ICSAS
Integrating Companies in a Sustainable Apprenticeship System

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Integrating Companies in a Sustainable Apprenticeship System

Potentials of Curricula-driven Work-based Learning Schemes within School-based VET Systems of Romania and Portugal

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Content

1 Introduction

Dual Vocational Education and Training (VET) or apprenticeship schemes as promising approaches to overcome the economic crisis in south Europe and to accelerate the economic speed-up of former socialist states in East Europe are high on the agenda of European (cp. EU 2018) and national policies since years. Consequently, a manifoldness of approaches and projects have been started to support Work-Based Learning (WBL) in “all of its forms”. The WBL-toolkit (2018) website provides a comprehensive overview.

But when having a closer look at these approaches it has to be stated that many of them are rather far away from “real” apprenticeship schemes; most measures are internships, learning projects, simulations, etc. – and many are not very effective; already mentioned by Euler (2013, p.6): “evaluation of transfer projects revealed in most cases a lack of sustainability”. In order to distinguish the approach of the Erasmus+ project ICSAS "Integrating Companies in a Sustainable Apprenticeship System" from internship or learning projects, a focus will be put on the question of how a successful one-year, curriculum-driven, WBL-pilot can be integrated into the school-based VET-regulations of Portugal (PT) and Romania (RO).

Another approach on policy level to increase linkage between VET and the labour markets have been Qualification Frameworks (QF) (cp. EU 2008 and EU 2017). To achieve transparency and comparability of qualifications, National Qualification Frameworks (NQF) were established in the European countries and have been connected to the European Qualification Framework (EQF). In the last years many papers were already published, arguing that general Qualification Frameworks, might they claim national or transnational relevance, are somehow nothing but “a paradigmatic case of travelling educational reforms” (Bohlinger 2019). On the other hand, some evidence that Sector Qualifications Frameworks (SQF) could be of added value for enhanced transparency of qualifications in the respective sector has been published (cp. for example SIQAF 2018).

Against this background, we have drawn three conclusions for our research and development project:

- To include “sustainability” not only as a cliché, but as a core element in our approach.
- Stop the "vagrancy" of qualifications frameworks by anchoring the framework for levels 2-4 in a sector (Qualification Framework (SQF)).
- And thus, consequently, to focus only on one sector: industrial shoe production.

Our project worked on the following questions:

- What can be learnt in real work-processes?
- What should be learnt in real work-processes?
- What are the supporting or hindering factors of including curricula-driven WBL in the governing of national VET-Systems?
- Is there any added value by Sector Qualification Frameworks (exemplarily)?

No “objective” or “hard” barriers for developing apprenticeships in countries with traditionally school-based VET were found; but a row of “subjective” or “weak” factors like scepticism about quality of Learning Outcomes (LO) from curricula-driven WBL, concerns that apprentices are exploited as cheap work-force, uncertainties about roles of involved stakeholders, etc.. Despite these factors, we successfully designed, implemented, and piloted a one-year curricula-driven WBL in Portugal and Romania.

In addition, a sector qualification framework (levels 2-4) was developed for industrial shoe manufacturing and the qualifications on these levels from DE, PT, RO and ES were classified. The SQF could have the potential to support skilled workers with one of these qualifications to find a job in another European country.

The transfer handbook presented here, which is intended to facilitate the application of the ICSAS approach in other countries or sectors, is divided into chapters according to the structure of the work packages (Intellectual Outputs, IO), whereby in many chapters only exemplarily results could be included in this book as examples. Further products can be found via ICSAS (2020).

The **second** chapter presents a method jointly developed by vocational training researchers and practitioners that can be used to assess learning potentials within concrete work processes. This learning station analysis (LSA) is a work process analysis adapted to the conditions of industrial production. Furthermore, the result of a learning station analysis from the department "Cutting" is documented as an example.

There is no doubt that the work processes of industrial shoe production offer a wide range of learning potentials - the extent to which these are compatible with the curricula of the respective countries will be illustrated in the **third** chapter using examples. Not only potentials and contents must match, but also the curricular requirements regarding duration and possible learning locations must be met.

