

## Boosting Human Capital in the 21st Century

**Report of the tests March 2020 - June 2021**

Auteurs:

Dr. Kamakshi Rajagopal

Kim Dekeyser

Prof. Dr. Fien Depaepe

Dr. Annelies Raes

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## 1 - Boosting Human Capital in the 21st Century

### Introduction

Within the BHC21 project, training designs using innovative learning technologies (ILTs) were created, to boost the 21st Century skills of low-skilled people who follow training in Flanders, the UK or France with a perspective on a job in the industry. The new training designs were tested in a series of tests, gauging the perceptions of trainees, trainers and mentors. This report presents the results of the tests and interviews conducted within the scope of WP2 of the BHC21 project.

The tests were designed to follow the whole training of each trainee and trainer during the training programmes in each country. Next to the quantitative tests, interviews were held with trainers and trainees. In the UK, there were also mentors who played an important role in the programme, therefore we also included information from the interviews with those mentors to complete our information. We aimed at getting a better insight in how trainees and trainers experience training and using innovative learning technologies: how hard was it to use them, how did they feel about it...?

Each country had specific goals: in Flanders, the training aimed at low skilled people to prepare them for a job in the food industry. In France, the training was used to explore different jobs in the industry, eventually leading to a job or a subsequent specific training. Participants from the UK combined college-training with on-the-job training with the aim to be fully prepared to start working in the industry. Similar across countries was the integration of innovative learning technologies in training low-skilled people in an industry context.

With the tests, we wanted to examine if, and to what extent, all three countries reached their objectives. We also wanted to know what the trainers experienced as doable with the innovative learning technologies during training. The results were meant to give insights into the learning processes and to offer design advice for the pilots (new training programmes that start from September 2021 onwards).

The report is organized as follows:

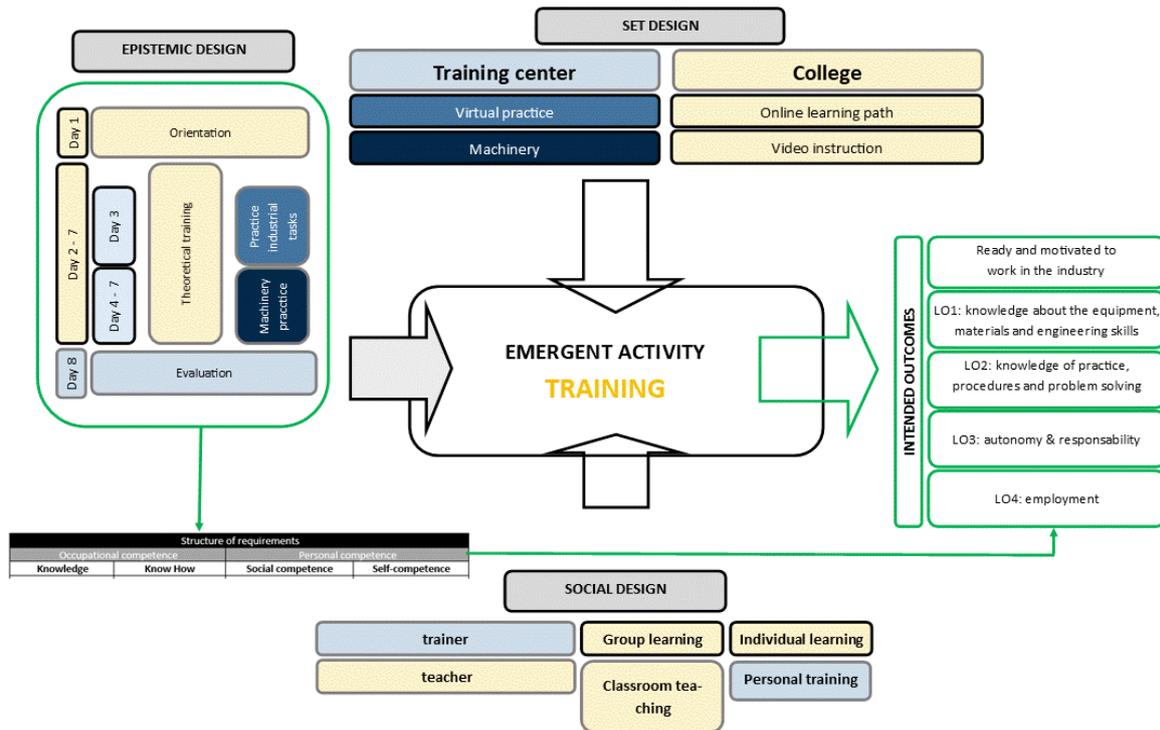
- First we give a description and analysis of the current training in Belgium, France and the UK. The analysis builds on the theoretical framework of the Activity-Centred Analysis and Design Framework (Goodyear, Carvalho & Yeoman, 2021).
- Next, we present the methodology we used to understand the experience of participants in the training.
- Then, we present the results.
- Finally, we offer some conclusions and areas for future work in the BHC21 project.

### ACAD-model

To give you an overview of the complete training programme and to give you a better insight in how different aspects of the training programme fit together, for each country the ACAD model (Goodyear et al., 2021) was used to describe the design decisions taken with regard to set, epistemic and social design. With this model, we want to clarify what was done, who was involved, what technologies, apps and machines were used and what the intended outcomes were. Different colors were used to give more insight in the course of the programme: how long a specific content part of the training took (epistemic design), who did what at what moment (social design), where the training took place (set

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design) and what were the intended outcomes? For some countries, we added a structure of requirements to give more insight in the specific knowledge, know-how, social competences and self-competences a trainee should master by the end of the programme.



**Figure 1 – ACAD model based on Goodyear et al., 2021**

In the model, by following the colours, you will always find what has been done (epistemic design), in what setting (set design) and with what machine, app or technology, who (social design) was present and what the intended outcome(s) was/were. For example:

The orientation took place during the first day of the training programme (epistemic design), trainees were together with the teacher and learned individually as well as together (social design). The teaching took place at college (set design) where an online learning path was used, together with video instruction. Everything together should lead towards the intended outcomes.

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### Development and Description of the trainings

#### Belgium

##### Context of the training

The Belgian BHC21 training model aimed to train low-skilled people (LSP), who are defined as those without a certificate or a diploma of secondary education. People often have multiple obstacles to tackle such as language barriers and a lack of digital literacy. The training prepared LSP to work in the food industry, with a focus on becoming packaging operators.

The preliminary/recruitment stage for each participant varied. Clients may have found the training online, received a recommendation from their personal VDAB mediator, or followed an orientation training beforehand that links to the vocational training. The specific training had a dedicated mediator who informed trainees about:

- the sector,
- their rights and obligations,
- steps in the training,
- and possible internships.

The possible participants got all of the above information during an information session, followed by a motivational interview with the trainer and the mediator. The dedicated mediator took care of the administrative tasks, while the trainer also served as a point of contact.

The training took place in Flanders in November 2020, whereby the group of participants followed the whole 10-day training programme (see figure 2) with innovative learning technologies.

##### Training Goals (Figure 2, intended outcomes & structure of requirements)

Various competences were trained to make sure that the trainees had the required knowledge about the equipment, materials and procedures that are used in the industry. Next to that, trainees should be able to use that knowledge during practice and problem solving. Autonomy and responsibility were also key goals during the training.

The innovative learning technologies that were used to work towards these competences and the knowledge were the VR-application, the online learning platform and instruction videos. Their use is thoroughly explained below.

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Description of the Belgium case using the ACAD Framework

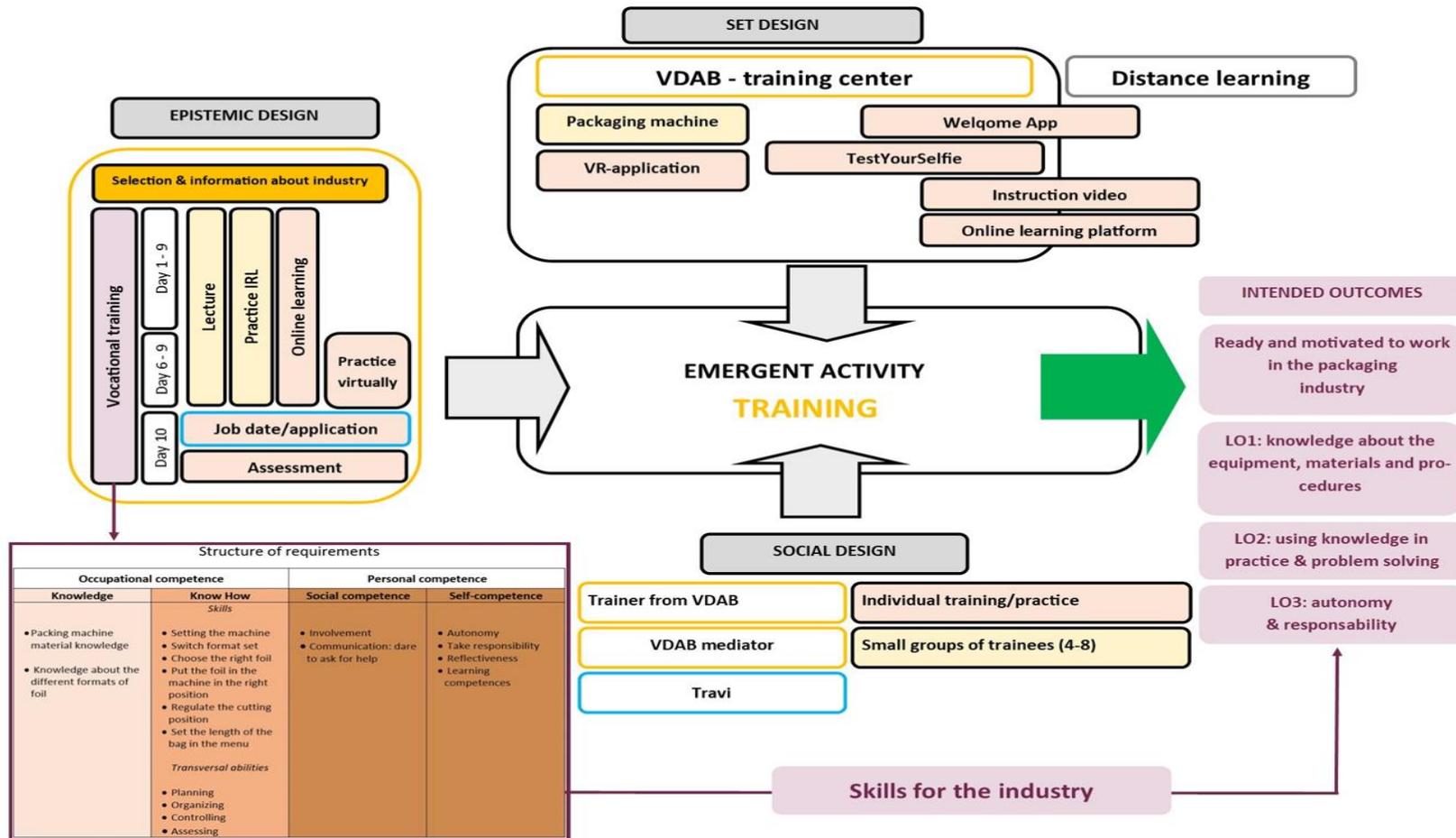


Figure 2: ACAD Belgium

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### Training programme

#### Description

#### Vocational training: course (figure 2, epistemic design)

The training was built up in a specific way. During the whole training, lecturing, practice in real life and online learning were included. From day 6 until day 9, trainees could also start practicing virtually. Day 10 was completely used as the end day. During that last day, evaluation took place and trainees got the opportunity to have a job date/job application.

#### Training center and online learning (figure 2, set design & social design)

On the first day of training in the training centre, the trainees installed the Welqome app on their smartphone with help from one of the developers (Travi). Next, they went to the website [www.testyourselfie.eu](http://www.testyourselfie.eu) (figure 3) to test how ready they were for the workplace (questions about flexibility, strengths and weaknesses ... were asked). Each trainee also got access to Google Classroom where they could browse the course and video material. During the training, the trainees got the opportunity to use Chromebooks from VDAB. If they wanted to, they could also login at home but only from their own devices. The trainer offered them an introduction to Google Classroom and also helped them if they got stuck during the training.



**Figure 3 - Test Your Selfie**

While the trainees were working on the learning platform (online course and instructional videos, ILT1 & ILT2), the trainer took small groups of trainees to the real machine to train them in using it, showing them how it worked. On day 6, the trainer introduced the VR-training (ILT3) which enabled trainees to learn individually in virtual reality.

During the vocational training, the trainer taught theory and trained them in practical skills too: packing machine material knowledge, knowledge about different formats of foil, setting the machine, switching format set, choosing the right foil, etc. You can see all the requirements for the trainees above in the representation of the training programme (figure 2).

On the tenth day, trainees were evaluated, they got job application training and a job date with employment services. In 95% of the cases, trainees started with interim work, for that reason, the job application training was organized together with Travi (training fund for the temporary employment

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sector). Travi collected about five companies with vacancies as operators in the food industry. Every candidate got 10 minutes to pitch him/herself to each company. The trainees prepared their pitch beforehand with the dedicated mediator who took a look at the CV and gave them some advice.

After the pitches were finished, the trainer, the dedicated mediator and the consultant from the interim office, sat together and gave feedback in group. This way, the trainer and the dedicated mediator got the necessary information about working points, about strengths and weaknesses and about the job application skills of the trainees. That way, if necessary, they could offer extra support afterwards. The feedback was also discussed with the trainees.

Because of covid, the trainees had to follow the job application training online but they got extra support in terms of digital skills in the training center.

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### France

#### Context of the training

Industrial professions in France suffer from bad press. These fields no longer attract young people. There is a real need for personnel. Attracting young people to work in the industry means opening doors to a field that recruits, trains and allows them to find a job more quickly. Moreover, the industry is a field that innovates and uses cutting-edge technology. This innovative side helps to attract young people who often have an old-fashioned view of the world of industry. Machinist is a trade considered to be a job in high demand for which it is essential to broaden sourcing for recruitment, in particular with low-skilled people and by equipping them with innovative technologies.

The participants for the training programme were chosen for their motivation and their desire to discover a field that was unknown to the majority of the participants.

#### Training Goals (Figure 4, intended outcomes)

During the training, participants individually discover different careers in industry and they gain knowledge about the different industries. Afterwards, participants are guided towards a job or towards a suitable training, based on their possibilities, the opportunities in the companies...

