A3.3, O2: Develop teacher training

Co-funded by the
Erasmus+ Programme
of the European Union

Abstract

The Workpackage 3.3 focuses on the support of teachers on the individual dimension, that is one out of three relevant for educational system transformations. This support includes their knowledge, believes, skills and competences needed to escort teams effectively whilst, working on challenges and to design educational programmes/units tailored to learners in the alliance. In this report, we describe a framework to conduct teacher training. This framework consists of three fundamental concerns. The first one are the factors known to affect the transfer of knowledge into teaching practice (chapter 1.1), subject and about target group considerations (chapter 1.2) as well as special circumstances due to corona pandemic (chapter 1.3). To address these concerns, the following actions were taken:

(1) A **workshop** on basic principles of CBL at ECIU university for teachers and point of contacts as well as coordinators and CBL-Experts to address basic principles of CBL and foster networking (see chapter 2.1)

(2) A **Round Tables** CBL to foster exchange between practitioners, give space to peer feedback as well spreading new information about CBL@ECIU during the term (see chapter 2.2).

(3) Implementing a tandem system at each university **PraxisDUO** for discussing specific issues concerning the own university and the individual teaching and learning environment (see chapter 2.3)

Next to the framework we describe our first experiences with the workshop and first Round Table CBL.

These three elements are meant to function as an example and should be copied and adapted to the needs of each university at each site. This scaffolding system doesn't work on its own. To implement an innovative didactical approach is a long process. It is important that each university helps their teachers having first experience with CBL to stay motivated and to profit from each other's lessons learned. Once Corona pandemic is over all the elements suggested here have to revised since all of them are online based now.

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Symbols, abbreviations and acronyms

CBL	Challenge-based learning
ECIU	European Consortium of Innovative Universities
IEL	Innovation of education labs
INSA	Institut National des Sciences Appliquées, France
UiS	University of Stavanger, Norway
UT	University of Twente, Netherlands

1 Introduction

It takes time and effort to implement a new and innovate didactical approach. Following Jenert el., 2009 and Merkt, 2016, in general, educational system transformations of this kind occur across various dimensions namely the organizational dimension (How teaching and learning is organized?), the pedagogical dimensions (What is state of the art in learning and teaching theories?) and the individual dimension (What is the teacher`s personal teaching believes, skills and competences?). This report particularly focuses on the individual dimension as reflected in Activity 3.3.

The Activity 3.3 focuses on the support of teachers and therefore on the individual dimension only. This includes their knowledge, believes, skills and competences needed to escort the teams, working on challenges and to design educational programmes tailored to learners of the alliance. A framework to conduct teacher training is the scope of this report. The three elements described in chapter 2 rest on fundamental considerations about

- factors known to affect the transfer of knowledge into teaching practice (chapter 1.1),
- subject and about target group considerations (chapter 1.2)
- as well as special circumstances due to corona pandemic (chapter 1.3).

Together with the other work packages we are working on how the educational innovation of Challenge-Based-Learning (CBL) can develop successfully from a theoretical to a practical guide to implement CBL in the context of the ECIU university.

