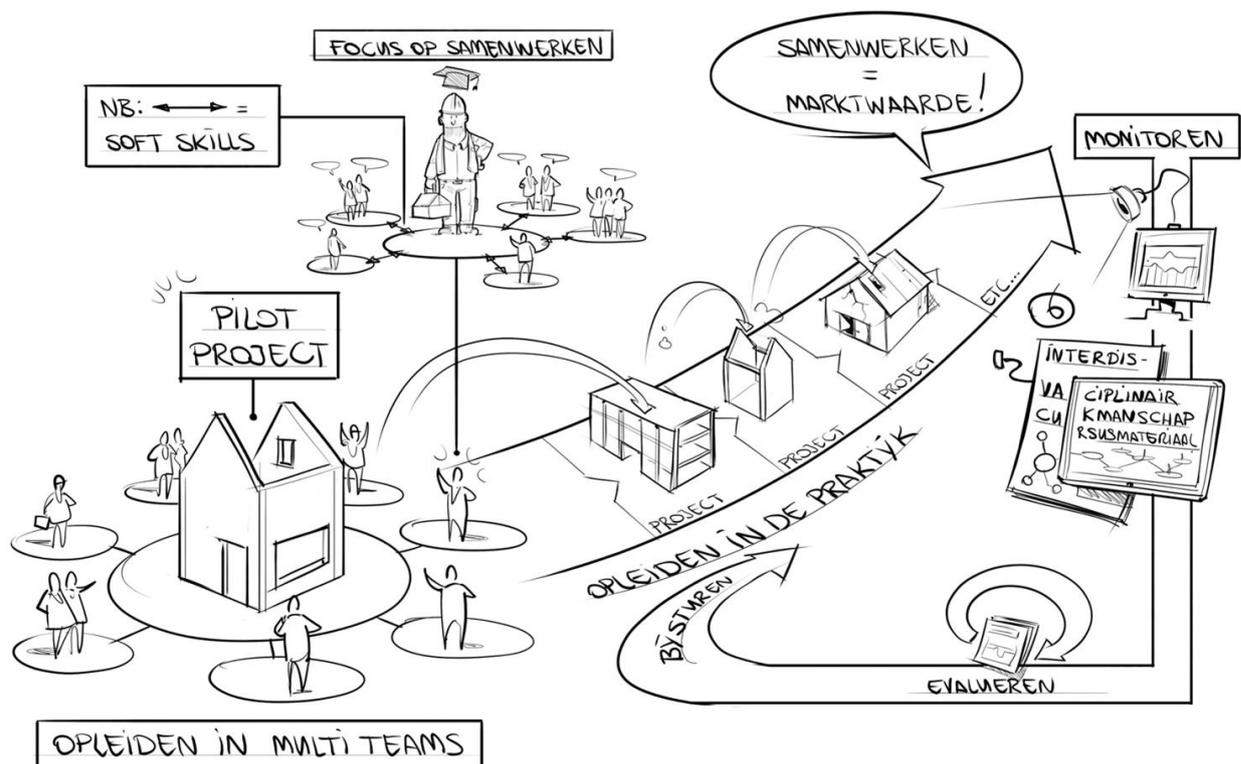


WP4 Regional Pilots

D4.5 Monitoring and lessons learned



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1. Executive summary (English)

The regional upskilling projects are monitored with the tools developed in BUS_N@W to assess the impact of upskilling actions. The monitoring results are used to determine the positive effect of upskilling and as input for the performance indicators specific for BUStoB. The results are also used to adjust our approach and to validate the adjustments.

By monitoring in BUStoB we tried to discover what the effect is of the developed materials for BUILD UP Skills in practice (construction projects, building companies and installation companies). For this purpose it was important to offer support to regional partners. It would ensure that they were optimally involved and motivated to integrate 'BUS-results' in their practice. This made it possible to test which skills are necessary and/or the most effective for their work. We introduced the developed e-learning modules including assessment and BUS-app as instruments. Each pilot was supported by a pilot team. This is described in "D4.4 Progress report regional pilots".