To make these introductions possible for the different industries, innovative learning technologies were used. A VR-scenario (ILT2) made it possible to introduce different professions in the field of industry and to experience them. Next to that, a video medium (ILT1) and voice-assisted audio (ILT3) were used.

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## Description of the French case using the ACAD Framework

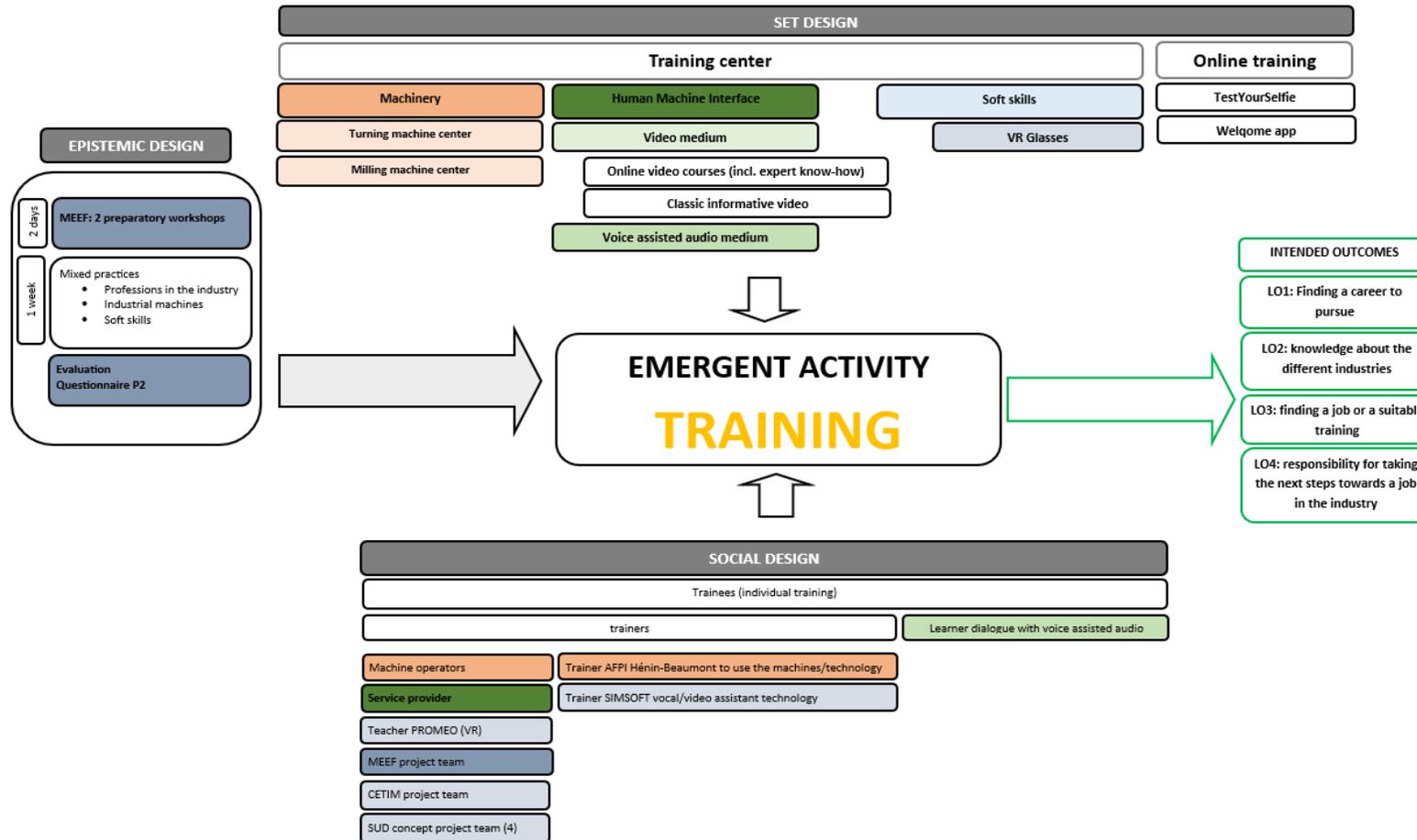


Figure 4 - ACAD France

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### *Description of the training in France*

#### **Vocational training: course (Figure 4, epistemic design)**

The training programme was spread over two introduction days and 1 week to discover different professions. The MEEF (Maison pour l'Entreprise l'Emploi et la Formation) held two workshops the week before the training started in order to provide the young people with the prerequisites and to prepare them.

#### **Training center & online learning (figure 4, set design & social design)**

The training took place in a training centre, in real conditions where individual mixed practice on industrial machines was offered. Two machines were used: a turning machine centre NC 4 axes MAZAK and a milling machine centre NC 3 axes JOHNFORD. Turning and milling are machining processes that consist of removing material to shape a functional or appearance part. The operation was carried out by experienced and trained machine operators to make it as realistic as possible.

Trainees were able to experience and to experiment while learning. The central learning goal was to allow them to discover different professions in the industry. For example, a part of an exoskeleton was built during a 15-minute virtual reality scenario that the participants tested. In this scenario, they had to create an exoskeleton using different workstations with different technical skills from the industry, via the use of VR glasses.

To introduce innovations into the process of training learners, two Human Machine Interfaces (HMI) were used and technology developed by Simsoft and CETIM. The notion of HMI (Human Machine Interface) covers all hardware (ergonomics) and software (cognitive ergonomics) devices that enable a human user to interact effectively with a product or equipment. They are being perfected to provide rapid learning, ease of execution, easy use of advanced functions, less operator fatigue, reduced risk of error, etc. in the context of the industry of the future.

- The first HMI was a **video medium (ILT1)**. The learner was guided through the training module. They could access classic informative videos or online video courses enriched with previously captured expert know-how.
- The second one was a **voice-assisted audio medium (ILT2)**. Instructions were given orally. The learner dialogues with the “system” which guided him/her actions he/she had to undertake and gave him/her the necessary explanations to carry out and understand his/her task.



**Figure 5 - Test Your Selfie France**

Test your Selfie (figure 5) and the Welqome app were used in the face-to-face tests in the training centre, as training tools to be used online.

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### UK

#### Context of the training

The aim of the project in the UK was to bring low skilled people (LSP's) into the engineering and manufacturing sectors. The focus was to develop an innovative training model to help move LSP's into employment in engineering and manufacturing jobs to address some of the skills and labour shortages in those sectors.

The participants were unemployed low-skilled people listed on the national unemployment system. After a voluntary Taster day, trainees could choose to join the programme. The selection of the participants took place in five steps:

1. BHC21 programme information was shared with frontline employees who advised the unemployed with an aim to support them into employment.
2. The programme idea was presented to low-skilled people (LSP's) listed on the national unemployment system.
3. Detailed information of the programme was, due to covid, presented virtually to interested LSPs.
4. Potential trainees self-selected to attend an in-person Taster Day.
5. Trainees self-selected to join the programme.

#### Training Goals (Figure 6, intended outcomes & structure of requirements)

Various competences were trained to make sure that the trainees had the required knowledge about the equipment, materials and procedures that are used in the industry. Next to that, trainees should be able to use that knowledge during practice and problem solving. Autonomy and responsibility were also key goals during the training. The specific requirements (knowledge, know-how, social competence and self-competence) can be found in Figure 6 (Structure of requirements).

During the vocational training, 3 innovative learning technologies were used to work towards these competences and the knowledge:

- video instruction (ILT1): the tutor demonstrates how to solder in detail.
- virtual welding (ILT2): trainees practice their welding skills virtually.
- online assessment (ILT3): during the training, the trainees are tested to check their overall skills and knowledge.

Their use is thoroughly explained in the next chapters.

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## Description of the UK case using the ACAD Framework

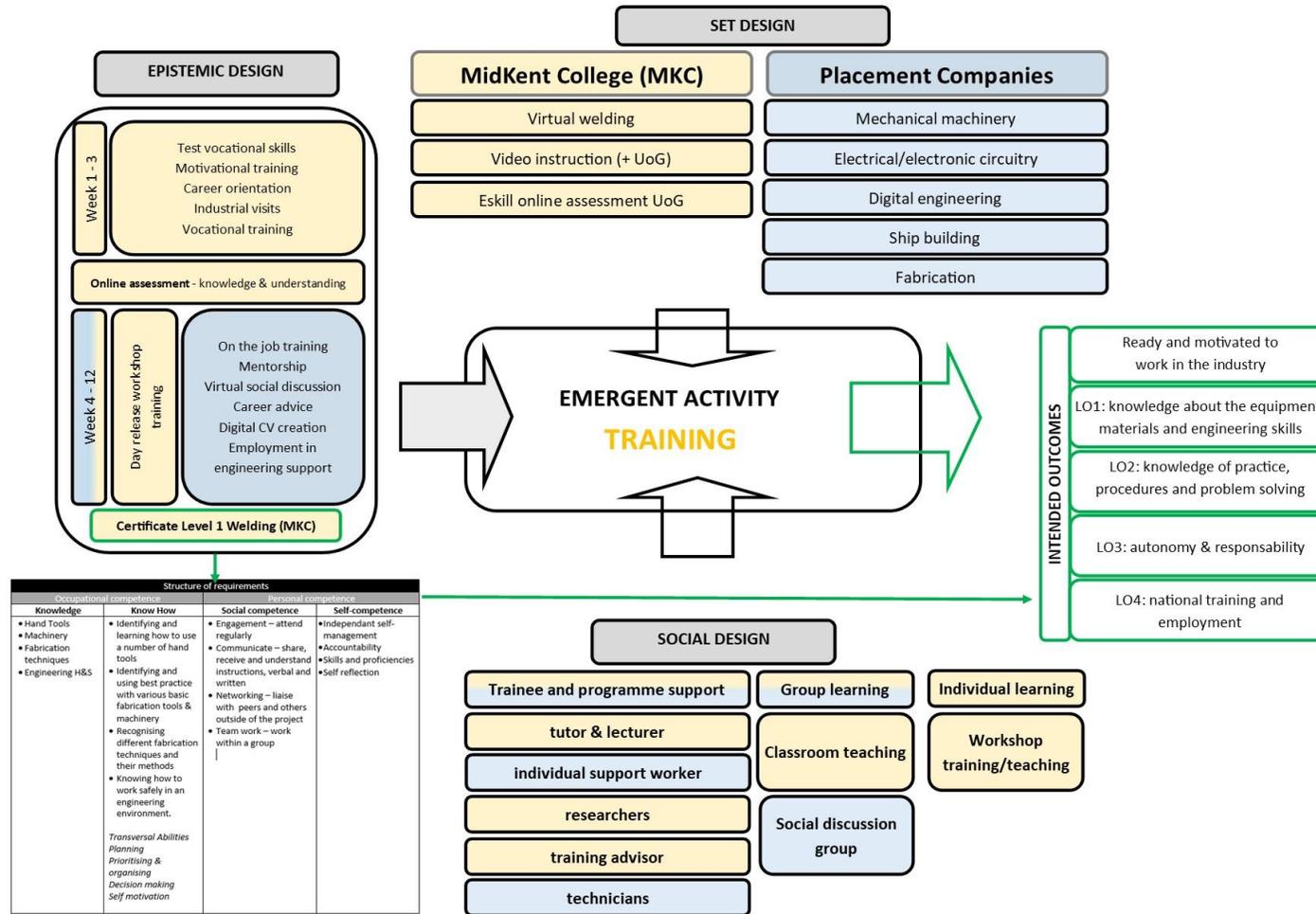


Figure 6 - ACAD UK

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### *Description of the training in the UK*

#### **Vocational training: course (figure 6, epistemic design)**

The UK programme took 12 weeks, 4 weeks in the college and university workshop to learn basic fabrication techniques followed by 8 weeks in the workplace applying those new found skills into a real working environment. The trainees also receive orienteering in the engineering sector, an introduction to human relations in the workplace and support from the National Careers Service.

#### **Training center and online learning (figure 6, set design, social design and epistemic design)**

The first four weeks, participants were trained at MidKent College by a tutor and at the University of Greenwich by an engineering lecturer (social design, figure 6). Different aspects (epistemic design, figure 6) were part of the training:

- **Testing vocational skills.** Prior to the programme starting, an applicant's aptitude and attitude is visually assessed at the Taster Day. This shows if there is an affinity with the programme content and indicates the ability to comply and work with others. During the 4 weeks at the college the trainees are introduced to a range of fabrication skills and knowledge, each project item introduces and demonstrates new technical abilities. When the college training is complete, the trainees will have an understanding of numerous engineering techniques and experience in a basic engineering workshop.
- **Motivational training.** This is delivered throughout the training programme in a variety of intended and unintended ways. The Tavistock Institute of Human Relations (TIHR) helps the trainees to focus on getting the most out of the experience through the understanding of:
  - working in the real world;
  - taking instruction through tuition and in the workplace;
  - working for other people and within a team;
  - TIHR also aims to help the trainees understand themselves.
 Other motivational outcomes are:
  - Completion of each fabricated piece of project work;
  - Peer competition;
  - Work placement engagements and outcomes.
- **Career orientation.** The trainees are introduced to the breadth and scope of a career in engineering and the variety of specialisms, branches and sub-branches available to enter. An awareness is raised at the levels of professionalism and continuing professional development required across the sector. This section will also help them find an area they may not have considered due to lack of information.
- **Industrial visits.** Visits to a variety of companies with different branches of engineering and different workshops.

In week 4, trainees were placed in companies for the start of their apprenticeship. This programme consists of:

- **On-the-job training:** trainees learned from the mentors in the workplace. They practiced the skills they acquired during the training at MidKent College.
- **Mentorship:** mentors supported the trainees in the companies. More information about the mentorship can be found in annex 7 and within the results from the tests.

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- **Day release workshop training:** one day a week, the LSP's return to Mid Kent College for theoretical knowledge.
- **Virtual social discussion:** trainees could talk about the things that went well during the apprenticeship and things they struggled with. That way, they could help each other and they heard that they were not the only ones who sometimes had a hard time.
- **Career advice**
- **Digital CV creation**
- **Employment in engineering support**

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### Methodology

#### Participants

In Table 1 you can see how many participants started and finished the training in each country. You can also see the education level of the participants.

