Integrating Companies in a Sustainable Apprenticeship System

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Intellectual Output 3

Optional didactic guidelines to use the learning potentials of work processes

Authors: ITB University Bremen and ICSAS-Team

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Erasmus+

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1. Didactic Design Options

In contrast to the Learning Station Analyses (LSA), which were mainly a stocktaking exercise, the didactic design options and their teaching in the "Train the tutor / trainer" workshops in PT and RO finalise the preparatory activities to exploit the potentials of the learning location “company”. Concrete minor changes that refer only to the organisational aspects of a learning station (e.g. duration) can be performed “en passant” after respective LSA or initial experience of PT and RO in practical learning. The "Train the tutor / trainer" workshop focusses, in addition to the content-related preparation of the tutors by means of the specific manuals, on the entire process and the linking of the individual steps.

Before discussing possible design dimensions and didactic guidelines in detail, three remarks should be made:

The concept of **optimisation** already implies that this is not about “reinventing the wheel”. The existing experiences in the training or in the integration of new colleagues should by no means be replaced. The objective of ICSAS is not to implement a fundamentally new approach of learning in the process of work, but to analyse the existing ones and to improve them with the help of methods that provide a structured and critical view on the learning potentials and their current and future use for education.

While the reorganisation of individual learning stations should result in an "objectively optimal" course, training plans, subjective preferences, experiences and also (business) cultural aspects play a decisive role in the overall consideration of vocational education and training. For example, in some of the companies involved, all the cutting work is done in one department, while in others the work is divided into 3 sections (manual cutting, press cutting, automatic cutting). Another example: Depending on the training regulations in different countries, the first operational assignments can take place in the first training months - or perhaps only after several years of preparation in a VET school. It is therefore not a matter of finding an "objectively" optimised design, but of taking into account the training regulations and traditions in the participating countries and the experiences of the involved companies.

As the results of the LSA phase show, the number and quality of the possible learning stations is so high that under the given framework conditions in PT and RO, the entire potential cannot be exploited for every apprentice. The question "breadth or depth?" summarises this dilemma. While it can be expected that the companies in PT and RO are more likely to focus on the core business of footwear manufacturing, some curricula of the industrial shoe maker (for example in DE or in PT at EQF level 4) as well as educational policy considerations envisage a broader vocational educational training. Our recommendation is to exploit also the potentials of spheres of activity, which do not play a major role in a given location of a company, and even to expand them, possibly by exchange of apprentices between the locations of the respective company (if possible) or by establishing training cooperation (for example with companies with other emphases, such as sports or safety shoes, or which employs different makes, e.g. Goodyear welt instead of the common Board lasting).

1.1. Dimensions of design and didactic guidelines

In principle, it is possible to intervene in the training cycle in each of the three dimensions listed in Table 1. However, these dimensions are mutually dependent and optimisations in individual areas could lead to contradictions in others.

Learning station
Sphere of activity
Vocational training/apprenticeship programme

Table 1: Possible dimensions for didactic design

Even if individual dimensions are in the focus of the following subsections, the considerations apply with the overall context in mind.

(Partial) Business process orientation
Overview knowledge - knowledge of correlations - functional knowledge - specialist's knowledge
Bottom-up design
Contextualisation

Table 2: Possible didactic guidelines

Each considered dimension could potentially be optimised according to the guidelines documented in Table 2. An orientation on the partial business process would correspond to designing the sequence of learning station in a training course according to the manufacturing steps in the company; for example, cutting would be the first learning station for the shoe maker.

The second possible guideline, designing the sequence of learning stations or learning contents on the basis of criteria of overview knowledge - knowledge of correlations - functional knowledge - specialist's knowledge, would begin with imparting of what the job (the learning station) is about, in order to clarify the correlations between the relevant aspects and the understanding of the function of these aspects and connections to a subject-oriented specialist's knowledge. This approach could be used, for example, in maintenance occupations:

1st step: the survey of damage report provides an overview of possible damage,

2nd step: minor on-site repairs clearly depict the correlation between the damage report and simple repair measures.

3rd and final step: in workshops where complex damages are repaired, there would be enough work processes and time to develop functional or specialist's knowledge.

In a certain contrast to this is the bottom-up design, where the first steps would consist of simple (sub-) tasks and over time, requirements that are more complex would have to be

coped with. An example for this bottom-up design in shoe manufacturing is stitching; this department offers a wealth of patterns of different complexity.

Another didactic principle takes up the contextualisation, the treatment of sessions with similar context in close connection. It applies for example, to avoid “learning ahead” in the training workshop or VET-school as far as possible; i. e. to coordinate training components as well as possible, or to connect, for example, the theoretical discussion of the various advantages and disadvantages of different sole presses (hydraulic or pneumatic) in the assembly room.