In this deliverable the monitoring setup is explained and applied. After this the results and lessons learned are reported. The main lessons are:

1. BUILD UP Skills is a catalyst for working on skills related to a sustainable built environment. BUILD UP Skills is often one of the many steps or incentives during several years of capacity development. Therefore it proves to be very difficult to measure impacts (both short term and long term). Most impacts are interrelated with other actions and the time passing between the intervention and the next steps taken by organizations and/or persons can be quite long. E.g. some of the training providers already active in the BUILD UP Skills period between 2011 and 2013 are now starting to show results in their training portfolio.
2. The period in which BUStoB pilots have been executed was too short to measure direct effects of the upskilling interventions on the workplace. Successful upskilling of craftsmen starts with a little encouragement, but needs to be accelerated during a longer time period with small incentives. In this way the necessary skills develop step by step.
3. Learning analytics proved to be a valuable source for future impact evaluation. A condition for successful application of learning analytics is the effective logging and exchange of anonymized learner data. We met this condition by using Google Analytics.
4. Realization of a sustainable built environment will take more than 30 years. For adequate preparation large scale upskilling must be facilitated in the next fifteen years, to ensure that around 50% of all companies is ready (the early adopters and the early majority groups (13.5% and 34%).
5. For large scale upskilling of blue collar workers a core condition is the ability of companies to innovate their business. That means that for further acceleration much more attention needs to be given to scaffolding (support of workplace learning) and training activities for companies, in order to re-invent or enrich their businesses and primary processes.
6. There is more than one way to catch a fish
A mix of measures and means is needed to reach the upskilling goals. The e-learning modules and assessments, the BUILD UP Skills advisor app, the training of trainers and ambassadors, the cooperation with VET education providers and the cooperation with training providers for continuing professional development are all means needed to give craftsmen one 'gentle push' at a time.

2. The monitoring methodology explained, applied and analysed

Monitoring of BUStoB has been implemented based on the setup developed in BUS_N@W.

In this chapter we explain the monitoring methodology developed in BUS_N@W and show how it is applied in BUStoB, including the interpretation of results.

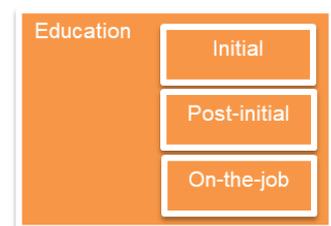
2.1. The BUILD UP Skills monitoring mission

The mission of BUILD UP Skills actually looks quite simple: how to best connect the knowledge supply to the current way of gaining knowledge in practice, and then to help improve it to enable large scale upskilling. Two topics may be distinguished: **knowledge supply** and **knowledge in practice**.

Knowledge supply is the whole range of offerings to bring the required skills to craftsmen. This can roughly be divided into initial, post-initial and on-the-job 'education categories'. The focus in BUStoB is on post-initial and on-the-job courses.

Additional questions for monitoring are about putting knowledge in practice:

- how do craftsmen learn in projects (learning-by-doing);
- is that linked to in-company courses;
- what is the role of suppliers and producers;
- how exclusive is this way of acquiring skills;
- and especially what does it mean for 'standard / traditional' knowledge supply?



The best way to tell something about the current skills of craftsmen (but also about the effect of newly acquired skills) is through evaluation of EE (Energy Efficiency) and RES (Renewable Energy Systems) projects. This is illustrated in the figure below. In an ideal world you have an EE/RES project as input in which companies and employees are applying their newly acquired skills needed for a sustainable built environment.