	BE	FR	UK
<b>Primary education</b>	4	-	Low skilled: 4 Not low skilled: 4
<b>2<sup>nd</sup> degree secondary education</b>	1	2	
<b>3<sup>rd</sup> degree secondary education</b>	3	5	
<b>Higher education</b>	0	1	
<b>Starters</b>	8 participants	8 participants	8 participants
<b>Finished</b>	6 participants	7 participant	5 participants

**Table 1 - Participants of the trainings**

#### Instruments

##### Development of the instruments

The first version of the trainee and trainer instruments capturing trainee motivation and perception of the training was developed by KU Leuven, campus Kulak Kortrijk on the basis of previous internal work (Vanneste et al., 2021). This was proposed at the roadshow in England in September 2019, finalised in January 2020, and tested with groups at the VDAB in February-March 2020. Simultaneously, a WP1 evaluation instrument was also developed for the second cohort in England in August 2020.

A research script was also developed to support the regional partners who are responsible for data collection.

In Belgium, a few trials were already held in fall 2019 and spring 2020 to work towards an optimal training programme and to try-out the questionnaires. During the first trial, no ILT's were used. During the second trial, an instructional video was used by the trainees working on Chromebooks in the VDAB-training center. No other ILT's were used. Attached, you can find Annex 6, with a brief description of the results from these trials.

Taking the general feedback from the tests in the three countries, new versions of the instruments were developed in August 2020. In the final version, questions about the knowledge of the industry and the career path of the participants were included. Introducing different industrial activities to the participants and leading them towards a job or a well-fitted training is crucial in BHC21. Therefore, it

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is necessary to look into the knowledge of the participants, their internal motivation and their career goals.

### Description of the instruments

In this description, you will find information about P-questionnaires, questionnaires that were completed by Participants. You will also find T-questionnaires, those questionnaires were filled in by Trainers. The number after P or T indicates the order in which the questionnaires were taken.

Participant questionnaires were used to explore how trainees looked at the industry and training beforehand (P1 - annex 1). After the training, trainees were questioned about how they felt about the industry, their future career, the training and the use of ILT's after the training (P2, annex 2). The initial trainee questionnaire was developed on the basis of work by Vanneste et al. (2021), but was adapted to the target group and the needs of the BHC21 project.

Trainers were asked how they felt about training the trainees with the use of ILT's (T1, annex 3).

An observation form (Observation form, annex 4) was available for trainers to count the mistakes trainees made and to note down workpoints. Trainers could use this at the end of the vocational training to evaluate the trainees.

Apart from the questionnaires and the observation form, there interviews with mentors in the UK (UK, annex 7) were held and all trainers from the three countries could give informal feedback via mail or via Google Forms.

### Description of the objectives of the questionnaires

**Questionnaire P1** was used to get insight in the expectations from the trainees. You can find the questions below. With **questionnaire P2** we wanted to study the differences between the expectations and the experiences during the training. The topics from P1 were repeated but two topics were added, you can find the specifics below.

Topics from the trainee questionnaires	P1	P2
● Understanding of the engineering/manufacturing sector	X	X
● Your interest in training	X	X
● Your goals for the future	X	X
● Your confidence and general motivation	X	X
● Overcoming obstacles	X	X
● How you feel about the training		X
● Thinking about the learning technologies		X
● How you feel about readiness for the workplace	X	X

**Table 2 - Questions of questionnaire P1 and questionnaire P2**

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In the table below, you can find an overview of all available instruments for trainers, for each country is mentioned what was used.

<b>Instruments for the trainers</b>	<b>BE</b>	<b>FR</b>	<b>UK</b>
<b>Observation form</b> To quantify the increase in skills and productivity through counting numbers of errors. The trainers also had the possibility to take notes.	X		
<b>Questionnaire T1</b> After the training, we wanted to know how the trainers felt about: <ul style="list-style-type: none"> <li>● the user-friendliness of the learning technologies;</li> <li>● the effect of the technologies on the training and trainees;</li> <li>● the effect of learning technologies on their role as a trainer.</li> </ul>	X	X	X
<b>Informal feedback</b> The feedback was given via mail and via a Google-form. The trainers could express their experiences and could share their needs and their advice.	X	X	X

**Table 3 – Instruments for the trainers**

All items were scored on a 5-point Likert scale. The colours scheme in the following tables was chosen as follows:

- Mean difference: green for mean higher than 3,25; red for mean lower than 2,75; orange for difference around 3 between 2,75 and 3,25.
- Mean: green for mean difference higher than 0,25; red for difference lower than -0,25; orange for difference around 0 between 0,25 and -0,25.

### Note

In the UK, mentors guided the trainees during the on-the-job training. They did not use ILT's and they had no specific training programme. For that reason, only interviews were held and no quantitative data was collected. During the interview, mentors could speak freely about the trainees they mentored, about their own experiences in the industry and about their future perspectives.

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Overview of the timing of the instruments in the three countries  
 In Table 4 you can see when the instruments were used.

	<b>Belgium</b>	<b>France</b>	<b>UK</b>
Test P1	before the start of the training	before the start of the training	before the start of the training and at the end of the training
Observation form	during the assessment		-
Test P2	at the end of the training	at the end of the training	-
Test T1	at the end of the complete training		at the end of the 3-week training in MidKent College
Informal feedback	yes	yes	yes
Interview	-	-	with the mentors

**Table 4 - Overview of the implementation of the instruments in the three countries**

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### Procedure

Data was collected from the different regions, who administered P1, P2, the observation form and T1 at different points in their training's timeline. The regional partners were responsible for data collection and could refer to a research script for the process. They then sent the pseudonymised data to KU LEUVEN, campus Kulak Kortrijk for further analysis.

Data was analysed in the following way: the quantitative data for each participant from P1 and P2 was matched for time1 and time2 and aggregated in one table for analysis. For each variable, descriptive statistics were calculated for the whole dataset and for the regional datasets. As the sample sizes were very low and no significant tests could be organised, mean difference for each variable was considered as a sign of the development between time1 and time2. There were regional differences in the data available (due to missing data or different use of the instruments). This was taken into account in the analyses.

Qualitative data from the informal feedback and interviews were thematically analysed per region. As this feedback was very close to the regional implementation of training, broader analysis was not preferred at this point.

To interpret the results of the quantitative and qualitative analysis, the results were presented to the whole project group (11 June 2021), and discussed in three sessions with the regional partners responsible for the training (VDAB (BE), MEEF (FR) and the University of Greenwich (UK)). During these sessions, the outcomes of the regional datasets were interpreted, reasons and rationales behind the design of the learning activities were sought, and proposed changes to future training were discussed. The results of these discussions are also incorporated in this report.

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### Results

#### Results from the trainees

##### 1. Understanding of the engineering/manufacturing sector

The trainees' perception of the sector before and after the training was gauged.

1. UNDERSTANDING OF THE ENGINEERING/MANUFACTURING SECTOR	BE	FR	UK
I feel I have a very good understanding of the Engineering/Manufacturing (E&M) sector	0	0,767857143	1,228571429
I know all about training and qualifications in the E&M sector			1,6
I know what it is like to work in the E&M sector	0	0,696428571	1,314285714
I have a good understanding of the potential career paths in the E&M sector	0,35	1,464285714	
I have a good understanding of the potential career paths in the E&M sector			0,6
I know some potential employers in my areas of interest	0,071428571	1,446428571	2,542857143
I know who to contact to discuss further training or employment opportunities	-0,083333333	0,285714286	0,657142857
I am highly likely to look for work in the E&M sector	-0,666666667	0,107142857	0,628571429
I see myself having a long-term career in the E&M sector	-0,041666667	0,339285714	0,914285714

**Table 5 - Understanding of the engineering/manufacturing sector**  
**Mean difference between P2 - P1**  
*(BE, n = 6; FR, n = 7; UK, n = 5)*

#### Belgium

After the training, the understanding of the E&M sector has increased but the interest of trainees to look for work in the E&M sector has decreased.

#### France

In general, we can see a positive evolution of the understanding of the engineering/manufacturing sector. Participants see a greater chance for themselves having a long-term career in the E&M sector after the post-test. The participants know where to go for further training or employment.

#### UK

The participants have a better understanding of the E&M sector after the training, they also see themselves having a long-term career in the E&M sector and know who to contact to discuss further training or employment opportunities.

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### 2. Your interest in training

#### *Motivation for joining the training*

In table 6, you can find all the reasons why trainees wanted to start the training. These results are from the P1-test (pre-test). Participants could choose to pick one or more reasons. The top 3 reasons to start the training were the same over the three countries, trainees wanted to learn new skills, they wanted career progression and they wanted to change industries/jobs.

	BE	FR	UK	In total
<b>1. To learn new skills</b>	1	6	7	14
<b>2. Career progression</b>	2	4	6	12
<b>3. To change industries/job</b>	3	3	5	11
<b>4. Earning higher pay</b>	0	2	5	7
<b>5. Looks good on my CV</b>	4	1	2	7
<b>6. Because I was referred by someone</b>	0	2	1	3
<b>7. Further education</b>	0	1	1	2

*Table 6 - Motivation for joining this training  
 (BE, n = 8; FR, n = 8; UK n = 8)*

<b>2. YOUR INTEREST IN TRAINING</b>	BE	FR	UK
I like to learn new things	-0,25	-0,035714286	-0,057142857
I feel ready to learn new things during the training	-0,314285714	-0,339285714	-0,114285714
I feel stressed about starting the training*	-0,5	-0,089285714	-0,257142857
I think I'm going to be bored during the training*	0,541666667	-0,410714286	1
The training looks interesting	-0,166666667	-0,267857143	-0,285714286
It feels like it's my choice to start this training	-0,142857143	-0,053571429	0,171428571
I would like to learn new skills throughout my working life	-0,208333333	0,035714286	0,285714286
I am interested in training because it increases my work certainty and it may lead to a job in the industry.	-0,791666667	0,410714286	

*Table 7 – Your interest in training  
 Mean difference between P2 - P1*

*\*reversed questions*

*(BE, n = 6; FR, n = 7; UK, n = 5)*

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### **Belgium**

Creating a better resume was the highest motivator at the beginning of the training. At the end of the programme, the general interest in training went down a little bit in Belgium. Trainees were also less interested in a job in the industry after the programme and they thought they might get bored during the training.

### **France**

French trainees were very interested in getting to know the industry and the work (7 out of 8), one person was hesitant (Table 6).

In France, there was a small change in the interest in learning new things and the training. However, the trainees are more interested in a job in the industry after training.

Quote of trainee: *“C'est intéressant de découvrir d'autres métiers dans un milieu de formation avec des professionnels”*. (Translation: “It is interesting to discover other jobs in a training environment with professionals.”).

### **UK**

Trainees from the UK were particularly enthusiastic about getting to know the industrial sector and about learning new skills. Half of the participants wanted to change industries/jobs and especially wanted to earn a higher salary. The quotes also reflect this:

*“Gain knowledge and skills in another sector without 100% commitment. A taster of the industry. If I enjoy/I am competent, I will pursue.”*

*“...complete this training because I like to explore new courses and also gain new skills...”*

*“I want to get a better understanding of other careers and find what I enjoy/am good at.”*

*“... to get a higher learning and knowledge of how E&M works.”*

The training has been evaluated as being less interesting after it was finished but they did want to learn new skills throughout their work life.

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### 3. Your goals for the future

3. YOUR GOALS FOR THE FUTURE	BE	FR	UK
I have aims that I would like to achieve in my life			0,114285714
I have a clear vision for my future	0,142857143	-0,017857143	0,857142857
I'm motivated to achieve the aims that I have set myself	-0,125	-0,089285714	0,2
I know what steps are needed in order to achieve my aims	-0,041666667	0,303571429	0,171428571
I have people in my life who are supporting me in achieving my goals	-1,175	-0,25	-0,057142857
Gaining qualifications or skills is important to me	-0,2	-0,071428571	0,171428571
I am going to succeed to reach my career goals	-0,291666667	-0,25	

**Table 8 – Your goals for the future**  
 Mean difference between P2 - P1  
 (BE, n = 6; FR, n = 7; UK, n = 5)

#### Belgium

Belgian trainees who have finished the programme say they have a clearer vision on their future although the knowledge about the necessary steps they need to take to achieve their aims, has gone down a little.

Before the training, 3/7 trainees mentioned they wanted to switch sector/work, 4/7 wanted to follow the training because it looks good on their CV. However, we do need to make a small remark. Trainees filled in the questionnaire after they talked to a VDAB mediator, a person who specifically mentions the importance of a CV. They could have been influenced by this conversation.

After the training, the trainees felt less supported by people on achieving their goals and indicated a lower belief in themselves to reach their career goals. The trainees found it a little less important to gain qualifications/skills and indicated a lower motivation to achieve the aims they had set for themselves.

#### France

Most trainees wanted to **discover** the industry (7/8). After the training, they seem to have better knowledge about what steps are needed to achieve their aims.

#### UK

Most trainees wanted to discover the industry (7/8), some of them also wanted to work towards a higher level degree (3/8). After the training, trainees indicate that they have a clearer vision for their future.

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### 4. Your confidence and general motivation

4. YOUR CONFIDENCE AND GENERAL MOTIVATION	BE	FR	UK
I feel confident in myself	-0,375	0,125	1,028571429
I am confident that I can overcome unexpected challenges	-0,583333333	0,446428571	-0,314285714
I am satisfied with myself			-2,857142857
I always try to do my best	0,225	-0,196428571	0,657142857
I am positive about my skills to progress in the future	-0,738095238	-0,178571429	0,457142857

**Table 9 – Your confidence and general motivation**

Mean difference between P2 - P1  
(BE, n = 6; FR, n = 7; UK, n = 5)

In all three countries, **stress, uncertainty and the need for confirmation** were noticed by the trainers.

#### Belgium

The trainer noticed that fine motor skills are hard to master for trainees from countries such as Somalia, Africa... Other trainees also dared to laugh at them, which is not beneficial for their self-confidence.

The trainer noted issues with stress, uncertainty and fear on each evaluation form:

- “Stress while putting in the foil.”
- “Uncertain about the use of the right button.”
- “Uncertain.”
- “Stress, uncertain.”
- “Asks for confirmation.”
- “Afraid, very uncertain.”

After the training, general confidence of the trainees has decreased.

The trainer mentioned that the training is a bit of a reality check for a lot of the trainees. They have great expectations of the training and themselves but those do not always turn out the way they hope it will. There are no barriers to follow the training, everyone who wants to enroll, gets an opportunity. That way, some trainees with little digital literacy, with poor math knowledge and poor Dutch speaking skills also end up in this training. Although the project aims to train low skilled people, there are also great differences within this group.