1.1 Design considerations to support the use of CBL in teaching practice

In research of what affect transfer of knowledge into teaching practice after teacher training, multiple factors were identified that a single workshop as well as programs should consider. The organizational characteristics of the teacher training is as important as the characteristics of the teaching environment in which the teaching innovation takes places as well as the attitude of the teacher him or herself (Figure 1, Feixas et al., 2014; Beuße et al., 2017; Hartz, S. & Kurtz, C. 2017).
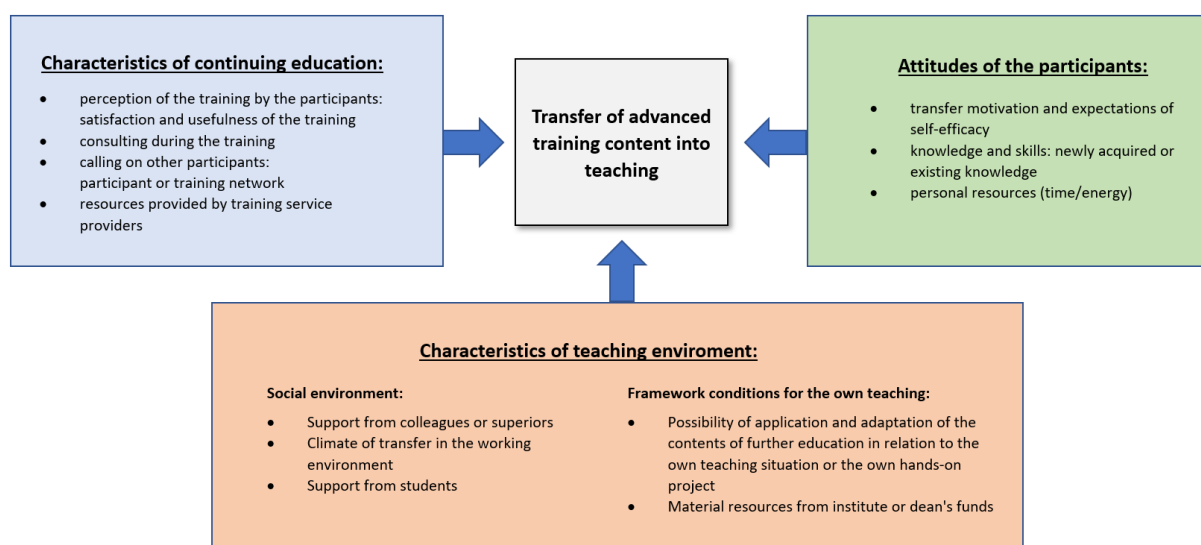
Figure 1: Characteristics that influence the transfer of advanced training content into individual teaching. Adopted from Hartz, S. & Kurtz, C. (2017)

At Hamburg University of Technology we found additional factors to be important in implementing Research-Based Learning in a training program consisting of six workshops to meet the needs of teachers (Bulmann et al., 2018 and Bulman et.al, 2019). It is necessary to
- include the opportunity for teachers to work on their own teaching courses.
- provide support to solve urgent problems and have also a continuing advisory offerings.
- foster an exchange between teachers and introduce peer to peer Learning formats.
- respect the expertise for teaching of each person no matter how much experience he or she has.
- be aware as a didactical coach that teachers are experts of their subject and know about the subject related teaching and learning culture.
- be aware that a change of a didactical setting only works if teachers are convinced that it makes sense and their university support them in this.

Some factors can be addressed by a concept valid for all teacher training through the alliance, e.g. by choosing suitable coaching formats. Others have to be addressed locally at each university and in person, e.g. the readiness and atmosphere to change didactical settings to facilitate the transfer of training content into teaching practice. To be aware of those factors affecting the transfer of knowledge into teaching practice is fundamental for the concept of teacher training to support implementation of CBL in ECIU university.

Nonetheless, the core elements of teacher support are the Innovation of Education Labs (IEL) that should provide orientation, support and spread the idea of CBL in ECIU university. For more information see deliverable report "Established Innovation of Educations Labs" A3.3, O1.

1.2 Subject considerations to support the use of CBL in teaching practice

CBL follows a social constructivist perspective in learning. The role of the learner is to co-construct knowledge, skills and at the end competences by going through the CBL learning cycle. Additionally, the role of the teacher is to accompany, facilitate and active take part in the learning process rather than strictly providing knowledge (Johnson et al., 2009). The teacher is expected to switch his or her role several times from being learner, mentor, expert in a specific field or feedback partner depending on needs of the team as well as phase in CBL learning cycle. But still, the teacher is responsible for student's learning, assessing and feedback as well as acting within the CBL framework. Therefore, it is urgently needed, that all teachers have a basic knowledge about teaching and learning theories and already had some pedagogical and didactical training. For some partners, e.g. in universities of Stavanger, Linköping, Twente, Kaunas and partly Hamburg, between 60-200 hours of pedagogical training is required before or while teaching students.

In Germany, teacher trainings are commonly based on a widely accepted set of competences which university teachers must possess in order to guide students (Brendel et al., 2006). This set (see table below) was analyzed and adapted by WP3 to have another foundation for teacher trainings.

Table 1 outlines the key differences between traditional and challenge-based teaching practices across multiple dimensions. It becomes clear that teachers when implementing a CBL framework in daily practice require additional knowledge, skills and competences.