2.2. The BUILD UP Skills monitoring setup

Monitoring in the scope of BUILD UP Skills is about the effect monitoring consisting of relations between:

- A. Policy/regulation
- B. Build environment and market conditions
- C. Companies/employees
- D. Training/education
- E. Innovations/(technical) developments
- F. Activities of the national BUILD UP Skills qualification platform / project(s)

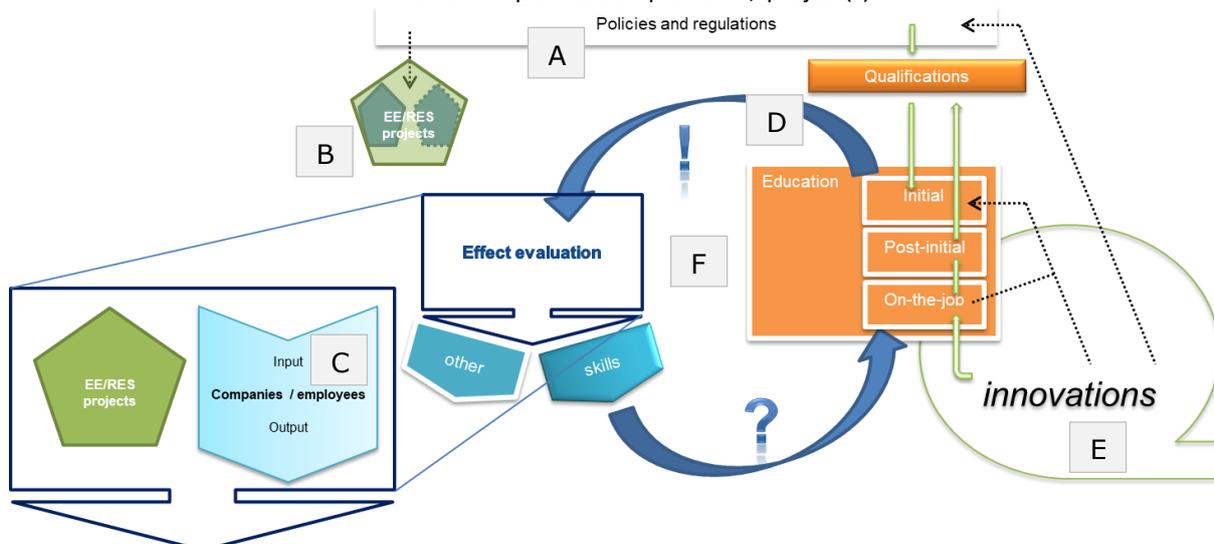


Figure 1: Overview of monitoring elements

2.2.1. A and B - Policy/regulation & Built environment and market conditions

At first, a number of standard issues must be monitored, like the availability of projects related to 2020 objectives. Will they reach the market anyway, and if so, in which shape? This also includes matters like market conditions, market development, influence of policy and regulation, with a distinction between new housing and renovation:

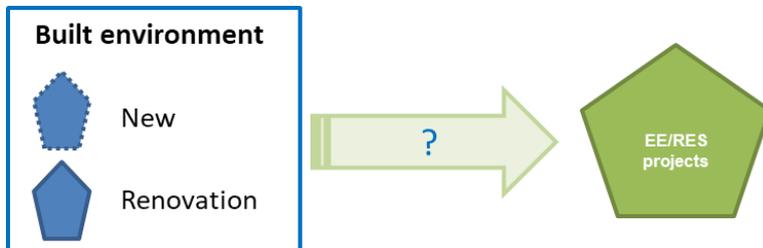


Figure 2: How will the market for sustaining the built environment develop into projects

A and B applied in BUStoB & results

In BUStoB the Policy/regulation & Built environment and market conditions are described and analysed in 'D4.2 Labour market analysis'.

A and B lessons learned

The most important lesson learned is that the market for a sustainable built environment needs a steep growth curve until 2030. After that, the market for sustainable buildings will stabilize and become a 'mass market'. From a BUILD UP Skills perspective, the tools and training materials developed in BUILD UP Skills can provide significant acceleration over the next 10-15 years. Another lesson is that the influence over government policy can both frustrate or accelerate the steepness of the growth curve. When frustration occurs, the dynamics on the labor market get much more complicated. E.g. when there is a need to upskill huge numbers of blue collars in a short time period, instead of gradual growth of the capacity through upskilling.

2.2.2. C - Companies/employees

In connection with this, general numbers about availability of relevant employees / disciplines should be monitored. Are there enough companies addressing the market and are there enough people to carry out the EE/RES projects? Companies which qualify for accreditation, can also be monitored.