#### France

Trainees had difficulties with concentration/attention (4 out of 7) and stress, the trainers describe stress, nerves, fear... The stress is expressed in talking and movements, one person in particular had a difficult time standing still. Another trainee was too self-confident, he wanted to catch the attention of others. However, the trainers also said he was positive and motivated!

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On the other hand, trainees were also described as thoughtful & curious (3 out of 6), positive & comfortable (2 out of 6). According to the trainers: “most participants work accurately and are enthusiastic”.

One of the trainees did not cooperate: he was calling someone, he was not listening, not polite... Another trainee asked for a lot of help but only because he wanted to work especially fast.

Quote trainee: *“Je ne me sens pas prêt pour la formation car j'ai peur d'échouer au cour de celle-ci et de ne pas avoir les connaissances et les compétences nécessaires.”*. (Translation: “I don't feel ready for the training because I am afraid of failing in the middle of it and not having the necessary knowledge and skills.”).

After the training, trainees feel more confident and they believe that they will be able to overcome unexpected challenges. They are a little less positive about their skills to progress in the future.

### UK

After the three week training in MidKent College, confidence has decreased, they seem to feel less satisfied with themselves.

The trainees mentioned that they liked to maintain contact with the base.

The mentors felt *“young people need more reassurance than other generations.”*

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### 5. Overcoming obstacles

5. OVERCOMING OBSTACLES	BE	FR	UK
I will be able to achieve most of the goals that I set for myself			-0,2
When facing difficult tasks, I am certain that I will accomplish them	-0,25	0,035714286	0,228571429
In general, I think that I can obtain outcomes that are important to me	-0,125	0,017857143	0,342857143
I believe I can succeed at most any endeavor to which I set my mind			0,342857143
I will be able to successfully overcome many challenges	-0,083333333	-0,017857143	0,342857143
I am confident that I can perform effectively on many different tasks	-0,25	0	0,4
Compared to other people, I can do most tasks very well			1,085714286
Even when things are tough, I can perform quite well	-0,5	-0,339285714	0,485714286

**Table 10 – Overcoming obstacles**  
 Mean difference between P2 - P1  
 (BE, n = 6; FR, n = 7; UK, n = 5)

#### Belgium

According to the trainer, some things will remain difficult for the trainees:

- fine motor skills for trainees from Africa, Somalia..., in those countries, less attention is given to practicing fine motor skills during childhood. Those skills are very hard to train when you get older.
- counting is difficult for most of the trainees, they made a lot of mistakes
- the understanding of specific terminology remains a challenge.

Trainees also need a lot of help during their training which might indicate working by themselves might be hard. Looking at the differences between the tests before the programme and after the programme, we notice that the trainees have become less confident that they will be able to overcome obstacles.

After the training, trainees are not sure they will perform well when things get tough.

#### France

There is only a very slight difference between before and after the programme, trainees mostly still believe they will be able to tackle challenges, unless when things are tough.

#### UK

In the interview it was mentioned: *“The mentors said that they did not expect trainees to know everything on day one. The mentors were prepared to train the trainees up further, but they were most concerned about whether the trainees were ‘coachable or not’.”*

The trainees themselves feel confident about overcoming their obstacles.

One trainee had specific obstacles, he was not low skilled but was on the autistic spectrum and tended to identify this characteristic of his persona upon his first meeting with a new person. This trainee had undertaken vocational academic studies in Engineering prior to the project and had

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shown a level of skill and knowledge in this subject area. His participation in the project has been with determination to complete the training and obtain a work place. Ideally, he required an SME that could provide almost 1-2-1 training. Initially, he requested constant checks of his work, but when he felt he had it just right, he would produce items well within their tolerance. His main challenge remains his inquisitiveness, hence prone to wander off to inspect something unless he was involved in a task. So keeping him focused was the key.

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### 6. How you feel about your readiness for the workplace

6. HOW YOU FEEL ABOUT YOUR READINESS FOR THE WORKPLACE	BE	FR	UK
I am aware of the skills needed to do well in employment	-0,25	-0,375	0,035714286
I am aware of how to behave in the workplace	-0,166666667	0	0,642857143
I feel fully prepared and ready to go into the workplace	-0,357142857	0,333333333	0,428571429
I have got some relevant work experience including placements, internships, or on-the-job training	-0,666666667	0,375	0,25

**Table 11 – How you feel about your readiness for the workplace**  
Mean difference between P2 - P1  
**(BE, n = 6; FR, n = 7; UK, n = 5)**

#### Belgium

After the training, Belgian trainees feel less ready for the workplace than before.

When we take a closer look at the feedback, we see that trainees indicate that they have a lack of relevant work experience which could explain why they don't feel fully prepared and ready to go into the workplace.

The trainees gave mixed reactions:

- *“The training is too short, it should be extended.”*
- *“I like the training because you learn a lot and you can practice in reality!”*
- One person also wrote down: *“I need more information during the training”.*

#### France

The trainees feel less aware of the skills needed to do well in employment; they do feel fully prepared and ready to go into the workplace. They also indicate that they have got some relevant work experience.

The trainers were pleased with the results: *“Tous les formateurs ont été épaté par la rapidité des acquis des formés de première. Ils ont tous réussi la troisième phase sans tablette et sans support (à 1 ou 2 doutes près mais ils connaissaient la réponse) en reproduisant les gestes qu'il faut pour produire la pièce.”.* (Translation: “All the trainers were amazed by the rapidity of the achievements of the first-class trainees. They all succeeded in the third phase (within 1 or 2 doubts but they knew the answer), without tablet and without any support. The trainees reproduced gestures that were necessary to produce the part.”.

#### UK

In the UK, trainees feel fully prepared and ready to go into the workplace, they also say they are aware of how to behave in the workplace.

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### 7. How you feel about the training

7. HOW YOU FEEL ABOUT THE TRAINING	BE	FR
I found it easy to understand the training	3,166667	4,285714
I found this training tiresome*	2,166667	2,428571
I was stressed during the training*	3	2,428571
I found the training very interesting	4,166667	4,571429
I thought about quitting during the training*	2,666667	1,428571
The pretraining did a good job in preparing me for the training	3,5	3,571429
Without the pretraining it would have been more difficult to follow the training	3,4	3,166667
The pretraining has increased my motivation to learn	3,25	3,666667

**Table 12 – How you feel about the training**  
**Mean of P2**

\* reversed question  
 (BE, n = 6; FR, n = 7)

#### Belgium

The trainees were positive about their training, they did not find the training tiresome or stressful and they did not think about quitting. The training was seen as very interesting, the pretraining did a good job preparing them for the training and the trainees think it would have been more difficult without that pretraining.

In the questionnaires we found a few quotes:

- *“... I would like to get more information during the training.”*
- *“I like the training because you learn a lot and you can practice in reality.”*

#### France

The trainees were positive about their training, they did not find the training tiresome or stressful and they did not think about quitting. The training was seen as very interesting and the pretraining did a good job preparing them for the training. The trainees also say they found it easy to understand the training.

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8. The learning technologies in the training

8. HOW YOU THINK ABOUT THE LEARNING TECHNOLOGIES IN THE TRAINING	BE	FR
I found the - LT1 - easy to use	3,8	3,666667
I had to learn a lot of things before I could use LT1*	4,2	3
I found that LT1 was suitable for learning this task	3,8	3,666667
I learned a lot while using LT1	3,8	3,333333
I found the - LT - easy to use	3,6	4,666667
I had to learn a lot of things before I could use LT2*	3,6	3,166667
I found that LT2 was suitable for learning this task	4	4,833333
I learned a lot while using LT2	3,4	4,666667
I found the - LT3 - easy to use	4	2,833333
I had to learn a lot of things before I could use LT3*	3,5	4,166667
I found that LT3 was suitable for learning this task	3,4	4,333333
I learned a lot while using LT3	3,4	2,666667

**Table 13 – How you think about the learning technologies in the training**

*Mean of P2*

*\* reversed question*

**(BE, n = 6; FR, n = 7)**

**Belgium & France**

All trainees were **positive about learning while using ILT’s**. They found it easy to use them but also expressed that they needed to learn a lot of things before they could use them. The trainees found the ILT’s suitable for learning their tasks.

**UK (qualitative report)**

In the traditional group, instruction was given by a professor from Greenwich University and worked at a steady pace with technicians to assist. The **ILT video** was also created by the professor.

The self-led group chose a variety of ways to interact with their learning tool, they also asked the assistants for help which was discouraged and then prevented. Many worked at a ‘staccato’ pace.

Both groups completed mini project A, by lunchtime, there was very little finish time difference between each group. The afternoon projects were tutor and technician assisted for all; this helped some students to work faster.

There were three mini soldering projects to complete. At the end of the afternoon session most students had completed two mini projects to satisfaction, some completed all three.

The students were asked to comment on their experience.

- Some members of the traditionally taught group expressed a preference to experience the self-led video,
- In the video-led group, for some, the remote working proved unsatisfactory, with them expressing the need to be assisted by the tutor or technicians.

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The academic tutor did not comment on the quality of the work.

This basic and simple comparison test indicates that in this instance, the preferred method of learning is highly dependent on the participant's preference to learn using a particular learning technology or learning medium.

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### Results from the trainers

#### User-friendliness of the learning technologies

User-friendliness of the learning technologies			
	Belgium (1 trainer)	Mean France (5 trainers)	Mean UK (2 trainers)
I felt confident in using the learning technologies.	4	4,6	4,5
I think the learning technologies are unnecessary complex*	2	1,4	2,5
The learning technologies were easy to use.	4	4,6	3
I think I need the support of a technical person to use the learning technologies*	2	2,6	3,5
I think the various functions of the learning technologies are well integrated.	3	4,4	5
I suppose a lot of people will learn quickly how to use these learning technologies.	4	4	3
I had to learn a lot of new things before I could use the learning technologies*	3	3,2	1,5

**Table 14 - User-friendliness of the learning technologies**

#### Belgium

The Belgian trainer felt confident about using the learning technologies and found them easy to use. He does not think he needs the support of a technical person to use them. They suppose a lot of people will learn quickly how to use the learning technologies.

#### France

French trainers were confident to use the learning technologies, they found them easy to use and did not think they were unnecessarily complex. They suppose a lot of people will learn quickly how to use the learning technologies.

#### UK

UK trainers were confident to use the learning technologies and did not think they were unnecessarily complex. They think various functions of the learning technologies were integrated and they did not have to learn a lot of new things before they could use the learning technologies.

#### The effect of the technologies on the training and trainees

The effect of the technologies on the training and trainees			
	Belgium (1 trainer)	Mean France (5 trainers)	Mean UK (2 trainers)
The learning technologies made the training better.	4	4,6	4,5
The learning technologies made the trainees learn faster.	4	4,6	4,5
The learning technologies lessened the instruction time.	3	3	3,5
The learning technologies made the training more interesting for the trainees.	4	5	4,5
It was easier to motivate the trainees with the learning technologies.	4	4,6	4,5
The trainees did not like to use the learning technologies*	2	1,8	1,5
The trainees were able to learn things with the learning technologies that were difficult to achieve with a classical training.	3	3,6	4,5
The learning technologies made it possible for the trainees to practice more.	5	3,6	4,5
I am happy with the way the learning technologies are used in the training.	4	4,4	4,5

**Table 15 - The effect of the technologies on training and trainees**

#### Belgium

The Belgian trainer found that learning technologies made the training better, made the trainees learn faster and made the training more interesting for the trainees. The learning technologies also made it possible for the trainees to practice more. The trainer was happy with how the learning technologies were used in the training.

	Benefits	Disadvantages/points of attention
ILT1: instructional video	<ul style="list-style-type: none"> <li>This technology (method) is ideal for repetition, but it is</li> </ul>	<ul style="list-style-type: none"> <li>The successive instructions are very fast and it is therefore difficult to</li> </ul>

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	<p>not ideal for learning new content.</p> <ul style="list-style-type: none"> <li>● Very visual.</li> <li>● It's easily accessible, simple to use.</li> </ul>	<p>remember them. There is little learning ability to be noticed.</p> <ul style="list-style-type: none"> <li>● The YouTube principle, whereby our job seekers start and stop independently to repeat and thus remember things does not work. This video is usually watched together with the instructor.</li> <li>● Language is an important aspect to understand the concepts and instructions. You can see everything well but because of the succession of information (and the language aspect), the learning content is not being learned any faster.</li> </ul>
ILT2: online learning	<ul style="list-style-type: none"> <li>● Excellent medium to present all information in a structured way</li> <li>● Can be read part by part at your own pace</li> <li>● Contains exercises to import knowledge but also insights</li> <li>● Is used while other trainees are busy with the VR</li> <li>● Visual, minimal text</li> </ul>	<ul style="list-style-type: none"> <li>● Good knowledge of Dutch is a must!</li> <li>● Minimal digital literacy is necessary: often the trainer needs to help to start the computers, login, explain the navigation...</li> </ul>
ILT3: virtual reality - packing machine	<p><i>Before developing and using the VR-application, the trainees were convinced that Virtual Reality could be a solution for the language issue. However, after testing it, they notice that trainees still need to listen very carefully to the vocal guidance in the application. So again, it is important for the trainees to understand the Dutch language in order to be able to complete the VR-training.</i></p>	
	<ul style="list-style-type: none"> <li>● The VR application is very suitable for learning procedures, the student gets more opportunities to practice.</li> <li>● With the VR-application, trainees work</li> </ul>	<ul style="list-style-type: none"> <li>● Language plays an important role. People who do not know enough Dutch, have difficulties to go through the actions without getting stuck.</li> <li>● The provided instructions are also sometimes not sufficient. Some get stuck, others don't get stuck or don't</li> </ul>

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	<p>independently so they cannot hide as with an exercise in pairs on the machine itself. They are self-reliant. It quickly provides a clear picture of how a student learns, listens, performs...</p> <ul style="list-style-type: none"> <li>● Working initially on the VR application makes the training safer. If trainees have misunderstood something and perform wrong actions, they do not destroy the machine and there is no danger of injuring themselves.</li> <li>● Working with the instructions in VR gives a good view of the level of the students. Listen &gt; Understand &gt; Perform. When the trainer looks at the log of the exercises and gives them a percentage to how far they got, it almost matches the impression of their level at the end of the lesson.</li> </ul>	<p>get stuck quickly.</p> <ul style="list-style-type: none"> <li>● It is necessary that the instructor can watch a screen to intervene if necessary. This does mean that the instructor must be present during the first use.</li> <li>● It is essential that students look around and follow instructions, which they do not do spontaneously, they must be pointed out regularly in the beginning.</li> <li>● Some people get dizzy or nauseous when they enter the VR environment. There was also one student who could not overcome the fear and did not want to work with the VR application. There is little that can be changed, it's a personal fact, according to studies.</li> </ul> <p>Tip: sometimes, it has to do with adjusting the glasses correctly and placing the glasses correctly on your head. It is important to pay sufficient attention to this and to give the trainee time to learn how to work correctly with the glasses. When it really does not work, it is certainly advisable to have an alternative available.</p>
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**Table 16 – Innovative Learning Technologies in Belgium**

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### France

The French trainers found that the learning technologies made the training more interesting for the trainees. They also made the training better and the trainees were able to learn things with the technologies that were difficult to achieve with a classical training.