Table 1: Comparison of competences which university teachers must possess in general for pedagogical and didactical activities (basic) and in regard to CBL. From S. Brendel et al., 2006 adapted by Siska Simon, 2020

Basic	Advanced training content in regard to CBL
Teaching learning objectives	
The teacher - as the **leading actor** in class - is able to **make decisions on why, what and how** learning activities will be designed using constructive alignment.	The teacher is **part of the learning team** and escorts students towards their learning goals. The knowledge of constructive alignment is needed to **understand whether activities match** with the individual learning goals. Teachers have to be able to **discuss and decide with the students** how it could be assessed.
The teacher needs **skills for target group-oriented planning**, e.g. formulation of learning objectives, didactic reduction of the learning content, structuring of the learning material.	Teachers have also to be able to accompany students to a successful learning path towards their learning goals. The **planning of learning activities is part of a group process** and has to meet the needs of the challenge.
Teachers are able to functionally plan and use a didactic **repertoire of methods**.	Teachers also need to **use didactical methods when required "just in time",** because the process might not follow a straight line. Teachers need an overview of existing methods to create new ones or combinations if necessary. Teachers can support the team to select suitable methods online and offline.
The **teacher develops assessment criteria** for learning performance and make them transparent.	The teacher is able to give advice to students in this open learning scenario with individual learning outcomes. The **teacher is able to help the student to formulate these learning outcomes** be transparent at the start. Learning outcomes are allowed to change during the process.
Social learning objectives	
Teachers give students constructive feedback on their performance, are able to **introduce and maintain a feedback culture**.	Teachers, students and stakeholder are part of the learning team. They give each other constructive feedback and are able **to work together on their feedback culture.**
Teachers are able to **perceive and control social processes** in their courses.	Same ability is needed; important is to have a **self-critical approach** of your perception of social processes as a teacher.
The ability to **control group dynamics**, even in difficult learning situations.	Same ability is needed; important to be added with **intercultural, interdisciplinary and international** working skills.
The teachers are able **to cooperate with the students in different roles**. They have the patience not to perform the tasks assigned to the students.	Teachers should be able to be aware what role they are in and what role the learning team needs to move forward. The teacher is able to **switch roles and make that transparent**. As an expert the teachers are allowed to contribute to the solution. Roles like in project-based learning are helpful and teachers are able to give advice to the students to use them.

Personal learning objectives	
Teachers know their **own limits** as a person and as a teacher.	Same ability is needed; teachers have to be able to talk about their limits and be open to search for help among colleagues for e.g. in the ECIU network.
Teachers are able to s**ystematically reflect on their own teaching.**	Same ability is needed; even in a higher dimension, because also the **learning is in focus**.
Teachers are able to strengthen and maintain the **motivation of the students**.	Same ability is needed together with the ability to **motivate themselves** as part of the learning team.
Teachers are able to constructively deal with **conflicts with students**.	Same ability is needed also dealing with **conflicts with colleagues, other external experts and stakeholde**r is necessary.
Teachers are able to act as a **personal model**.	Same ability is needed; important to keep everybody in line and focused. Teachers should know their weak spots, organize help if needed in time and be transparent about it.
Practical learning objectives	
Teachers are able to **present facts** in a way that is appropriate for the target audience.	
Teachers are able to choose the appropriate **method for visualization** and **use different media**.	
Teachers are competent in **conducting discussions** (e.g. about working groups or committees)	The same skill is required. Expanded with the use of online conference tools and with reference to international, interdisciplinary contexts.
Teachers are able to **moderate, advise students** and can promote their development process.	Same abilities are needed; combined with being able to **listen to and work with advice from students and stakeholders**.
Teachers are able to initiate, evaluate and reflect on **feedback processes**.	
Innovation competence	
Teachers are able to analyze the **institutional** framework.	Same ability is needed; the teacher is also able to analyze the structure of stakeholder and **other institutions** involved.
Teachers are able to determine and use their own creative leeway.	
Teachers recognize and accept their own limits to options for action.	

In addition, the implementation of Challenge Based Learning requires from teachers the following actions (EDUtrends, 2015, The teacher's role, p12):
- Give up having the usual amount of control of the class in order to attend students throughout the entire process.
- Encourage students to make mistakes so later on they can realize their error and correct it themselves.
- Do some research in the event students choose a topic they are not very familiar with or involving technology that is beyond their area of expertise.
- Work collaboratively with other colleagues from different areas, since challenges are often multidisciplinary.

- For both teacher and student this approach involves a greater commitment of time compared to more traditional academic activities."