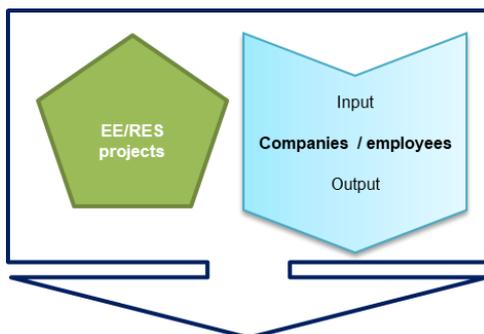


Figure 3: Companies and employees performing EE/RES projects

C applied in BUStoB & Results

In BUStoB there are no additional activities undertaken to monitor the number of companies and employees active in the market. Both the building and installation sector are already monitoring these on a yearly basis. As a result of economic growth, the previous crisis and ageing of the workforce a labour shortage started to grow while BUStoB was running. There is now a labour shortage even for traditional forms of work. Because of this companies are less inclined to explore new kinds of business (such as a sustainable built environment). Despite this, the market segment for sustainable built environment is growing rapidly, mainly because of decisions by

the Government to become independent of natural gas. There is still a lot of uncertainty when it comes to the ‘technical mixes’ for adequate sustainability.

C lessons learned

For mass upskilling of blue collar workers a boundary condition is the ability of companies to innovate their business. That means that for further acceleration much more attention needs to be given to scaffolding and training activities for companies (business owners and business developers), in order to re-invent or enrich their businesses and primary processes. In traditionally organised companies, training the blue collars follows the impact made by white collars changing the business and primary processes.

2.2.3. D – Training/education

Training and education is the translation of Knowledge supply. It consists of the whole range of offerings to bring the required skills to craftsmen. This can roughly be divided into initial, post-initial and on-the-job ‘education categories’. The formalized part of the knowledge supply is regulated with qualifications, both voluntary and legally required qualifications.

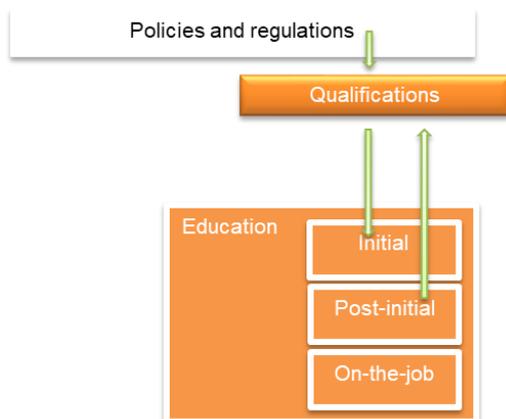


Figure 4: Relations between policy-making, qualifications and education supply

With the BUILD UP Skills monitoring setup several effects can be observed:

1. Initial education effect (quality of school-leavers). Especially seen over a longer time; if the examination performances become better, this can be related to improvements in the curriculum, etc. Monitoring this ‘loop’ is particularly important for the educational side, because of its connection with curriculum, policy and government funding.
2. Post-initial education effect. Monitoring the quality of school leavers helps predict the need for additional training for starters. The BUILD UP Skills monitoring setup can relate this to the actual variation in demand for training courses: are new employees actually sent to post initial education activities?
3. Learning on-the-job effect; the monitoring setup allows for a combination of data on learning in training projects, internal training and in-company (product-related) courses. Although on-the-job education can partially be considered to be a part (subcategory) of initial and post-initial education, the monitoring setup treats it as a separate category. In this way it provides an opportunity to observe (changes in) current dominating structures within initial and post-initial education.

D applied in BUStoB & Results

1. Qualifications:
BUStoB successfully promoted and contributed to the translation of the Professional Development Profiles (BCP’s from BUS_N@W) into qualification subset descriptions for ‘optional curriculum parts’ formally recognised by the Dutch government. This success was followed by another one: after on the Qualification subsets for EQF2 and 3 were published vocational institutes asked for the same kind of Qualification subset for EQF 4. BUStoB cooperated for the development of training materials with

several publishers who helped translate the BUS modules to material that may be formally used in education. The branch organizations involved organised the construction of formal exams related to these qualifications.