Curriculum-based learning potentials are a necessary condition for successful learning in the process of work; however, learners must also be supported in developing the corresponding competences. The colleagues in the departments are experienced skilled workers - but not necessarily prepared to support trainees. For this reason, ICSAS project has developed eleven manuals for skilled workers (mentors) who accompany apprenticeship training. The manual for the "Cutting" department is documented in the **fourth** chapter.

Whether learning in the process of work has been successful or whether there is still some catching up to be done by individual trainees, if necessary, must be communicated between the specialist departments and the trainers or teachers responsible for the respective trainees. Fundamental considerations on this and a detailed proposal on how this communication can be structured can be found in the **fifth** chapter of this book.

The steps described in the previous chapters represent, according to the authors, an optimal preparation for learning in the process of work. But "the proof of the pudding is in the eating", hence the question: Do they pass the practical test? To answer this question, a one-year practical phase of learning in the process of work was closely monitored in Germany, Romania, and Portugal. The experiences gained were each subjected to a strengths/weaknesses/threats/opportunities (SWOT) analysis and are documented in the **sixth** chapter.

Taking up the manageable benefit of non-sector-specific qualification frameworks already mentioned above, the **seventh** chapter presents a sector qualification framework of levels 2-4 for industrial shoe production. The qualifications of these levels in Germany, Spain, Portugal, and Romania were referenced in this framework - thus contributing to the transnational transparency of these qualifications.

The **eighth** chapter is devoted to the sustainability of ICSAS project. In addition to the documentation of two rather basic papers, a Memorandum of Understanding and a position paper of the project partners and supporters, the focus is especially on the steps taken by the Romanian and Portuguese colleagues to implement learning in the process of work in the respective national or regional VET-regulations.

This book concludes with a chapter on the prospects, which reflects the three years of the ICSAS project and also, quite self-critically, reflects the lessons learned: learning in the process of work is not a automatic process.

2 Learning Station Analysis (LSA)

Learning Station Analysis (LSA) - an instrument to connect occupational Activity Fields (AF) respective Spheres of Activity and Work-Based Learning (WBL).

2.1 Introduction

Learning within work processes differs in three important aspects from formal learning in schools or apprentices' workshops:

- → What can or should be learnt does not only depend on decisions of teachers or trainers, but is strongly determined by work processes;
- → The absence of pedagogically specialised staff;
- → The number of mentors (skilled workers accompanying the apprentices, supporting the development of their vocational competences).

This manual 'Learning Station Analysis – an instrument to connect occupational Activity Fields (AF) respective Spheres of Activity (both terms are used synonymous) and Work-Based Learning (WBL)' is an adapted version of a collaborative product of ITB (University of Bremen) and trainers from Airbus which was developed for two pilot projects in the aeronautic sector 'Move Pro Europe' and 'AERONET'. This method has already been approved in other sectors and other European projects such as 'APPRENTSOD' or DUAL TRAIN. In particular, the form of documentation of the analytical results has been adapted with respect to the specific aims of the 'ICSAS' project. The methods proposed here are supposed to be applied to exemplary work places in shoe production, where 'activity fields' (AF) or units have been identified and selected for their suitability for the implementation of dual structures.

The 'LSA' (Learning Station Analysis) method was developed to support the training organisation at the learning places in an effective way, taking into regard business needs as well as processes requirements. Essentially, it helps users to identify the work places that are important both in terms of the significance of their operating processes and for the learning opportunities

they provide. This approach emphasises the value of trainings taking place at work stations where the most significant operations are being carried out: the quality of training to prepare apprentices for the requirements of modern skilled work is considerably increased if the training takes place at the most relevant operational processes.

LSAs should not only enable the development of training processes which focus on the work process, they should also provide support for the positive development of the trainees.