Nonetheless, empirical findings about teacher competence profiles in CBL are still missing as well as findings addressing the multiple roles of teachers. In addition, for CBL at ECIU university other roles, as Challenge Coordinator, Teamcher, local CBL experts and Persons of Contact likely become involved in the upcoming pilot phase 2. As such, trainings about basic principles in CBL should be expanded to those who are directly involved in the design of the pilot and/or learning process. (for more details see Operational Manual).

1.3 Format considerations to support the use of CBL in teaching practice

In the proposal it was considered to visit each campus by members of WP3 Activity Leads to get a personal impression of the framework conditions for didactic support on site. Because of the Corona pandemic this was not possible. In many instances it was also not possible to offer university internal workshops for the CBL expert, the local challenge coordinator and teachers on campus. Consequently, a concept for an **online support** was developed which aims to create a community of teachers and offer information for all people involved in the development of a CBL framework. This structure (providing support on different levels see chapter 1) is meant to be adopted by local point of contacts and coordinators and adapted at each university of the alliance to fit to different situations of CBL implementation.

Once Corona pandemic is over the concept presented here has to be revised and adapted to the "new" (traditional) situation.

2   Objectives

Based on considerations described in chapter 1 the proposed framework is meant to create a didactical community by offering:

- orientation on the didactical approach of the ECIU University
- information about CBL executed at ECIU university
- a support structure focussing on teachers but address also other stakeholders involved in teaching and learning setting
- peer-support and peer-feedback
- an example from a lead university that could be adopted by others to create an own structure for their local circumstances, structures and resources
- open education resources for exchange
- online teacher training

The framework to support teachers addressing their knowledge, attitudes, skills and competences needed to escort the teams, working on challenges and to design educational programmes tailored to learners of the alliance should consist of three elements:

(4) **Workshops** on basic principles of CBL at ECIU university for teachers and point of contacts as well as coordinators and CBL-Experts to address basic principles of CBL and foster networking (see chapter 2.1)

(5) **Round Tables** CBL to foster exchange between practitioners, give space to peer feedback as well spreading new information about CBL@ECIU during the term (see chapter 2.2).

(6) Implementing a tandem system at each university, "**PraxisDUO**" to provide a platform to discuss specific issues concerning the own university and the individual teaching and learning environment (see chapter 2.3)

Next to framework presented here we describe our first experiences with the workshop and first Round Table CBL in upcoming sections.

2.1 Workshop Basic Principles of CBL@ECIU

Within the ECIU University and framework of Work Package "Challenge Based Education" (WP3), the Centre for Teaching and Learning of Hamburg University of Technology offered all partners of the ECIU University an introduction workshop to Challenge Based-Learning (CBL) on September 10th and 24th, 2020. The workshop was offered twice and both workshops were more or less identical in provided topics. For more detailed information about agenda, structure, used online tool and discussed topics see deliverable report " A3.3, O3. Conduct teacher training".

Main goals of the workshop were:
- giving a good start to those implementing CBL in their teaching,
- network building and
- sharing expertise.

The workshop included:
- an introduction about basic principles of CBL (ECIU definition, learning theories behind, Challenge Based-Learning cycle)
- discussion and exercise how you could transform an existing teaching units to CBL
- introduction and discussion of examples of CBL from ECIU university partners.

The workshop format offers the possibility to share information, work on own topics and discuss them. In particular learning objectives as summarized in Table 1 could be addressed by short key notes and presentations, by a reading task provided prior to the workshop or collaborative working phases.

Although the first workshop met all intended goals, we know that not all open questions could be clarified and all expectations met. The workshop setting (described more detailed in Deliverable Report "Conduct Teacher Training" A3.3, O3) could not consider local conditions and specifics and therefore could not give concrete support how teachers of a partner university implement CBL locally. It is important that upcoming workshops will be organized by local CBL experts using resources of their innovation of education lab (described more detailed in Deliverable Report "Establishes Innovation of Education Labs" A3.3, O1) by each ECIU partner. To address all possible question in implementing CBL@ECIU University, e.g. how to form a team after students applied for a challenge or how to spend credits after students completed a challenge, we recommend that the local Challenge Coordinator and possibly service staff from international offices and students service centers attend.

Furthermore, a one-day workshop about basic principles in CBL is not perfectly suitable for teachers with less than two years teachings experiences. To talk about and discuss the implementation of CBL a sound understanding of basic terms such as learning outcome or basic theories such as Constructive

Alignment or Problem Based-Learning is required. Teachers which less experience could profit from accompanying support in a Round Table (see chapter 2.2), participating in a PraxisDuo (see chapter 2.3) as well as profit from local support structures.