Selecteer uw verfijningsopties	Duurzaam vakmanschap Werktuigkundige installaties		Keuzedeel
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	Code keuzedeel	K0799	
	Versie	Herziening keuzedelen	
	Duurzaam vakmanschap Elektrotechnische installaties		Keuzedeel
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Versie	Herziening keuzedelen		
Duurzaam vakmanschap Elektrotechnische installaties geschikt voor niveau 2 en 3		Keuzedeel	
Code keuzedeel	K0798		
Versie	Herziening keuzedelen		
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Versie	Herziening keuzedelen		
Duurzaam vakmanschap Werktuigkundige installaties, geschikt voor niveau 4		Keuzedeel	
Code keuzedeel	K0897		
Versie	Herziening keuzedelen		
Specialist vakmanschap bij duurzaam bouwen		Keuzedeel	
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Versie	Herziening keuzedelen		

Figure 5: BUS_N@W qualification subsets formalised during BUStoB

In parallel the roofing sector successfully formulated qualifications for green roofs and facades

Kwalificaties mbo		een onderdeel van beroepsonderwijs  bedrijfsleven		Geen items in verzamellijst
Zoeken	Dossieroverzicht	Lijsten	Overlap	
Zoeken				
Groen daken				
Zoeken Wis				
Selecteer uw verfijningsopties	Dak- en gevelbegroening geschikt voor niveau 2		Keuzedeel	
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	Versie	Herziening keuzedelen		
	Dak- en gevelbegroening geschikt voor niveau 3		Keuzedeel	
	Code keuzedeel	K0257		
	Versie	Herziening keuzedelen		
	Dak- en gevelbegroening geschikt voor niveau 4		Keuzedeel	
	Code keuzedeel	K0310		
Versie	Herziening keuzedelen			

Figure 6: Qualification subsets for Green roofs and facades

2. Initial education:

Following the success of the qualification subsets for 'optional curriculum parts' VET providers worked on implementation in the actual curriculum. Several VET providers were successful in acquiring additional funding from national subsidy programs to finance the implementation (creating practise environments, training teachers and so on). Among these are ROC Friese Poort, ROC Nijmegen, ROC

van Twente, ROC Tilburg, ROC Da Vinci and ROC Gilde.



Figure 7: Heat recovery exercise and a domotics center at ROC Friese Poort

3. Post-initial education:

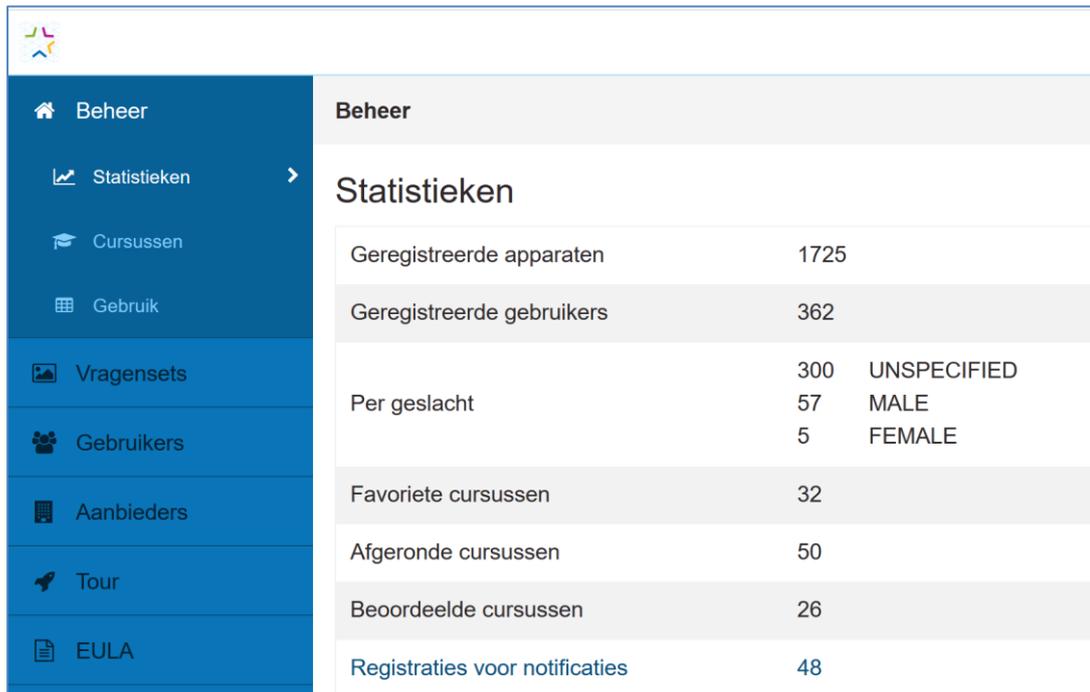
During BUStoB we saw a rapid growth in the number of training institutes delivering training within the field of sustaining the built environment. The BUILD UP Skills advisor-app now works with 83 training institutes who are together promoting 404 course titles.