The LSA method serves to examine the quality of individual work stations within a training process, and, moreover, can highlight the value of these being attended in a certain order. A simple example would be the comparison of a single-task operational work place in a workshop and a more complex operational work place in the final assembly line that offers insight into and experience of a technology and a quality procedure that are characteristic for a professional occupation. However, prior to entering into such a more complex workplace, young people need to possess an understanding of certain production procedures. Without such preceding experience (for example if a trainee arrives at a relatively early apprenticeship stage at a challenging learning station and remains there for only for a short period of time), it is quite impossible to fully impart the actual functioning at that work station. In consequence, learning opportunities are missed. This example illustrates that the overall training organisation and the order of flow through different learning stations has an impact on the learning results and the training quality. An additional important aspect of the LSA method is that skilled work is being regarded from a beginner's perspective: elements that seem self-evident and too trivial for experienced workers to explicitly explain can pose considerable, if not insuperable problems for a trainee and need to be communicated explicitly. LSAs reveal the communication needs and the learning potential of specific workstations within the entire apprenticeship programme, and they can contribute to analyse other work stations so as to provide information on the optimal sequencing of movement through the work stations, which can be depicted in form of a flow chart. The LSA method is also suitable to assess the potential of workstations that have not yet been used for training purposes – not only the learning potential at work stations already being used in trainings.

→ The LSA method was jointly developed by researchers and trainers.

→ Its primary objective is to evaluate learning potentials of work processes.

→ It helps to set up training plans according to work processes, and fosters the acquisition of skills and competences by the learners.

2.2 Procedure – Milestones

The term 'Learning Station Analysis' itself clarifies the aim of the LSA method as a tool. 'Learning stations' are places where learning to acquire skills and competences to perform work central to the occupation takes place. LSAs analyse workplaces, which cover activity fields (AF). AFs describe skilled work tasks in terms of characteristic operations and work contexts that are needed in order to make sense of learning and allow the trainee to "grow" into an occupation. They are typical for the profession and, in total, comprise a complete specification of the learning required in order to become fully skilled. With this definition vocational activity fields can be specified as follows:

No individual activities or performances are analysed, for example closing a backseam or activating an upper. Instead tasks, in the sense of complete actions, following a holistic process structure, are analysed, such as cutting or lasting. The aim is to obtain a general process structure of activity fields; containing specifications of concrete tasks, including their planning and accomplishment as well as quality inspection and assessment of work outcomes. The LSA method is based on the following criteria:

- It has to reflect the super-ordinate coherence of the occupational work process and refer to a distinct vocational profile;
- It always describes a work context and a complete work action, highlighting planning, performing and evaluating the work;
- The formulation of the documentation also emphasises the content and types of skilled work;
- It reflects function and meaning of a work-process in the context of super-ordinate operational business processes;
- Particular attention is paid to the creative potential in skilled work.

LSAs assigned to activity fields are divided into the following three phases:

→ Preparation of the analysis,

→ Accomplishment of the analysis,

→ Evaluation and documentation of the analysis (the results serve for developing a training schedule respecting a logical sequence of progression through learning stations).

2.3 Learning Station Analysis – Approach

2.3.1 Preparation of a LSA

Investigation team

The selection of the LSA team is part of the preparatory phase. It is recommended to choose a group of two people, including an expert skilled worker and a researcher or teacher.

Selection of workstations

Although each LSA corresponds to a previously identified activity field, the following procedure is recommended: It is necessary to distinguish an activity field from sub-tasks. It has to be checked whether a workplace fulfils the precondition of being relevant both in terms of competence development and syllabus. The ICSAS project intents to plan a complete apprenticeship: it requires numerous individual analyses in the technical and production departments in order to achieve the desired training results – but the LSA method also reveals what cannot be learnt within the company and thus should be taught in VET-school or training workshops.

It is necessary to select operational work places as (possible) learning stations in the company and/or a department, where qualified specialists master the tasks, which are representative for the activity field. The operational representative in the LSA team is responsible for the selection of the workstations, since he/she has detailed insight into the business and work processes and can ensure LSA performance on site.

In practice, activity fields are often not completely isolated from each other. At many work places (and therefore at learning stations or in work fields), several closely linked activity fields are mastered together. For the analysis it is advisable to select work places with the ‘core characteristics’ of an activity

field. Although, only one individual activity field is analysed at a time, the interfaces with other activity fields have to be observed. Simultaneous analysis of several fields could cloud the view on the most relevant processes in different fields. When – due to work organisation – several AFs are involved in a work process, it might be necessary to perform several LSAs from different angles (for example in the case of function checks, disassembling and malfunction analysis).