2.2 Round Table CBL

To foster exchange between practitioners, give space to peer feedback as well spreading new information about CBL@ECIU during the term we recommend each partner of the alliance to accompany CBL teaching units with a Round Tables CBL@ECIU.

This format addresses all those teachers that do not have the time to join a fulltime workshop, those with long lasting experience in Problem-, Project or Challenged-Based Learning but still have open questions and interest in peer-feedback as well as all those implementing CBL as a teaching innovation. In other words, the format addresses especially personal and individual characters affecting the transfer of training content to teaching practice (see Figure 1). With this format we also want to make all teachers aware, that implementing CBL is an ongoing process and that everyone is still figuring out, how it works best for the students and the local community (universities and stakeholders). This is why we chose a setting that is known for accompanying an ongoing process and stands for exchange between equal partners.

Currently, Round Table CBL@ECIU is a monthly online meeting using zoom as video conference system open for all participating in CBL@ECIU education and offered by Centre for Teaching and Learning of Hamburg University of Technology (https://www2.tuhh.de/zll/challenged-based-learning/#support). It could be also done with a closed group as well as local meeting without mayor changes in the setting.

ROUND TABLE CBL

Join our one-hour round table to adress questions, aks for feedback exchange ideas and network:
November 6th 2 pm (CEST) and
December 11th 2 pm (CEST) on zoom. Is is open for all partner of ECIU network.

Figure 2: Promoting Round Table CBL on CBL webpage

The round table setting has four phases. A round table meeting takes about 60-90 minutes.

1) 5-15 min: Introduction of participants today and latest news on how CBL@ECIU is developing provide by the moderator (information from WP3)
2) 15 min: Collecting of questions from the participants and clustering these questions by the moderator.
3) 15-30 min: Each cluster gets a break out session (virtual room), where people can discuss their findings and problems. They document their ideas in e.g. a fling board, a padlet or whiteboard provided in zoom.
4) 15-30 min: In plenum share the major aspects and collect the still open questions (for the next Round Table or further collaboration between participants).

We suggest that after the round table 'event' the most likely ongoing discussion should be documented in a way that is accessible for all for at least one term. One possibility might be the padlet, the online whiteboard with cooperative working possibilities, that we used in the workshop "Basic Principles of CBL at ECIU".

First Round Table were on October 2nd 2020. We reminded all participants of the workshop "Basic Principles of CBL at ECIU" to join. We hoped that in this way people who couldn't attend the two workshops would join us now.

There were participants from Aveiro, Barcelona and Aalborg, but not enough to spilt up in several small group discussions. So, we didn't stick to our plan and had an hour of intensive discussion. Main topics were:

1) Evaluation and assessment of CBL
2) Amount of student participation and degree of independence in CBL
3) Research: CBL in contrast to PBL and project-based learning

The next Round Tables will be on the November 6th and December 11th, 2020.

2.3 CBL@ECIU PraxisDUO

To help teachers implementing CBL at each site best, we want to bring them together with their local CBL expert in a familiar, protected way that creates a small community of learners. With this in mind we want to implement a moderated and didactically scaffolded peer-consultation about specific issues concerning each university. We would recommend that these peer-groups use the method of collegial advice on how to do CBL in detail. In addition to the basics of CBL workshop (see also deliverable report A3.3, O3) and a space for peer-exchange (Round Table see chapter 2.2), a setting that focusses on the specific teaching situation at each site including teaching resources and social environment is planned.

To help teachers directly during the implementation of CBL, we suggest to offer a third format for exchange between teachers that we call PraxisDUO similar to an offer at TUHH (still in German: https://www2.tuhh.de/zll/praxisduo-kollegiale-hospitation/). This format has not yet been implemented.

Invited and moderated by the local CBL expert, teachers can choose their tandem partner also involved in CBL beforehand or the CBL expert establishes contact between teachers doing CBL. Three of those tandems become a peer group. To keep it cosy and familiar we recommend to have not more than three tandems (six teachers) in such a format. They profit from each other by getting to know each other personally and get an impression of each other's CBL projects. They visit each other's CBL sessions and give peer to peer feedback. Using the collegial advice method (see Attachment 1), they can profit from ideas and know-how from colleagues.

This way there will be at each university a group of teachers having a protected space to accompany each other while learning to implement CBL@ECIU. The structure of the PraxisDUO you can see in Table 2.