Despite RES obligations we see a decline in blue collars applying for a formal examination. This may be caused by the voluntary nature of the RES accreditations.

4. Learning on the job:

So far we did not obtain enough data in BUStoB to start monitoring Learning on the job. Due to the decentralised nature of on the job learning it is not easy to catch in numbers. However, the rapid growth of BUILD UP Skills advisor app users is promising. As the number of very short interactions that are used for learning on the job is also growing we will soon be able to see patterns emerging.

5.



Beheer	
Statistieken	
Geregistreerde apparaten	1725
Geregistreerde gebruikers	362
Per geslacht	300 UNSPECIFIED 57 MALE 5 FEMALE
Favoriete cursussen	32
Afgeronde cursussen	50
Beoordeelde cursussen	26
Registraties voor notificaties	48

Figure 8: 1725 installations of the BUILD UP Skills advisor-app in 2018.

D lessons learned

Mass upskilling takes persistence and structural cooperation between involved stakeholders. Thanks to the BUILD UP Skills qualification platform BuildUpSkillsNL it was possible to organise a learning cycle for cross-fertilization in the development of criteria and final terms for courses, trainings and tests, stored in qualifications (between 2011 and 2018 in the three successive Dutch BUILD UP Skills projects).

2.2.4. E – Innovation

The required competences follow innovations regarding EE and RES. These innovations mainly come from industry and research, but can also emerge in practice with the companies themselves. Since many competences are acquired on-the-job, especially with innovations which are developed in-house within projects, it is desirable in any case to connect training to projects as much as possible and formalise it using Qualification descriptions.

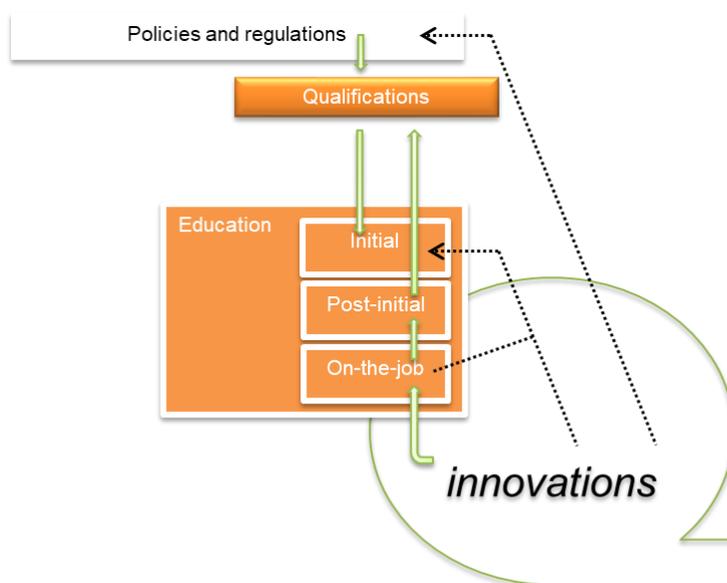


Figure 9: Impact of innovations and the innovation absorption capacity

E applied in BUStoB & Results

In BUStoB we applied a so called innovation maturity scan to detect upcoming innovations. One of the best indicators from the perspective of upskilling was the request for in company custom training and after that the operationalization of the content in training courses which were added to the BUILD UP Skills advisor-app. In the course of BUStoB the overview of relevant technologies has been updated regularly with nine upcoming technologies in total, an average of three new technologies each year. A smaller number of two technologies was removed, because they appeared to be of less importance.