An immensely influential factor in LSAs is the cooperation with the skilled workers at the respective work places. It is important to make particularly clear to them that the analysis is not conducted to prepare rationalisation measures, personnel restructuring or an assessment of their performance. The participation of specialists with substantial professional experience is crucial for devising vocational education and training programmes in practice. This central request should be clarified with the production manager who has given agreement for the planned analyses to take place.

The following four steps have to be performed to complete a LSA:

- Discussion schedule (interview);
- Preparation of a record (references);
- Preparation of photos and sketches;
- Materials and samples for visualisation (design sketches, semi-finished products, components).

→ Ideally, a LSA is conducted by a skilled worker and an external colleague.

→ The manual for analysis should be used as a toolbox, not as a rigid rule.

→ A LSA takes several (few) hours.

2.3.2 Manual for the Analysis

Not only (experienced) researchers, but also the skilled staff selected for a LSA should read the LSA manual beforehand and focus on the following questions:

- In which business and working processes is the activity field integrated?

- At which workplace is the task of the activity field executed?
- Which items are being worked on during the actual performance of a task?
- Which tools, methods and organisation forms are used?
- Which requirements in terms of skilled work have to be met?
- Which interfaces to other activity fields exist?
- What are the experiences in regards to training at this workplace?

Based on these preliminary questions, the analysis categories are developed, which can then be complemented in detail by a catalogue of central questions.

Analysis category: business process

The analysis of skilled work cannot refer to the workplace without considering the context. Without consideration of the integration in business and working processes, skilled work in its full complexity cannot be appropriately captured. For this analysis category, material and information flow charts as well as schematic diagrams of the order flow are very useful. This material can be examined by the LSA team in the preparatory phase, i.e. before the 'on-site-analysis' starts.

Analysis category: workplace

When describing a chosen work place, it is of special interest to identify – besides the location (department, production area and section) – the working conditions under which the specialists perform their everyday work. Relevant details are lighting conditions, noise exposure, ambient temperatures but also aspects of ergonomics at the workplace (e.g. sitting positions, work benches).

Analysis category: subject of skilled work

In order to describe the subject of skilled work, the work context and the work process need to be considered. For example, the technical realisation of a machine is very often done in such a way that the machine operator requires only few skills and knowledge. However, the work routine of the machine operator differs substantially from that of the maintenance technician, although both work processes refer to the same machine. The machine operator adjusts the necessary machine settings (e.g. model- and size-dependent), feeds parts to the machine and accomplishes simple maintenance tasks. The

operator relies on the trouble-free functioning of the machine, and in general does not know much about the internal design and the technical details. In case of machine breakdown, the maintenance technician has to determine the cause for the defect and therefore, on the contrary, needs detailed knowledge of how the machine is constructed in order to identify all possible causes for malfunction.

Skilled work can contain a surprising degree of creative potential. For example: Even if two maintenance technicians proceed in a completely different way when trying to repair a machine default, their goal is the same: identification of the defect and rapid repair. LSAs identify the methodical approach of skilled workers in performing such professional tasks. Differences can be found not only in the actual work execution but also in planning the work. In many cases, different strategies are viable.

Analysis category: tools and equipment for the skilled work

Concerning the description of the tools and equipment used in the skilled work, the context of the work process is crucial. Beside the tools used, the workshop facilities that are used in the work process at the work place are also of interest.

Analysis category: organisation of the skilled work

The form of work organisation of work is a key feature of skilled work that cannot be neglected. In this respect, the operational structure and sequence organisation are at the centre of attention (e.g. group organisation, division of labour, hierarchy levels, co-operation with other professions). Co-operation with other professions (e.g. in skilled maintenance work; decentralized versus central maintenance) is an important aspect of the analysis. Varying organisational forms can lead to substantial differences in terms of occupational responsibility, task connection and co-operation and communication requirements relating to the work process. Also work time models (e.g. shift work, break times, part-time jobs) may affect the nature of skilled work considerably.

Analysis category: requirements for skilled work and its components

In this phase the demands towards the work process and the work components, made by different stake holders, are identified. For example, the company sets specific quality standards, which are necessary to stay competitive and have to be respected when performing skilled work. This may

require, among others, the adherence to time and cost targets. In addition, legal requirements and standards, e.g. technical standards or the health and safety at work regulations, must be respected. The possibilities and requirements of organising and aligning technology and skilled work only become clear when these varying and partially contradictory demands are compiled in the format of a list.