Table 2: Suggestion how to implement the format PraxisDUO

What is to do?	Who is in charge?	Timeframe
Before the start		
Inform teachers doing CBL about PraxisDuo and that they can either	CBL expert/point of contact CBL delivers the information (due date	ongoing on the IEL website (latest 4

apply with a tandem partner or they will get the chance to meet one later on (or if there are not enough teachers doing CBL so fare, invite also teachers who want to do CBL next term)	to apply, time to start the PraxisDuo, room or online etc.) and develops a suitable internal advertisement (maybe together with a puplic relation expert or a web designer)	weeks before the CBL starts)
Viewing the applications, matching the tandems if necessary, inviting teachers applied so that they build a group of six people (three tandems); letting them know what will be expected.	CBL expert maybe together with the point of contact CBL or a well CBL experienced practitioner or another person, who knows CBL and can support.	two weeks before the start
Starting phase		
The CBL expert gives an overview about CBL@ECIU and also the history of CBL at the university. The content of the PraxisDuo is described in detail. Some parts are compulsory (one observation visit each) others are free to choose (supervision). The participants get to know each other and present their CBL projects and other concerns. The method of peer observation and counseling is introduced by the CBL expert. If not already done, the tandems find each other and plan their cooperation.	CBL expert maybe together with the point of contact CBL or a well CBL experienced practitioner or another person, who knows CBL and can support. The participants.	3 hours
Observation visits		
There are mutual visits by the tandem partners in the courses planned. These are prepared by defining a focus of observation and a feedback mode. After the teaching visits, the tandem meets to share their observations (see attachment 1)	Participants have to organize it by themselves. Maybe the CBL expert can offer help for finding a suitable focus or questions for their observations and how they could easily document them.	Each visit 1,5 hours at least one visit each. It depends on the needs of the teacher. It is possible to visit each other three times during each phase (engage, investigate, act)
Collegial advice		
One of the peer group presents his/her case of his/her CBL project (e.g. something didn't work as planned or didn't work at all, or is planned and she/he needs more	CBL expert is doing the moderation and the timekeeping. All participants are in charge to make this method a success.	Each case 1/2 hour. Depending how many teachers have cases they would like to discuss.

ideas about something). He/she is finding together with the CBL expert the exact question behind this case. The other people can ask questions if they need further information about the case. After that step they make comments suggestions, describe their associations so that the case giver can find some different point of views. At the end she or he points out what she/he takes with her. This method of a semi-structured peer-consultation you find in detail in Attachment 1.		
Supervision		
The supervision offers space to exchange experiences during the observation sessions and to clarify questions about CBL or site-specific situations.	Participants together with CBL expert	1,5 hours as often as possible or needed
Closing event		
The résumé of the CBL courses and their further development shared with all tandems: What worked well? What are still challenges doing CBL? What ideas do the participants have? Cozy end with an evaluation of the PraxisDuo sessions and information about upcoming other CBL events.	Participants together with CBL expert	1,5 hours

For the CBL expert this helps to spread information and news about CBL@ECIU by having a group of teachers to work with. The CBL expert gets an inside overview about the topics discussed and can use that knowledge to point out common problems to people in charge at his/her university. The CBL expert can use the ECIU network to get information and ideas for solutions.

This way we hope to meet the need of teachers to work on their own CBL project and get to know others with similar problems to get practical advice and tips and tricks they can use immediately.

3   Conclusion and outlook

To bring ECIU educational vision into daily live we planned to implement a thoughtful scaffolding structure for an online teacher training consisting of three pillars:

1) **Orientation: Sharing knowledge about implementing CBL@ECIU**
   To create a common understanding of CBL@ECIU we share our knowledge and experience through developing and using the IELs (see delivery report A3.3, O1), creating and using ECIU

websites and developing workshops for all people involved in educational aspects in the ECIU.

2) **Confidence: Sharing experience about implementing CBL@ECIU**
   Apart from time during the workshop to share experience, to foster and have a continuing exchange between teachers, we implement an online format called "Round Table CBL". Teachers involved in implementing CBL@ECIU from different universities meet to expand their field of vision and share experience, tips and tricks and challenges.

3) **Partnership: Sharing (site) details about implementing CBL@ECIU**
   Tandem partner that create a small group of teachers who can give each other collegial advice and help with detailed problems that occur on each site or between sites. Tipps and tricks will be shared and personal issues can be addressed.