Figure 10: The most recent overview of professions, technologies and softskills

Lessons learned

Moving towards a sustainable built environment is a real transition, both in the building, installation, infrastructure and energy supply sectors. Due to cross-overs and interconnectivity the field of practice is rapidly developing, together with the number of possible solutions to reach the goal. For example during the last two years of BUStoB we signalled a rapid growth of modularization in retrofitting activities, together with digitization and robotization. Also the flexibility of the energy supply system has to become more and more agile or flexible. Therefore we expect in the coming years rapid developments in decentral smart grids and energy storage systems empowered by digitization and e.g. use of DC-grids.

2.2.5. F- Evaluation of upskilling activities, is there a learning loop?

Ideally, there will be a learning loop occurring, based on which supply will improve and adapt to the needs of companies and employees.

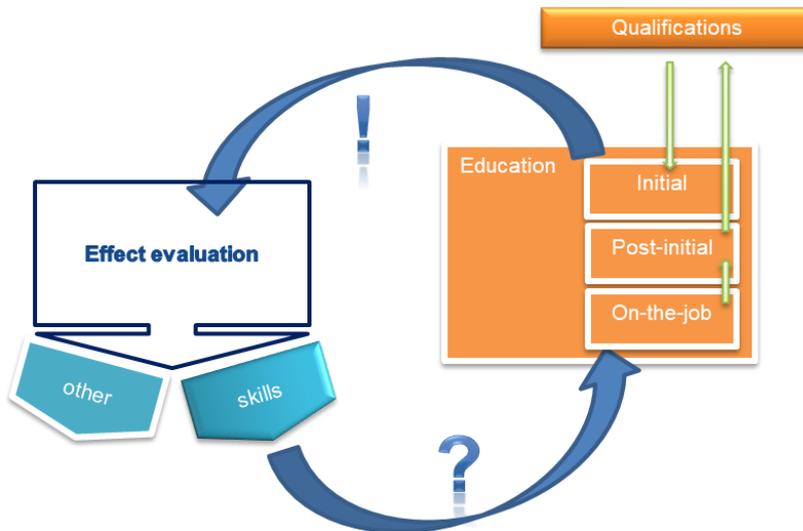


Figure 11: Learning loop occurring when upskilling takes up speed

The expected added value of upskilling for companies is that they will be able to see where improvement is possible and is being created, e.g. on the subject of failure costs, and which upscaling intervention will have the greatest effect on projects.

F applied in BUStoB & Results

In BUStoB we had no means to monitor these effects in a quantitative way. Only when looking at trends one can see there is a fast growing number of companies upskilling not just one employee in a new technology, but larger groups and in-company groups.

We also found a growing interest for the collective development of criteria and final terms for courses, trainings and tests. This is a signal that the market is growing and the need for means to show the quality of training supply is also growing.

BUStoB focused on the development of short basic e-learning modules to establish a measure for upskilling. Looking at the results at the end of the project it seems that at this moment only two out of ten craftsmen are prepared to invest time in e-learning activities. Most users of the BUILD UP Skills advisor app are using it primarily to find a specific (offline) training course.

F lessons learned

There is not one way to catch a fish

A mix of measures and means is needed to reach the upskilling goals. The e-learning modules and assessments, the BUILD UP Skills advisor app, the training of trainers and ambassadors, the cooperation with VET education providers and the cooperation with training providers for continuing professional development are all means needed to give craftsmen one ‘gentle push’ at a time.