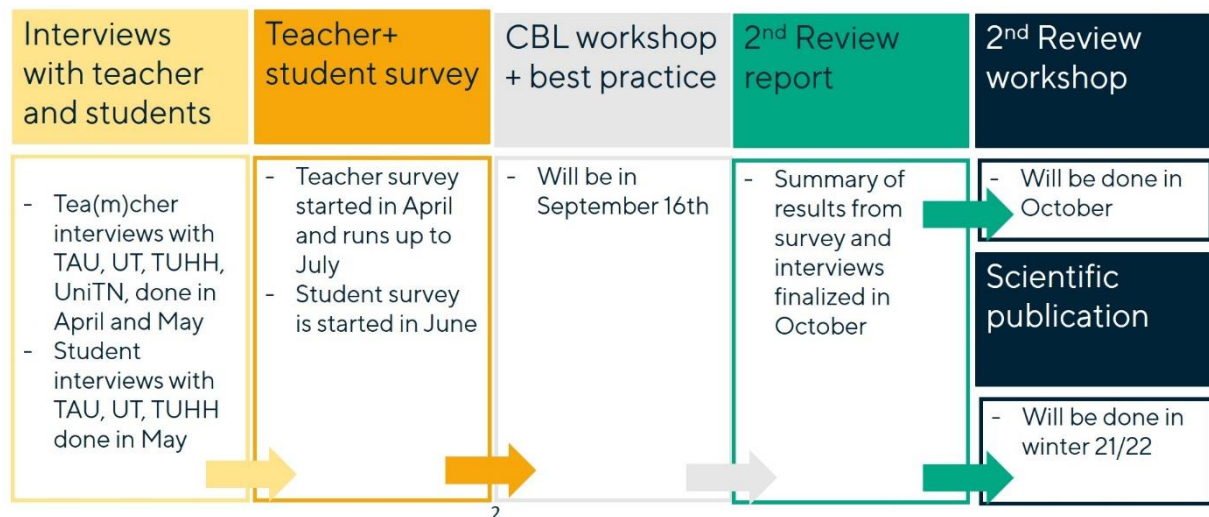

Figure 9: Timeline and review design for pilot 2

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