Qualitative feedback from the trainers about the effect of technologies on the trainee and trainer.	
ILT1: SIMSOFT Electric component	<ul style="list-style-type: none"> <li>• Concentration &amp; stress are sometimes difficult (4/6), trainees are thoughtful and curious (3/6)</li> <li>• A lot of nervousness is noted</li> <li>• Person A asks for a lot of help, he wants to work especially fast</li> <li>• Person B has a difficult time standing still</li> </ul>
ILT2: Virtual Reality Exoskelet	<p>Two <b>trainees</b> were experienced with VR, both behaved differently:</p> <ul style="list-style-type: none"> <li>• Person A: experienced with VR, which makes it easier to work with VR; he did admit that <b>experience in industrial creation was missing</b>.</li> <li>• Person B <b>acted like a “gamer”</b> and sometimes behaved uninterested.</li> </ul> <p>Quote of one of the trainers: <i>“Effect waouh systématique malgré des profits pafer “joueurs”. Ajoute un côté ludique supplémentaire à tous les contermes proposés”</i>. (Translation: “Trainees experience systematic “whaouh”-moments despite the small wins as “players”. Adds an additional playful side to all proposed contermes.”).</p>
ILT3: SIMSOFT vocal guidance	<p>Quote:</p> <ul style="list-style-type: none"> <li>• Quote: <i>“Formation sous un autre angle!”</i>. (Translation: “Training from another perspective”.)</li> <li>• Positive for the trainer as well as the trainee.</li> <li>• Pleasantly surprised by the results &amp; fast learning by the trainees.</li> <li>• Learning becomes more personal: the soft skill activity allows us to improve the training and to give confidence.</li> <li>• Very intuitive, simplifies learning</li> <li>• Improves comprehension and memorization of the different steps.</li> </ul> <p>All trainers were surprised by the speed with which the trainees and the first ones performed. They all succeeded in the third phase without tablet and without any support. The trainees reproduced gestures that</p>

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	were necessary to produce the part.
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**Table 17 – Innovative Learning Technologies in France**

### UK

Trainers from the UK said that the learning technologies made the training better and let the trainees learn faster. They also found that the training became more interesting for the trainees and it was easier to motivate them too.

Qualitative feedback from the trainers about the effect of technologies on the trainee and trainer.	
ILT1 - Video teaching	<p><i>Quotes from the trainers:</i></p> <ul style="list-style-type: none"> <li>• <i>“The video was clear and as close to the actual workshop as possible. I paid close attention to the characteristics of soldering, this made it easy for the trainees to follow independently.”</i></li> <li>• <i>“Everything worked well and I am happy with the trainees' use of the ILT.”</i></li> <li>• <i>“When instructing students and giving them clear constant direction regarding the process, I am teaching. Giving them information to enable the development of independant working and learning is a form of coaching.”</i></li> <li>• <i>“I enjoyed using the ILT with the trainees. It gave them freedom to think about the process as they worked through the exercise.”</i></li> </ul>
ILT2 - Virtual welding	<p><i>Quotes from the trainers:</i></p> <ul style="list-style-type: none"> <li>• <i>“This is a great platform for blended learning to help focus on areas that cannot be covered so well in a workshop.”</i></li> <li>• <i>“As a trainer, this is a very good piece of equipment to use as a supportive coaching instruction tool.”</i></li> <li>• <i>“It has been a great help in my instruction and I would highly recommend it.”</i></li> </ul>

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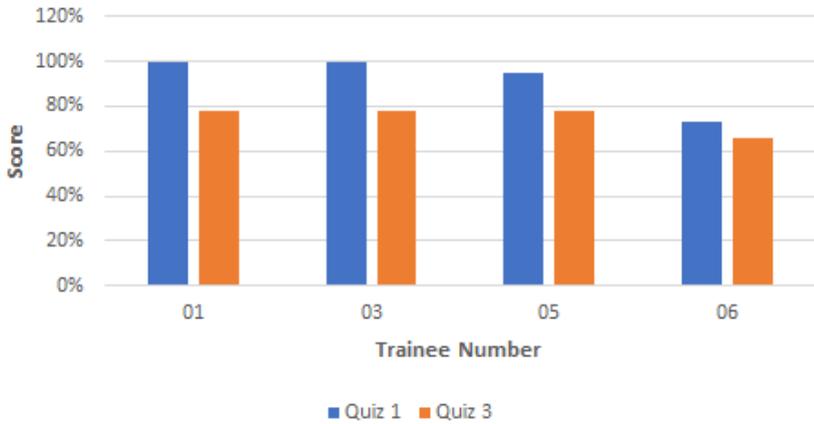
<p>ILT3 - Online assessment</p>	<p><i>We introduced an online knowledge assessment quiz to help keep the trainees engaged during lockdown No. 3. The group of four found ‘Quiz 1’ (knowledge at week 1) very basic with easy questions and took coaxing to complete it. Pitching introductory knowledge in the quiz at the right level for the group is important. If questions are pitched too low, individuals may feel insulted, pitched too high and they may feel demoralised.</i></p> <p><i>Quiz 3 (overall learning by week 3) covered elements and aspects of engineering they had learnt throughout their three weeks of training. Although lower marks were attained, the group had more positive online discussion amongst themselves about Quiz 3.</i></p> <p><i>Eskill allowed us to create appropriate questions related to the trainees learning and apply them to the quiz. Quiz 1 could be created from the group assessment at the applicant Taster Day.</i></p> <p><i>Quotes from the participants:</i></p> <ul style="list-style-type: none"> <li>• <i>“Quiz No. 3 helped me to revise my learning and encouraged me to check answers using my notes.”</i></li> <li>• <i>“The final quiz was good and tested our knowledge of the things we had learnt.”</i></li> </ul> <div data-bbox="507 1323 1385 1843" style="text-align: center;">  <table border="1"> <caption>Online eskills Results</caption> <thead> <tr> <th>Trainee Number</th> <th>Quiz 1 Score (%)</th> <th>Quiz 3 Score (%)</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>100</td> <td>78</td> </tr> <tr> <td>03</td> <td>100</td> <td>78</td> </tr> <tr> <td>05</td> <td>95</td> <td>78</td> </tr> <tr> <td>06</td> <td>72</td> <td>65</td> </tr> </tbody> </table> </div>	Trainee Number	Quiz 1 Score (%)	Quiz 3 Score (%)	01	100	78	03	100	78	05	95	78	06	72	65
Trainee Number	Quiz 1 Score (%)	Quiz 3 Score (%)														
01	100	78														
03	100	78														
05	95	78														
06	72	65														

Table 18 – Innovative Learning Technologies in the UK

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### The effect of the learning technologies on your role as trainer

The effect of the learning technologies on your role as a trainer			
	Belgium (1 trainer)	Mean France	Mean UK
I am happy that I can work with learning technologies.	5	4,8	4,5
The learning technologies made my job as a trainer more difficult*	4	2	1,5
The learning technologies enabled me to teach less and coach more	2	3	3,5
The learning technologies increased my preparation work for the training*	3	3,8	3,5
I would like to use learning technologies in my future training courses.	4	4,6	5
There was a good balance between teaching and coaching.	2	3,8	4,5
I have the skills to coach trainees in their learning process.	4	4,2	5

**Table 19 - The effect of the learning technologies on your role as a trainer**

(BE, n = 1; FR, n = 5; UK, n = 2)

#### Belgium

The trainer is happy that he can work with learning technologies although they made his job as a trainer (a little) more difficult. The learning technologies did not enable him to teach less and to coach more. He does want to use learning technologies in his future training courses. At this point, there was no good balance between teaching and coaching although he thinks he has the skills to coach trainees in their learning process.

#### **Additional informal feedback from the trainer**

The use of learning technologies provide extra effort and are also the reason why the instructor may experience this as an extra burden. In the first instance, working with ILT's is no relief for the trainer. It provides extra work, adjustment etc.

It is important to involve the trainer(s) directly in each development and to give them the necessary support. It is therefore very important to **find solutions to organizational problems** and to **make a clear plan/checklist for the instructors**. Sufficient attention must be paid to this during the Train The Trainer programme. In addition, it must be considered who can/must support the instructor in this.

Even after implementation, follow-up and support (technical, pedagogical, bug fixes...) are indispensable. Recording interim evaluations is useful for following up the evolution and adjusting it if necessary.

The trainer liked the observation form because it allowed him to evaluate in a structured way that was the same for each trainee.

#### France

In France, the trainers were all very happy they could work with learning technologies although this increased preparation work before the training. All five of the trainers would like to use learning technologies in their future training course. The trainers found there was a good balance between teaching and coaching and they found themselves having the skills to coach trainees in their learning process.

#### **Additional informal feedback from the trainers**

Quote: "Les activités soft skills m'ont permis en tant que formateur de perfectionner ma formation auprès des jeunes, de créer des liens avec eux pour les mettre en confiance. Cela a facilité les échanges débats et construction collective." (Translation: "Soft skills activities

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enabled me as a trainer to perfect my upwind training of young people, to create links with them and to build confidence. This facilitated the exchanges, debates and collective construction.”)

### **UK**

The learning technologies did not make the job of the UK trainers more difficult, they were happy working with them. The preparation work before the training has increased with the use of learning technologies but they do want to use them in their future training courses.

#### ***Additional informal feedback from the trainers***

*Quote: “I enjoyed using the ILT with the trainees. It gave them freedom to think about the process as they worked through the exercise”*

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### Conclusions for future training with ILT's

#### Discussion with the partners

After the analysis of the tests, we had a general discussion with all partners, after which we conducted individual talks with each country where we dived deeper into the results of each country separately. The partners themselves had also noticed some points of improvement and already planned or even implemented adjustments for those.

In general, all partners were pleased with the results of using ILT's, the trainers and trainees were mostly happy using them. Nevertheless, they do seem to demand (some) extra effort from trainers and trainees to learn how to use them properly. This said, we need to take into account that not all trainers are willing to invest in this effort, even if outcomes are positive. Trainers need time to put up the material, technical issues are a possibility, some trainees will not be willing to use technologies such as virtual reality... New challenges seem to occur with the use of new technologies.

ILT's seem to be great instruments to use during the training: trainees sometimes learn faster, better and they like the fact that the training becomes a bit more 'playful'. However, the ILT's should be part of the training, they cannot replace the trainer, a complete training or the experiences of trainees in the workplace. Many trainees mention the urge for work-experiences in the industry, that way they can see how they fit in and how the job is performed in reality.

Self-confidence is also an overall topic, some of the trainees are very self-confident at the start of the training but this decreased towards the end of the training. Others are very curious at the start but also have a lack of self-confidence which makes this a point of attention for the trainer. Each country has its own challenges to tackle, we discuss them underneath.

#### Lessons learnt in Belgium

In Belgium, the trainees had few literacy skills, few digital skills and some of them had issues with fine motor skills. The two week training "Packaging operator" (at level 3) was very short to tackle all of those issues and to make sure they were fully prepared to start working in the packaging-industry afterwards. For this reason, VDAB decided to adjust the training. In the future the training will change to "Production operator" (6 weeks, at level 4). That way there will be more time for remediation but also to dive deeper into the necessary knowledge. One of the suggestions is to offer a mathematics course, however, this should not be offered digitally since the participants also have low digital literacy skills. The trainees will also learn more about the mechanics of the machines, about chemical processes...

The trainer emphasized that it is very important for the trainees to master digital skills since the food industry specifically searches for those profiles. A job in the food industry nowadays is a technical job.

In the informal feedback, the trainer gave some advices for the trainers who would use virtual reality during their training in the future. Before the training, well thought-out preparation is important, as well on technical as on a pedagogical level. For each tool, they looked at exactly where they would like it to be discussed and on which day. From getting used to the tool to effectively learning with it.

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During the training, the trainer used a video at the beginning to show students what the virtual reality environment would look like and what they could expect. A short explanation about the controllers and what was intended was needed. Girls with a headscarf had problems putting on the VR-headset properly. The hygiene wipes for the VR-headset were not practical, they fell in front of the eyes and made it difficult to see. It also made it difficult to put on the headset. Also, the use of a mouth mask ensures that the lenses of the headset fog up.

Reliable and high-performance Wi-Fi are a must. You need to check all tools: prepare hardware and charge systematically, provide sufficient space and projection options...

One of the things that stood out in the tests was to find out why trainees would not want to build a career in the E&M sector after the programme. According to the VDAB, this had something to do with the overestimation of the trainees. When they started, they had great expectations about their future wage, their own capacities and a lot of them underestimated the job. For them, the training was some sort of wake-up call where they noticed they still needed to learn a lot before they would be able to join the industry as an employee.

### Lessons learnt in France

The results were very positive: trainees learned very fast with the ILT's and after the training period they were able to perform well without any help. Trainers were also happy with the use of ILT's and saw a lot of benefits. The trainers also mentioned some working points and some things to take into account.

**An introduction course in metrology** would be a good idea. Almost each trainee indicated having issues with this.

A point of attention: there have been positive experiences with the different technologies and the results were good, yet **not all trainers are willing to put effort in this.**

### **Virtual Reality - Exoskelet**

- A **separate room to work with Virtual Reality** could be useful. The noises on the workflow disturb and distract the trainee sometimes.
- You need to take into account the preparation time: it takes some time to put up the material.
- Less contact, more difficult with bigger groups.