This brief general description is followed by suggestions on how the concrete implementation of the guidelines can look like, but not without referring to the above-mentioned situation- and supply dependency – there can be no ready-made objective flowchart for apprentices that meets the requirements of all companies, trainers and, last but not least, apprentices.

Optimisation dimension learning station

In-company learning station

The experience of trainers and the results of the learning station analysis suggest focusing on the didactic guidelines 3 and 4 with regard to a single work station:

- Does the apprentice understand the work processes and their interdependencies at this workplace?
- Which materials / manufacturing equipment etc. are used?
- What happens to the semi-finished shoe before / after?
- Where in the business process is the workplace positioned?
- It should be avoided that apprentices acquire skills or knowledge without knowing how they will be applied.
- Is the apprentice enabled to "grow into" the work processes of the workplace?
- Does the apprentice start with simple tasks?
- Does he/she get more complex tasks during the assignment?
- Are there sub-processes from which he/she remains excluded?

Basically, the essential parameters of eventual optimisation are the duration of stay in the learning station and the subtasks given to apprentice during this time. Here it has been shown that the involved tutors make learning design intuitively, whereby in some cases the apprentices have to perform only easier tasks. In terms of duration, experiences have shown that trainees who simply rush through a learning station will not learn much and at best can say afterwards what they have heard and what equipment exists in the department, but will not be able to perform tasks. It is important for the understanding of processes to dive in deeply. It is necessary in all steps to learn everything that can be needed professionally or can serve as a prerequisite for the future assignments. Although ICSAS refers to an alternating phase of one year, only, it may be appropriate for future experimentations to leave apprentices longer in relevant and complex learning stations.

Optimisation dimension Sphere of Activity

The workplaces where qualified shoe makers are employed /can be employed after apprenticeship have been assigned to the spheres of activity and curricula (in GER: vocational positions). This way, the matching of the curricula and the vocational educational and training can be determined. This reveals the strengths and weaknesses of the learning potentials of a company, which must be taken into account during planning. If an enterprise (including the training workshop) offers several non-parallel learning stations for a sphere of activity, these could be arranged as follows:

“Bottom-up” - increasing complexity of learning stations:

- The learning stations of the sphere of activity “Lasting” at Carite in PT should be in the order “Lasting preparation” => “Lasting”.

Contextualised learning / avoiding “learning ahead”:

- Reasonable and short gaps between areas with similar content;
- Learning the basics of sewing for upper production in the footwear industry - assignment in the stitching room;
- Consideration of prior knowledge (not too early in complex stations).

For an optimum organization of the individual learning stations (including those in the training workshop or at school) in the dimension of the spheres of activity, the following important questions known from the LSA must be taken into account:

- What can the apprentice learn here and what is relevant for the subsequent stations?
- Which skills should an apprentice already have acquired in order to be able to work here and extend the basic skills?

In a process-oriented vocational education and training programme that takes place at selected learning stations, it cannot be the aim to turn beginners as fast as possible into “masters”. The LSA should serve to identify and put in certain order the learning stations corresponding to the spheres of activity of the “core” of the competent professional work.

Company-specific comprehensively conducted LSA will result in a coherent sequence of the necessary learning steps, predetermined in the processes' workflow. Evaluation of the findings should therefore be done from the point of view of the internal connection of all work processes in order to check whether the actual work organisation ensures an orientation towards the spheres of activity - because, according to the LSA, there is the requirement that individual learning must follow a skill development process.

Optimisation dimension Apprenticeship Programme (flowchart)

Knowledge and capability of skilled labour working in typical and important workplaces provide the norm for vocational educational training which would raise the competence development of apprentices to the level of skilled workers over the course of three years - through process orientation, apprentices should be able to work professionally and cooperate with the colleagues at the end of their training. In other words, if the spheres of activity are appropriately described for the concrete company (1-st condition) and the learning stations

are properly selected (2-nd condition), then the very essential information is available for a competence enhancing arrangement of the learning stations.

In designing an optimal, first-step virtual flowchart for apprentices, the following didactic guidelines have proved their worth:

- Bottom-up - increasing complexity:
    - Integrational tasks such as independent quality control should be at the end of the learning process.
- Orientation towards the business process / profession:
    - Spheres of activity, which cannot be covered by a company should be visited at other locations or companies - if this is not possible, the appropriate skills, knowledge and key competences should be acquired in a training workshop or school.

In particular, at this point, additional materials, especially the current flowchart for apprentices, should be taken into account. In case that the optimal "virtual" flowchart for apprentices mentioned above will not be an option for all apprentices, a further question arises:

- How can all apprentices be offered the best possible flowchart for apprentices?

It is useful to analyse the “packages” found in the spheres of activity according to which prerequisites are absolutely necessary and which ones are dispensable. As a consequence, it is possible to find alternative flowchart for apprentices whose learning potentials differ only in nuances from those considered optimal.