This way everyone can find the amount of help needed to go on with their own CBL project. From getting an idea what CBL is to finding a suitable solution in your own university, these three pillars help to develop the necessary competencies to be implement and do CBL in own teaching units.

These three pillars are meant to function as an example and should be copied and adapted to the needs of each university at each site. This scaffolding system doesn't work on its own. To implement an innovative didactical approach is a long process. It is important that each university helps their teachers having first experience with CBL to stay motivated and to profit from each other's lessons learned. Also, teachers who want to start in February 2021 with an extra-curricular CBL-project (Mini or Nano) need help and training that might slightly differ from those of pilot 1 sine criteria changed between changed. Once multiple university implemented a structure similar to PraxisDUO and made good experiences with CBL itself it might be worth to bring together tandems of teacher from different partner of the alliance to strengthen the community pf practice.

Of course, there are further steps needed to implement teacher trainings. Especially working together more intensively with work package 4 to bring together competencies' passport with intendent Learning outcomes and forms of assessment and formative feedback as well as process of challenges of WP5 goes along subjects of teacher training for CBL.

We do expect Corona to stay for a while, so we do not plan with on-site visits. If we can travel again, there would be some adjustments needed.

4 Bibliography

Beuße, M., Hartz, S. & Heil, K. (2017): Instrumente und Methoden zur Evaluation von hochschuldidaktischen Weiterbildungsmaßnahmen für Hochschullehrende. Praxisbeispiele aus einem vom Qualitätspakt Lehre geförderten Projekt. In: *Handbuch Hochschullehre*. I 4.5

Brendel, S., Eggensperger, P. & Glathe, A. (2006) Das Kompetenzprofil von Hochschullehrerinnen: Eine Analyse des Bedarfs aus Sicht von Lehrenden und Veranstaltenden. In: Zeitschrift für Hochschulentwicklung ZFHE Vol. 1 / No. 2, pp. 55-84

Bulmann, U., Bornhöft, S., Vosgerau, K., Ellinger, D. and Knutzen, S. (2018) Combining research and teaching in engineering. Creating a pedagogical qualification programme on research-based learning

for early stage researchers. In: Proceedings of the 46th Annual SEFI Conference. Annual Conference of European Society for Engineering Education (SEFI) 2018. Danmarks Tekniske Universitet (DTU), Kopenhagen, Dänemark

Bulmann, U., Bornhöft, S. & Ellinger, D. (2019) Barriers and enabling factors for engaging engineering students in research. A multi-perspective approach. In: Proceedings of the 47th Annual SEFI Conference. Annual Conference of European Society for Engineering Education (SEFI). Budapest, Hungary

Edu Trends (2015) CHALLENGE BASED LEARNING, Observatory of Educational Innovation Tecnológico de Monterrey [download](#)

Feixas, M., Fernández, I. & Zellweger, F. (2014): What factors affect learning transfer? Academic development in perspective. Paper presented at the ICED Conference 2014: "Educational Development in a Changing World", Stockholm.

Hartz, S. & Kurtz, C. (2017): *KoLeHo: Kompetenzentwicklung und Lerntransfer in der Hochschullehre. (Videobasierte) Erfassung von Lehrkompetenz: erste Ergebnisse*. Präsentation auf dem 2. Auswertungsworkshop der Begleitforschung des Qualitätspakts Lehre im November 2017 in Berlin.

Jenert, T., Zellweger Moser, F., Dommern, J. & Gebhardt, A. (2009) Lernkulturen an Hochschulen. Theoretische Überlegungen zur Betrachtun studentischen Lernens unter individueller, pädagogoischer und und organisationaler Perspektive. IPW-Arbeitsberichte, Band 1. St Gallen: Universität St. Gallen, Institut für Wirtschaftspädagogik

Johnson, L.F., Smith, R.S., Smythe, J.T. & Varon, R.K. (2009). Challenge-Based Learning: An Approach for Our Time. Austin, Texas: The New Media Consortium. Retrieved October 15, 2020 from https://www.learntechlib.org/p/182083/.

Merkt, M. (2016) Zwischen individueller Kompetenzentwicklung und strategischem Qualitätsmanagement: Anforderungen an eine hochschuldidaktische Professionalisierung zur Entwicklung von Lehr- und Lernkulturen. In R. Egger & M. Merkt (Hrsg.), Teaching Skills Assessments (S. 7-26). Wiebaden: Springer VS