### **Feedback TestYourSelfie & Welqome app by the trainers**

*“There were connection problems with the Welqome app and Test Your Selfie tools. LSP's could not use the app every day. As for Test Your Selfie, many links are inactive and errors appear when reading the answers.*

*I would improve the apps used, including Test your selfie to remove the rating and make it a personal skill profile.”*

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### Lessons learnt in the United Kingdom

In MidKent College, where the ILT's were used, trainers were very positive. We do need to take into account that the same people who used them to teach the trainees were also the people that designed them. The outcome might be different when used by someone who did not design the technologies, we should be careful with the results from these tests.

The mentors/trainers have spoken about different problems on the work floor and issues they have with the (younger) trainees (Annex 7). The mentors - especially in the first group - had a hard time dealing with the young people, there was a talk about a **generation gap** which made training difficult. The mentors specifically asked for tools on *"how to talk to the younger generation"*.

We do need to note that the mentors were usually unprepared on the arrival of the trainees. With the first cohort, the initial meetings happened with directors and/or senior management. It was expected that they would inform their employees of their mentorship. However, this did not take place and they were surprised when the training started: "I don't know why I am here."

Mentors are mostly older people (who are very good at their jobs), who have already been supervising yet never official, this is why they "don't know how to do it.". There is a big gap between the social skills of the youngsters who haven't worked a lot and the older mentors.

Some of the mentors also felt concerned that the trainer intended to 'teach' them a process they had (probably) been doing for many years.

With the second cohort, there was mentor training +/- 2 - 3 hrs, introduced to prepare them for the internships they would supervise. Additionally, there was a (digital) college visit and the mentors spoke one-on-one with Tavistock. Tavistock is focusing on those human relations. There are weekly sessions about social skills/work ethics and experiential methods are used. Trainees first need to unravel the work themselves and they need to find out what works for them. When people are not working well or there are other issues, they talk about it like a group.

The second apprenticeships went a lot better due to those modifications. However, how things are handled and how it goes is also a personal thing: some people can work with everyone, others can't. There have been attempts to find where the difficulties are situated and to break them down.

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### Conclusions about the methodology

#### Preparations for the pilots

##### Description of the ILT's

In some of the questionnaires, the ILT's were not named, it literally said "ILT1" which made it unclear for the trainees. For future research, we should make sure that all the ILT's are filled in correctly .

##### Language issues

We noticed that a lot of the Belgian trainees encountered problems with the questions, especially with the open questions. They left them blank or they wrote something that had nothing to do with the question. For the pilots, we will try to make the questions more understandable and/or we will take more time to go over the questions with the trainees. The use of icons may provide a solution.

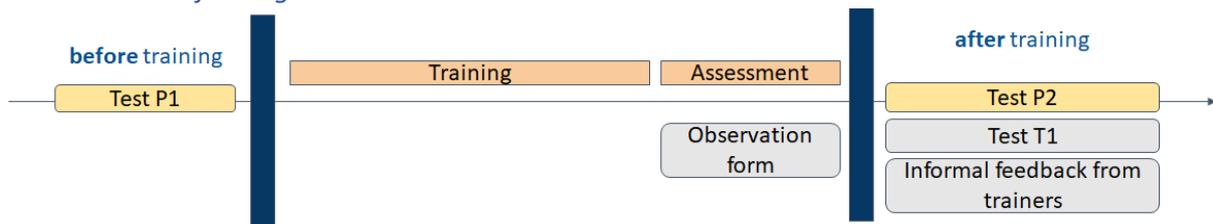
##### Future timelines

We noticed that some used the wrong tests, sometimes they were forgotten... We now have a clearer timeline for each partner where they can see what needs to be done at what moment during the pilots.

Since there is a difference in training time in the three countries, we have made three timelines where we take into account the differences but where we also make it possible to compare certain things across the three countries.

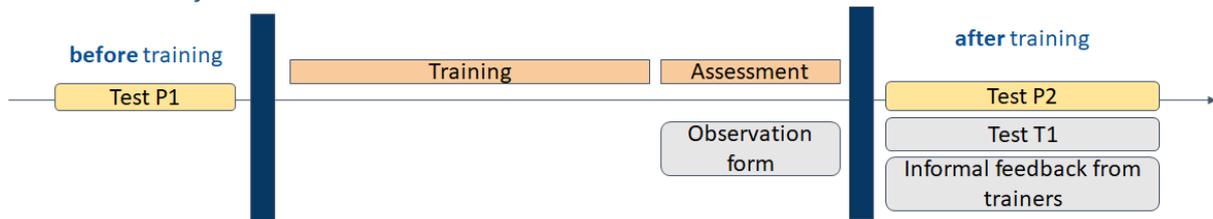
These future timelines will be adjusted to each pilot when they are planned. In Belgium (figure 7) and France (figure 8) we have a similar course. In the UK (figure 9), we added two extra tests (P3 & T2) so that the trainees can give feedback about their on-the-job training. Next to that, the mentors will also be able to give feedback.

##### Future timeline for Belgium



**Figure 7 - Future timeline for Belgian pilots**

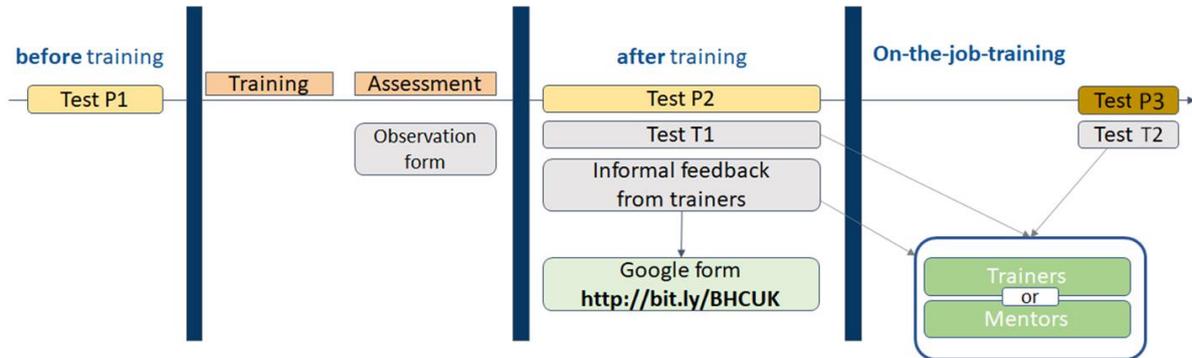
##### Future timeline for France



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**Figure 8 - Future timeline for French pilots**

Future timeline for the UK



**Figure 9 - Future timeline for UK-pilots**

### Limitations of quantitative approach

Although the quantitative methods give us a lot of insight into the trainees' experiences in the ILT-augmented training, the tests have shown that qualitative data is very important to interpret the results. In particular, it is necessary to take into account the regional context in which the training is organised (e.g. how training fits into the larger programme, which additional support exists for LSPs in the region, region-specific challenges for LSPs, etc.).

We have therefore adapted the methodology in two ways:

- we have made a nuanced analysis of the design used in the training per region (analyses of trainings according to ACAD model under Development and Design of Trainings, p6), which we will build on during the rest of the project.
- we have included an extended qualitative approach to the methodology which will be implemented in the rest of the project. This will be elaborated in the next section.

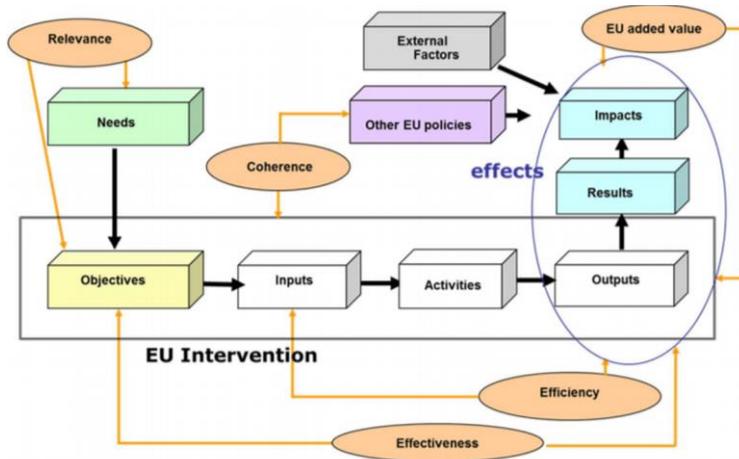
### Inclusion of Qualitative research and evaluation approach

#### The rationale

With consideration to the three most common purposes for undertaking a project evaluation—accountability, purposes of learning, and/or to produce generalisable knowledge or evidence that can guide future actions—it is the opinion of the Tavistock Institute of Human Relations (TIHR) that the sponsoring authorities' (Interreg 2 Seas) primary interest is in accountability, regarding the economic and sustainable viability of the training model, whilst the project's secondary interest is in furthering the learning and knowledge of all stakeholder groups engaged to benefit future training initiatives.

Thus, in service of determining whether the BHC21 training model is (1) efficient and effective and (2) benefits stakeholder group learning and planning for future vocational training endeavors, TIHR proposes a qualitative research and evaluation approach that is informed by the following EU intervention logic for evaluations (Figure 10) and which emphasizes both impact (for accountability) and process (for learning).

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**Figure 10. A simplified view of the intervention and 5 key evaluation criteria**

The benefit of crafting an evaluation of the BHC21 training model which integrates both impact and process-related agendas is that, if the outcomes of the training model are different from those anticipated or vary from one training site, pilot, or region to another, as the quantitative results of the tests suggest, some process data will be helpful in explaining *why* this is the case during the pilots. Further, given the variations in implementation across the three regions as noted in the previous section, ‘Limitations of quantitative approach,’ it is important to take into account and understand the similarities and differences between the three regional programmes. Such analysis will lend insight into the meaning of the quantitative results and whether the BHC21 project is successful or not which will enable a stronger recommendation for the common methodological approach.

### Summary of the approach

The qualitative research and evaluation approach includes a series of eight research activities noted in the table below, conducted during time intervals occurring either before, during, or after each pilot. Each activity is either delivered by TIHR with development input (e.g., instrument design and subject selection) from the regional partners or delivered by the regional partners with some facilitation support from TIHR.

**Table 20 - Research activity by delivery partner and pilot stage**

Research activity	Delivered by	Before pilot 1	During pilot 1	After pilot 1/Before pilot 2	During pilot 2	After pilot 2
1. Intervention logic workshop w/ regional partners	TIHR					
2. Interviews/questionnaire for screening employers	Regional partners					
3. Focus group w/ job coaches and company trainers/tutors/men-tors	Regional partners or external facilitator/researcher		after implementation of the ILT/TTT		after implementation of the ILT/TTT	
4. Interview/questionnaire w/ regional partners	TIHR			integrated w/ the mid-term evaluation		

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5. <b>Partnership</b> surveys (regionally and cross-border)	TIHR					
6. Programme actor feedback interviews w/ <b>senior leaders of employers</b> (e.g., HR and L&D managers) and <b>heads of vocation training departments</b>	Project coordinator					
7. Interviews w/ <b>professionals</b> (employers, trainers, etc.) of employer associations	Regional partners					
8. Feedback survey w/ <b>trainees</b> (by phone)	Regional partners					

A description of the objectives of each activity:

1. **Intervention logic workshop with regional partners:**
  - a. Explores the context, actions, outputs, outcomes, impacts, and key assumptions associated with each region's training model.
  - b. The purpose of the first workshop is to develop the causal model that underlies each region's approach and guides the evaluation.
  - c. The purpose of the second workshop is to test each region's theory of change - i.e., to investigate how a programme causes the intended or observed outcomes.
2. **Screening interviews with employers:** Select interviews with prospective employers to:
  - a. Gather information on the **training needs of prospective employers**, and identify the level and type of education and training that meets their business requirements; and
  - b. Gauge whether the BHC21 programme will meet prospective employers' needs and inform the future design of the BHC21 programme that aims to address the skills shortage in the engineering and manufacturing sector.
3. **Focus group with job coaches and trainers or mentors:** Two focus groups to:
  - a. Gauge their opinion on how the whole programme works specific to the regional context (e.g., how is it being implemented);
  - b. Identify challenges and strengths of the training model; and (3) identify how the programme can be improved, specific to ILT and their experience of the TTT or mentor briefing.
4. **Feedback interviews with regional partners:** Select interviews with regional partners to
  - a. Provide input to the interim evaluation and final evaluation of the project required by the commission;
  - b. Assess how the whole programme works specific to the regional context (e.g., how is it being implemented)
  - c. Identify programme challenges, strengths, and how the programme can be improved, specific to ILT and the experience of the TTT.
5. **Partnership survey (regionally and cross-border):**

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- a. Measure how well the partnerships are working together (within regions and between regions/cross-border)
- 6. Feedback interviews with senior leaders of SMEs and vocational training programmes (programme actors):** Select interviews with employers to:
  - a. Assess how the whole programme works for the SME (e.g., how it is being implemented);
  - b. Identify challenges and strengths of how the programme is being implemented; and
  - c. Identify how the programme can be improved.
- 7. Interviews with industry professionals of employer associations (non-programme actors):**
  - a. Gain insights into the strategic sector - e.g., does the model help to address skill shortages for SMEs?
  - b. Identify the implications of COVID-19 and Brexit for recruitment policies specific to the project; and
  - c. Assess the professional knowledge gained from the programme.
- 8. Feedback survey with trainees:**
  - a. Assess whether their technical and 'soft' skills and aptitudes have been enhanced by the programme, which links to the (7th) main result- employability of the trainee (e.g., what % of trainees have found a job after completing the programme)

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### References

Goodyear, P., Carvalho, L., & Yeoman, P. (2021). Activity-Centred Analysis and Design (ACAD): Core purposes, distinctive qualities and current developments. *Educational Technology Research and Development*, (0123456789). <https://doi.org/10.1007/s11423-020-09926-7>

Vanneste, P., Van Den Noortgate, W. (sup.), Depaepe, F. (cosup.), Raes, A. (cosup.) (2021). Measuring and optimising latent variables in technology-enhanced learning contexts.

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### Attachments

Annex 1 - Questionnaire P1

Annex 2 - Questionnaire P2

Annex 3 - Questionnaire T1

Annex 4 - Observation form

Annex 5 - Informal feedback (only used in France)

Annex 6 - Intermediate report test results Flanders

Annex 7 - Interview with the UK mentors

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P1 - Boosting Human Capital in the 21st Century

Region	3	Test	01	Class Number	01
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Age: \_\_\_\_\_

Highest obtained degree:

- No degree
- Primary education
- Secondary education
- Further education
- Higher education

1a. Please select your primary motivation for joining this training (select only one answer).