Analysis category: interfaces

Furthermore, the analysis must be put in a broader context. Especially interfaces and overlaps with other activity fields deserve special attention. As previously mentioned, activity fields occur rarely completely isolated; they are often closely linked to others and cannot be clearly demarcated. In consequence, results of analyses concerning the chosen activity fields, which derive from other workplaces, can also be subject of critical reflection.

Analysis category: experience with training

As already mentioned, LSAs focus on the development of recommendations as to the sequential order, duration and type of training a learner can receive at work stations. The experiences of skilled workers with trainees are therefore of particular importance. For the purposes of the ICSAS project, entries in the fields “experiences with new colleagues”, “preliminary conditions” and “level of autonomy” are of particular relevance:

- Experiences with new colleagues: The answers to this question might reveal relevant weaknesses of the training system, which most likely cannot be solved at the level of single activity fields.
- Preliminary conditions: It strongly increases the acceptance of internships if basic skills and knowledge (I. e. health and safety regulations, working under workshop conditions) are trained in advance.
- Level of autonomy: This indicates the learning outcomes that can be expected. Sometimes the highest level (autonomy) cannot be attained (legal preconditions, necessity to have of a lot of experience, etc.) – but this does not lower the potential benefit of WBL; it only indicates the possible realistic outcome. In addition, the autonomy level scale is very useful to document the achievements of trainees (cp. Table 2 and Table 3): The mentor responsible for the learning station can indicate on a personal assessment sheet which performance level a trainee has attained.

The classification scheme with guiding questions for the LSA is merged in table 1 and designed as a master template to guide the analysis. The guiding questions offer suggestions for the analysis. They do not need to be strictly followed in each analysis and are not to be considered as a checklist. Their purpose is rather to provide suggestions in order to be able to produce meaningful LSA results.

Analytical category	Central questions
Business and work process	• Which business processes is the learning station part of? • Which products are manufactured? • Where do pre-products come from? • How are orders accepted? • Where in the further process are the products used? • How are processed orders handed over? • Who is client / customer of the service?
Workplace	• Where is the analysed workplace located? • What are the prevailing lighting conditions? • Prevailing climatic conditions (heat, cold, radiation, ventilation, gas, vapours, fog, dust)? • What are the postures of the workers when performing their tasks?
Subjects and methods of skilled work	• What exactly is being worked on at the respective learning station (e.g. technical products and processes, services, documentations, control programs)? • What is the role of the object produced within the working process? • What procedures are applied when working on the task (e.g. manufacturing / assembly operation, error tracing, quality assurance procedure)?
Tools / equipment of skilled work	• Which tools and equipment are used to perform the task (machines, tools, devices, software)? • How is the tool/equipment handled?
Organisation of skilled work	• Organisation of the skilled work (e.g. individual work or group work, division of labour)? • Which hierarchies affect the skilled work? • Which co-operations and boundaries with other occupations or departments exist? • Which qualifications come together in multi-skilled workers / teams at the respective learning station?
Requirements of skilled work	• Which operational requirements have to be met when performing the task? • Which demands are placed by the customer?

	• Which social requirements do play a role? • Which standards, laws and quality specifications need to be considered? • Which rules and standards does the community of practice require?
Interfaces	• What are the links and interfaces with other activity fields? • Which comparisons can be made with other analyses in this activity field that have already been accomplished? • What are the similarities / differences to other workplaces in the company or in other companies which refer to the same field of activity (perform the same tasks)? • How are theory (vocational school) and practical work interlinked, what are the 'vocational basics' and/or 'core competencies'?
Training experiences	• Is the analysed workplace actually being used in training programmes? • If not, why? • In which year of apprenticeship are the trainees at this learning station (or should they be)? • How long are (should be) they at the learning station and where were they before / where do they go afterwards (should have been / should go)? • Which preliminary conditions should the trainees meet? • What should a trainee learn in the opinion of the skilled workers at this respective learning station? • What are the experiences of the skilled workers with trainees/ young skilled workers at the respective learning station? • How are the trainees coached / supported? • Do the trainees work on "normal" work orders do they work on separate orders (e. g. simulated work processes)? • What level of autonomy expected from a trainee at the end of his internship at this station? (support/under instruction/ under surveillance/independently)