- Career progression
- To earn higher pay
- Looks good on my CV
- To learn new skills
- To change industries/jobs
- Because I was referred by someone
- Other: [ \_\_\_\_\_ ]

1b. Why do you want to complete this training?

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1c. Thinking about YOUR UNDERSTANDING OF THE ENGINEERING/MANUFACTURING (E&M) SECTOR (including awareness of career paths and employers) to what extent do you agree with the following statements? (for each statement, indicate how much you agree or disagree with it)

Strongly disagree    Disagree    Neutral    Agree    Strongly agree

---

I feel I have a very good understanding of the Engineering/Manufacturing (E&M) sector.                             

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I know what it is like to work in the E&M sector.	<input type="checkbox"/>				
I have a good understanding of the potential career paths in the E&M sector, including available training and qualifications.	<input type="checkbox"/>				
I know some potential employers in my areas of interest.	<input type="checkbox"/>				
I know who to contact to discuss further training or employment opportunities.	<input type="checkbox"/>				
I am likely to look for work in the E&M sector.	<input type="checkbox"/>				
I would like to have a long-term career in the E&M sector.	<input type="checkbox"/>				

## 2. Thinking about YOUR INTEREST IN TRAINING, to what extent do you agree with the following statements? (for each statement, indicate how much you agree or disagree with it)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I like to learn new things.	<input type="checkbox"/>				
I feel ready to learn new things during the training.	<input type="checkbox"/>				
I feel stressed about starting the training.	<input type="checkbox"/>				

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I think I am going to be bored during the training.	<input type="checkbox"/>				
The training looks interesting.	<input type="checkbox"/>				
It feels like it is my choice to start this training.	<input type="checkbox"/>				
I would like to learn new skills throughout my professional life.	<input type="checkbox"/>				
I am interested in training because it will enhance my employability and possibly lead to a job in the E&M sector.	<input type="checkbox"/>				

### 3. Thinking about YOUR GOALS FOR THE FUTURE, to what extent do you agree with the following statements? (for each statement, indicate how much you agree or disagree with it)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I have a clear vision for my future.	<input type="checkbox"/>				
I am motivated to achieve the career aims that I have set for myself.	<input type="checkbox"/>				
I know what steps are needed in order to achieve my professional aims.	<input type="checkbox"/>				
I have people in my life who are supporting me in achieving my goals.	<input type="checkbox"/>				
Gaining qualifications or skills is important to me.	<input type="checkbox"/>				
I will be able to achieve my career goals.	<input type="checkbox"/>				

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**4. Thinking about YOUR CONFIDENCE AND GENERAL MOTIVATION, to what extent do you agree with the following statements?** *(for each statement, indicate how much you agree or disagree with it)*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I feel confident in myself.	<input type="checkbox"/>				
I am confident that I can overcome unexpected challenges.	<input type="checkbox"/>				
I always try to do my best.	<input type="checkbox"/>				
I feel confident about my skills and abilities to progress in the future.	<input type="checkbox"/>				

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**5. Thinking about OVERCOMING OBSTACLES, to what extent do you agree with the following statements?**  
*(for each statement, indicate how much you agree or disagree with it)*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
When facing difficult tasks, I am certain that I will accomplish them.	<input type="checkbox"/>				
In general, I think that I can obtain professional outcomes that are important to me.	<input type="checkbox"/>				
I will be able to overcome many work-related challenges.	<input type="checkbox"/>				
I am confident that I can perform effectively on many different work tasks.	<input type="checkbox"/>				
Even when things are tough, I can perform quite well.	<input type="checkbox"/>				

**6. Thinking about HOW YOU FEEL ABOUT YOUR READINESS FOR THE WORKPLACE, to what extent do you agree with the following statements?**  
*(for each statement, indicate how much you agree or disagree with it)*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I am aware of the skills needed to do well in employment.	<input type="checkbox"/>				
I am aware of how to behave in the workplace.	<input type="checkbox"/>				
I feel fully prepared and ready to go into employment.	<input type="checkbox"/>				
I have some relevant work experience including placements, internships, and/or on-the-job training.	<input type="checkbox"/>				

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7a. Lastly, in a few words, please tell us in what ways (if any) you may feel **NOT** ready to start a training.

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7b. What would make you feel more ready to start your training?

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Thank you for taking the time to complete this survey.

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Region		Test		Class number	
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**1a. Please select your primary motivation for finishing this training (select only one answer).**

- Career progression
- To earn higher pay
- Looks good on my CV
- To learn new skills
- To change industries/jobs
- Other: [\_\_\_\_\_]

**1b. Why would you recommend this training to someone else?**

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**1c. Thinking about YOUR UNDERSTANDING OF THE ENGINEERING/MANUFACTURING (E&M) SECTOR (including awareness of career paths and employers) to what extent do you agree with the following statements? (for each statement, indicate how much you agree or disagree with it)**

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I feel I have a very good understanding of the Engineering/Manufacturing (E&M) sector.	<input type="checkbox"/>				
I know what it is like to work in the E&M sector.	<input type="checkbox"/>				
I have a good understanding of the potential career paths in the E&M sector, including available training and qualifications.	<input type="checkbox"/>				

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I know some potential employers in my areas of interest.	<input type="checkbox"/>				
I know who to contact to discuss further training or employment opportunities.	<input type="checkbox"/>				
I am likely to look for work in the E&M sector.	<input type="checkbox"/>				
I would like to have a long-term career in the E&M sector.	<input type="checkbox"/>				

## 2. Thinking about YOUR INTEREST IN THE WORK PLACEMENT, to what extent do you agree with the following statements? (for each statement, indicate how much you agree or disagree with it)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I like to learn new things.	<input type="checkbox"/>				
I feel ready to learn new things during the work placement.	<input type="checkbox"/>				
I feel stressed about starting the work placement.	<input type="checkbox"/>				
I think I am going to be bored during the work placement.	<input type="checkbox"/>				
The work placement looks interesting.	<input type="checkbox"/>				
It feels like it is my choice to start this work placement.	<input type="checkbox"/>				

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I would like to learn new skills throughout my professional life.

I am interested in the work placement because it will enhance my employability and possibly lead to a job in the E&M sector.

### 3. Thinking about YOUR GOALS FOR THE FUTURE, to what extent do you agree with the following statements? (for each statement, indicate how much you agree or disagree with it)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I have a clear vision for my future.	<input type="checkbox"/>				
I am motivated to achieve the career aims that I have set for myself.	<input type="checkbox"/>				
I know what steps are needed in order to achieve my professional aims.	<input type="checkbox"/>				
I have people in my life who are supporting me in achieving my goals.	<input type="checkbox"/>				
Gaining qualifications or skills is important to me.	<input type="checkbox"/>				
I will be able to achieve my career goals.	<input type="checkbox"/>				

### 4. Thinking about YOUR CONFIDENCE AND GENERAL MOTIVATION, to what extent do you agree with the following statements? (for each statement, indicate how much you agree or disagree with it)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I feel confident in myself.	<input type="checkbox"/>				

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I am confident that I can overcome unexpected challenges.	<input type="checkbox"/>				
I always try to do my best.	<input type="checkbox"/>				
I feel confident about my skills and abilities to progress in the future.	<input type="checkbox"/>				

### 5. Thinking about **OVERCOMING OBSTACLES**, to what extent do you agree with the following statements? (for each statement, indicate how much you agree or disagree with it)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
When facing difficult tasks, I am certain that I will accomplish them.	<input type="checkbox"/>				
In general, I think that I can obtain professional outcomes that are important to me.	<input type="checkbox"/>				
I will be able to overcome many work-related challenges.	<input type="checkbox"/>				
I am confident that I can perform effectively on many different work tasks.	<input type="checkbox"/>				
Even when things are tough, I can perform quite well.	<input type="checkbox"/>				

### 6. Thinking about **HOW YOU FEEL ABOUT THE TRAINING**, to what extent do you agree with the following statements? (for each statement, indicate how much you agree or disagree with it)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I found it easy to understand the training	<input type="checkbox"/>				

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I found this training tiresome

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I was stressed during the training

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I found the training very interesting

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I thought about quitting during the training

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The pretraining did a good job in preparing me for the training

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Without the pretraining it would have been more difficult to follow the training

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The pretraining has increased my motivation to learn

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**7. Thinking about THE LEARNING TECHNOLOGIES IN THE TRAINING, to what extent do you agree with the following statements?** (for each statement, indicate how much you agree or disagree with it)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I found the <b>-learning technology 1-</b> easy to use	<input type="checkbox"/>				
I had to learn a lot of things before I could use <b>-learning technology 1-</b>	<input type="checkbox"/>				
I found that <b>-learning technology 1-</b> was suitable for learning this task	<input type="checkbox"/>				
I learned a lot while using <b>-learning technology 1-</b>	<input type="checkbox"/>				
I found the <b>-learning technology 2-</b> easy to use	<input type="checkbox"/>				
I had to learn a lot of things before I could use <b>-learning technology 2-</b>	<input type="checkbox"/>				
I found that <b>-learning technology 2-</b> was suitable for learning this task	<input type="checkbox"/>				
I learned a lot while using <b>-learning technology 2-</b>	<input type="checkbox"/>				
I found the <b>-learning technology 3-</b> easy to use	<input type="checkbox"/>				
I had to learn a lot of things before I could use <b>-learning technology 3-</b>	<input type="checkbox"/>				
I found that <b>-learning technology 3-</b> was suitable for learning this task	<input type="checkbox"/>				
I learned a lot while using <b>-learning technology 3-</b>	<input type="checkbox"/>				

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**8. Thinking about HOW YOU FEEL ABOUT YOUR READINESS FOR THE WORKPLACE, to what extent do you agree with the following statements?** (for each statement, indicate how much you agree or disagree with it)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I am aware of the skills needed to do well in employment.	<input type="checkbox"/>				
I am aware of how to behave in the workplace.	<input type="checkbox"/>				
I feel fully prepared and ready to go into employment.	<input type="checkbox"/>				
I have some relevant work experience including placements, internships, and/or on-the job training.	<input type="checkbox"/>				

**9a. Lastly, in a few words, please tell us in what ways (if any) you may feel NOT ready to start a work placement.**

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**9b. What would make you feel more ready to start your work placement?**

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Thank you for taking the time to complete this survey.

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### T1 - Boosting Human Capital in the 21st Century

Region		Test		Trainer	
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**1a. Thinking about the USER-FRIENDLINESS OF THE LEARNING TECHNOLOGIES used in this training, to what extent do you agree with the following statements?** (for each statement, indicate how much you agree or disagree with it)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I felt confident in using the learning technologies	<input type="checkbox"/>				
I think the learning technologies are unnecessary complex	<input type="checkbox"/>				
The learning technologies were easy to use	<input type="checkbox"/>				
I think I need the support of a technical person to use the learning technologies	<input type="checkbox"/>				
I think the various functions of the learning technologies are well integrated	<input type="checkbox"/>				
I suppose a lot of people will learn quickly how to use these learning technologies	<input type="checkbox"/>				
I had to learn a lot of new things before I could use the learning technologies	<input type="checkbox"/>				

**1b. Please elaborate your answers about the user-friendliness of the different learning technologies** (Feel free to add as many lines as you want)

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**2. Thinking about THE EFFECT OF THE TECHNOLOGIES ON THE TRAINING AND TRAINEES, to what extent do you agree with the following statements? (for each statement, indicate how much you agree or disagree with it)**

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The learning technologies made the training better.	<input type="checkbox"/>				
The learning technologies made the trainees learn faster.	<input type="checkbox"/>				
The learning technologies lessened the instruction time.	<input type="checkbox"/>				
The learning technologies made the training more interesting for the trainees.	<input type="checkbox"/>				
It was easier to motivate the trainees with the learning technologies.	<input type="checkbox"/>				
The trainees did not like to use the learning technologies.	<input type="checkbox"/>				
The trainees were able to learn things with the learning technologies that were difficult to achieve with a classical training	<input type="checkbox"/>				
The learning technologies made it possible for the trainees to practice more.	<input type="checkbox"/>				

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I am happy with the way the learning technologies are used in the training.

**2b. Please elaborate your answers about the effect of the different learning technologies on the training and the trainees (Feel free to add as many lines as you want)**

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**3a. Thinking about THE EFFECT OF THE LEARNING TECHNOLOGIES ON YOUR ROLE AS A TRAINER, to what extent do you agree with the following statements? (for each statement, indicate how much you agree or disagree with it)**

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I am happy that I can work with learning technologies.	<input type="checkbox"/>				
The learning technologies made my job as a trainer more difficult.	<input type="checkbox"/>				
The learning technologies enabled me to teach less and coach more.	<input type="checkbox"/>				
The learning technologies increased my preparation work for the training.	<input type="checkbox"/>				
I would like to use learning technologies in my future training courses.	<input type="checkbox"/>				
There was a good balance between teaching and coaching.	<input type="checkbox"/>				

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I have the skills to coach trainees in their learning process.

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**3b. Please elaborate your answers about the effect of the different learning technologies on your role as a trainer** *(Feel free to add as many lines as you want)*

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**4. Lastly, please share with us your general experience with using the different learning technologies in your training** *(Feel free to add as many lines as you want)*

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**Thank you for taking the time to complete this survey.**

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Observation form

<b>Region</b>		<b>Test</b>		<b>Class Number</b>	
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Observation	
<b>1</b>	Total time
<b>2</b>	Count of errors influencing the final product
<b>3</b>	Count of corrected errors without influence on the final product
<b>4</b>	Number of times a participant needs help
<b>5</b>	Bodylanguage of the trainee
<b>6</b>	Unforeseen events or general remarks

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Informal information from the trainers (France)

### Préoccupations informelles

Les commentaires informels peuvent être très précieux pour préparer les prochaines épreuves. Ce que vous remarquez en tant que formateur est également une excellente source d'informations qualitatives.

Je vous remercie pour votre contribution!

\*Vereist

La date \*

Jouw antwoord

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Nom instructeur \*

Jouw antwoord

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Y a-t-il eu des problèmes pendant la formation ? Problèmes pratiques, difficultés pour les stagiaires, défis avec la technologie... ?

Jouw antwoord

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Changeriez-vous quelque chose pour que la formation se déroule plus facilement ?

Jouw antwoord

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## Introduction

In the past months, two tests took place in Flanders resulting in a first walkthrough of the methodological framework for WP1 and WP2. The goal of this intermediate rapport is firstly to give a glance on the results of these first tests, but secondly and as important, it is a way of evaluating the methodological approach. Using the experience we gained, the methodological framework will be fine-tuned for the next series of tests. Two work packages are running now in the BHC21 project, each with their own goals and instruments. Therefor this report consists of two sections, WP1 and WP2, and each section is divided in three main parts: the methodology, the results and a discussion of the tests as a whole.

## WP1

### Methodology

<b>Work package 1</b>		
<i>Target</i>	<i>Parameter</i>	<i>Instrument</i>
Trainee	Perceived motivation	Questionnaire P1
	Motivation in training	Questionnaire P2
	Self-perception – to be decided	Not tested
	Digital skills – to be decided	Not tested

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Trainer	To be decided	Not tested
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Motivation is until now the only parameter monitored for WP1. Depending on the cross border approach, other parameters will be added. Questionnaire P1 and P2 are based on the Intrinsic Motivation Inventory and are used to test the motivation of the trainees (IMI; Ryan & Deci, 2000). The IMI is based on the Self Determination theory and consists of four scales: interest/enjoyment, perceived competence, perceived choice and pressure/tension as a negative predictor. This results in 10 questions that can be used before and after the training of the participants. We made the decision to adapt the three questionnaires to a five point scale with smileys. It was considered that three different answering mechanisms were too confusing for our target group. We also used smileys instead of numbers, because there is a chance that illiterate people will participate in the project. As shown below, questions with a negative connotation (e.g. 'I was frustrated during the task'), will have reversed answering options. To guarantee the correct completion of the questionnaire, the trainees will be assisted while filling in the questions.

It was easy to understand the task	
The task was tiring	

## Results

### Perceived motivation

Over the two tests we had 11 participants in total who completed questionnaire P1, six in the first and five in the second test. All of the participants were low skilled, meaning their

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highest degree was not more than 4 on the European Qualification Framework (EQF). Participants scored themselves high in both groups, resulting in high mean scores for test 1 ( $M = 4,50$ ;  $SD = 0,25$ ) and test 2 ( $M = 4,62$ ;  $SD = 0,50$ ) on perceived motivation. An independent t-test showed no significant differences in perceived motivation between the two groups  $t(6) = -0,51$ ;  $p = 0,63$ . Figure 1 gives an overview of the mean scores for perceived motivation at the question level, no significant differences were found between test 1 and test 2.

Figure 1 Perceived motivation

### Motivation in training

There was only data gathered from six persons for motivation in training, making it nonviable to compare the tests with each other. Nevertheless the scores for motivation in training were very high ( $M = 4,76$ ;  $SD = 0,45$ ).

## Discussion

At first glance it is remarkable that participants of both groups perceived themselves as highly motivated before the training and during the training. With the mean scores of both parameters close to the maximum of 5, it gives little room for improvement in the upcoming tests. Given that 3 of the 11 participants dropped out of the training, despite their high scores on perceived motivation, shows that at least part of the participants overestimated their perceived motivation. Although we reassured participants that their were no correct answers to the questionnaire and that their results would only be viewable by the researcher, it is possible that participants gave socially desirables answers.

It was not surprising that there were no significant differences between the perceived motivation of the participants in test 1 and test 2. Given the small group sizes, individual differences are more likely to outweigh the differences between groups. Furthermore the difference between test 1 and test 2 for WP1 was the introduction of the Welcome app. Due to time constraints, the content was not fitted for the language skills of the target group and participants reported in interviews that they didn't use the app because the language was too difficult.

The lack of answers for motivation in training is due to the corresponding questions being on the back of the questionnaire. Because questionnaire P2 is taken after the training, participants were eager to go home and in the first test the researcher present didn't see in time that there were answers missing. This error was not repeated in test 2.

## WP2

### Methodology

Work package 2		
<i>Target</i>	<i>Parameter</i>	<i>Instrument</i>
Trainee	Time needed to perform a newly learned task	Observation
	Total number of (corrected) mistakes during a newly learned task	Observation
	Usability of the technology	Questionnaire P2/focus groups
	Task load	Questionnaire P2
	Stress	Questionnaire P2

#### Questionnaire P2

The questionnaire P2 will be used to measure stress, task load and usability of the technology. The questionnaire has 25 questions, 10 of which are the same as the first questionnaire. The questions are composed of three frequently used questionnaires.

Stress and task load will be measured by questions based on the Nasa Task Load Index (NASA-TXL; Hart & Staveland, 1988). This instrument measures the perceived workload of

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the participants during a given task on 7 topics: mental demand, physical demand, temporal demand, overall performance, effort, frustration level and stress. The questions were altered to fit in the same five point scale with smileys.

The usability of the technology is questioned by the System Usability Scale (SUS; Brooke, 1986). There are three central themes: can users successfully achieve their objectives, how much effort is needed and was the experience satisfactory. Eight questions are used in our instrument and trainees will also answer on a five point scale with smileys.

We made the decision to adapt the three questionnaires to a five point scale with smileys. It was considered that three different answering mechanisms were too confusing for our target group. We also used smileys instead of numbers, because there is a chance that illiterate people will participate in the project. As shown below, questions with a negative connotation (e.g. 'I was frustrated during the task'), will have reversed answering options. To guarantee the correct completion of the questionnaire, the trainees will be assisted while filling in the questions.

It was easy to understand the task	
The task was tiring	

### Observation

During the training, participants will undergo a practical evaluation of the skills they learned. This evaluation will largely depend on the context of the training. During this evaluation the participants will be observed and scored by an experimenter using an observation guideline. This guideline consists of 6 parts: total time, count of errors influencing the final product, corrected errors without effect on the final result, number of times a participant needs help, emotion and body language and unforeseen events. It is very important that the observation guideline is adapted to every test and pilot. Defining what is the final result and what is an

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error is crucial in correctly using the guideline for evaluating a trainee who's demonstrating his newly learned skills.

## Results

### Time to perform a newly learned task and count of mistakes

A total of 11 participants were evaluated when operating the packaging machine. The overall mean time to complete the task was 17 min 13 sec ( $SD = 3$  min 37 sec). The means differ between test 1 ( $M = 16$  min 57 sec;  $SD = 4$  min 14 sec) and test 2 ( $M = 17$  min 32 sec;  $SD = 3$  min 10 sec), but a t-test didn't show a significant difference between the time of participants from test 1 and test 2.

Comparable to needed time to perform a task, no significant difference was found between the means of count of mistakes between participants from test 1 ( $M = 8,00$ ;  $SD = 2,45$ ) and test 2 ( $M = 7,00$ ;  $SD = 3,46$ ). The overall mean count of mistakes was rather high ( $M = 7,50$ ;  $SD = 2,81$ ).

### Task load, stress and usability of the technology

Participants in both tests reported a low task load and a low level of stress. There were no significant differences in stress between participants of test 1 ( $M = 1,50$ ;  $SD = 0,70$ ) and test 2 ( $M = 1,75$ ;  $SD = 1,50$ ). There was however a significant difference for task load between test 1 ( $M = 1,94$ ;  $SD = 0,67$ ) and test 2 ( $M = 0,71$ ;  $SD = 0,65$ ), participants of group 2 reported a lower task load  $t(7) = 2,77$ ;  $p = 0,03$ .

The usability of the technology was only asked at the second group, because the first test served as a baseline without new technology. Participants of test 2 were unanimously positive about the new technology, resulting in a mean of 5 ( $SD = 0,00$ ).

## Discussion

The difference between test 1 and test 2 was the integration of a video clip explaining how to operate the machine. In the classical training, a textbook was used to explain this, combined with a demonstration on the machine given by the trainer. The videoclip serves as an addition to the textbook and demonstration, giving the participants the possibility to repeat certain parts of the workflow. The integration of the videoclip did not result in a significant difference between test 1 and test 2 for count of mistakes and total time. However the trainer reported that participants were more attentive to details and made less

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mistakes on parts of the machine that were not always visible during a demonstration. The operating of the packaging machine requires a lot of practice and in the upcoming tests the innovative learning technologies that will be integrated will focus on more time for practicing.

The reported scores for task load and stress are low, meaning that participants are comfortable during the training. High scores on one of these parameters could be an indication for a low receptiveness to learn new skills and are important to monitor during the project. The integration of a new innovative learning technology did not result in a higher level of stress. The significant difference in task load between test 1 and test 2, should be interpreted carefully because of the small group sizes. However it could be an indication that the integration of the video had a positive effect on task load.

Every participant from test 2 gave the maximum score on the usability of the new technology. The video was well received by the participants and the trainer and although it didn't result in better outcomes in the observation and given participants reported a lower task load, it can be seen as the first successful implementation of an innovative learning technology.

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### Interview with the UK mentors

#### Meeting with BHC21 Trainers at the University of Greenwich

20/02/20

#### Mentors/Trainers

1. **MENTOR A** Chargehand for 10 years. Works in the machine shop repairing gearboxes and pumps. He supervises 4 apprentices each year.
2. **MENTOR B** A support engineer, working on DC/AC drives, responsible for project upgrades. Has had contact with many trainees including his own son.
3. **MENTOR C:** Has been a maintenance engineer for 23 years. Is a mechanical Craftsman. Has apprentices and supervises their day-to-day work. He says he needs insight into talking to young people. Apprentices today are different from the old school. Today young people have strong feelings of entitlement and he is confused by this. He helps his trainees take pride in their jobs; emphasizes tidying up and he provides reassurance.
4. **MENTOR D:** Engineering foreman. Worked for the company for 45 years, joining as an apprentice at 16. Company deals in winch equipment for heavy engineering. Engineers are retiring and are hard to replace (one just retired after 25 years). The pool of engineers has dried up and there is little continuity, a big skills shortage and non-competitive wages. The factory is old fashioned, hands-on, and noisy. In his opinion, many companies do not seem interested in the apprenticeship route. He said his company used to have apprentices but a couple let them down and now they don't have a system anymore. Not hard to do, but it takes experience to do it properly (because it is dangerous operating heavy equipment). Says they used to be a thriving port for engineering talent but that talent pool has nearly dried up. Years ago there used to be a group of 20-30 engineers that all worked together (and rotated around the different mills), but they've aged out. Now many engineers are trying to get out because the pay is so low.

#### Discussion by Themes:

1. **Wage suppression:** The four trainers spoke about how conditions have changed - pay rates are much less now. They have had **no pay rise for 7 years, suggesting that they might be uncomfortable about taking on new duties, like mentoring young people.**
2. **Poor upkeep from management re: people and equipment resources:** They spoke about the **old machines and presented a depressing picture of the engineering environment in old companies** - no new machines for the past 25 years. The mentors expressed concern about competition with the big employers and the lack of succession planning from their own management (e.g., a manager died at 79 without

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making provisions for training and development of the next workforce generation) → **no continuity of transferring knowledge**. Now 3 employees have taken over this business need. Claimed that the firm will not pay the going rate to get skilled labor (they have great benefits, but low wages).

- Inter-generational differences:** There was a lot of grumbling and they **appeared as depressed and anxious older men**. They complained about youth entitlement and their lack of awareness of others, suggesting negative perceptions of young people that are anxiety-arousing. They claim that young people worry about unimportant things, like gaming, and in general, have **different expectations out of life**. Their disparagement of young people continued throughout most of the meeting; felt they were less likely to clean up behind themselves and take pride in their workspace. Also, they felt **young people need more reassurance than other generations** (one made a joke that it's 'as if they need to give them a hug during the day') and their lack of awareness of others, suggesting negative perceptions of young people that are anxiety-arousing. They claim that young people worry about unimportant things. Their disparagement of young people continued throughout most of the meeting.

One trainer said that he is perceived as a sexist, racist and homophobic, because of the kind of **jokes the men tell each other in the engineering machine rooms**. Numerous examples were given of what could happen to the mentors if they say the wrong things to young people, like **complaints made against them, reputations and jobs put at risk** because the owners tend to take the side of the young people because they don't want trouble. A wide gulf between the generations was said to exist.

- Fear to engage younger generations:**

Finally, they said, anxiously, how scary it is teaching these young people. They appeared almost phobic about the prospect. An alternative approach was also offered - saying to the young trainees "toe the line or you're out", said angrily, referring to the **laziness of young people and their desire for instant gratification, supported and colluded with by social media**.

There was a strong projection of negative feelings into this group of young people; they spoke about their fear of criticizing young people because they do not tolerate criticism and would be upset by workplace banter. He expressed anxiety around the current culture of political correctness is at odds with the harmless banter in the workplace. When incidents occur there is no space for dialogue. The mentors said that the culture of engineering is taking the mickey, straight-talking, putting others down with cruel humour; they wondered whether young over-sensitive people would be able to cope with this old macho culture, and they added "**we're certainly not**

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**going to change**". They seem to be expecting and even setting the scene for future conflict and an expectation of failure.

Themes emerged around

- (i) the power of the mentee;
- (ii) 'who holds the power' in the manufacturing workplace? and
- (iii) fear to engage.

In rather annoyed tones they asked us: "can you tell us what to do?", "**we want tools on how to talk to the younger generation**". One person suggested emphasizing building relationships with the young people. On several occasions, we invited the trainers to discuss an issue they might be grappling with at the present time with a trainee, but no one could produce a case. They obsessively return to the retelling repeatedly of a picture of spoiled youngsters who will not do as they are told.

They were understanding of trainees who would have limited skills. The mentors said they did not expect trainees to know everything on day one. The mentors were prepared to train the trainees up further, but they were most concerned about whether **the trainees were "coachable or not", i.e., can they follow instructions?**

**Concluding statement:** Of the 4 mentors present, 3 were there mostly to get advice on how to work with new mentees and had existing, robust apprenticeship programs in place (both formal (Mark M) and informal ones (Jeremy and Marc W). One (Graham), however, had the most need for the programme but expressed concern for the lack of competitive wages at his firm and that they hadn't had a new apprentice in over 25 years.

Three mentors said they had no idea why they were here. They thought they were here for CPD training on mentoring "broadly speaking", unaware that they would be receiving trainees in a week's time. They certainly had not been told they were part of a larger InterReg project. Either they did not hear what was told to them or in-house company communications were poor. Only today, as they visited the MKC workshops, did they realize that they were expected to commit to a larger project than simply mentor an individual trainee. They said emphatically that they would not be able to accept trainees at the due date of the start of the 9-week placement because they had other pressing priorities to which they are committed.