Table 1: Guiding questions for the Learning Station Analysis

2.3.3 Execution of Analysis and Documentation

At the beginning of each LSA, the specialists, i.e. the personnel working at the selected workplaces whose work will be analysed, must imperatively be informed of the aims of the LSA. They should follow their work routine as usual: the analysis does not focus on performance, but on how a skilled worker organises and carries out his/her tasks. It can happen that no 'highlights' occur on the day of the LSA, just unspectacular 'standard work'. This is not a problem for the analysis; it just reflects normality. The workplaces

are visited and analysed according to the guiding questions which were conceived to get answers making the «invisible» visible. All LSA interviews must be audio-taped in order to handle the information abundance. Of course the recordings must be previously authorised. The amount of time required for the LSA interviews depends on the complexity of the tasks at each workplace. Experience shows that a LSA usually takes a couple of hours.

- → The core of a LSA is to analyse daily work of a skilled worker from the perspective of an apprentice.
- → LSAs are not an attempt to evaluate the individual performance of skilled workers.
- → The skilled workers involved in the interviews should proofread and give their ok for publication of the documentation of a LSA before further circulation.

2.4 Evaluation

The LSA tool pursues two targets: Firstly, to compare the organisation of work at the learning stations with activity fields (AF) respectively units of the curriculum, and secondly to document the learning potential of learning stations. The interviews should cover all necessary aspects to unveil the learning potential of each workplace and to describe it with the necessary clarity. However, the LSA team should give the question of what learning potential can be realistically expected at each specific learning station some initial thoughts, taking into regard the individual progress of each trainee and the requirements of vocational training.

For sure 'potential' is not a guarantee of 'learning'. The term 'potential' rather highlights that a situation or context offers (good) possibilities for substantive learning. In qualification research and professional education 'learning potential' not only has connotations of positive influences at a personal level, it also means the increase of competences in the special subject or task – in the sense that someone is enabled through the learning process to do something that he or she was not able to do before. This also means that someone who is not capable of doing something which he will be required to do later in her/his career is not behaving wrongly. He/she is just not yet able to perform the required tasks. The trainee is expected to reach the required performance

level not through threats or exhortation, but by learning to do something thanks to appropriate learning opportunities. The learner has to take advantage of these opportunities in order to gain experience and expertise. Vocational training helps trainees to achieve these goals, but in order to enable them to do so, the responsible staff for organising work-based learning in companies have to be knowledgeable about where within the work process the relevant learning possibilities are located.

The goal of work-based learning is that trainees reach the level of skilled workers in the chosen activity fields. A precondition is that the AF are correctly described and learning stations are selected correspondingly. However, the skilled work observed during LSAs is actually based on long-term experience. Hence, even under ideal conditions at a learning station, it is practically impossible for a trainee to reach the level of an experienced skilled worker within the scope of a limited training period.

Another pedagogical argument has to be considered: it is virtually impossible for an apprentice to catch up with the routine and experience that a skilled worker has acquired during 5 to 15 years of career – even if the training is organised with utmost efficiency. But this is exactly why job beginners should get in contact with skilled workers, with 'masters of their profession', and should be coached by them during the entire practical training. Even if it is not possible to become even nearly as professional as the experts within a training of several weeks at the learning station, the contents that are important for the profession can be most effectively learned from the experts in the field. A knowledge and skill gap between an expert skilled worker and even the most talented beginner will, of course, always persist. It will only diminish over time.

It is not the primary objective of a process-orientated training to turn beginners as quickly as possible into 'experts'. As we have seen, LSAs aim to identify the core features of skilled work that are present at the relevant learning stations according to the AF. A further aim of LSAs is to bring the learning stations into an appropriate order for learning purposes. Hence it is necessary to be aware of the learning potential of all learning stations. For example, consider the core work associated with cutting of upper parts from leather hides. It can be analysed how the necessary skills and competences can be acquired in an effective way. It can also be identified what prior skills, knowledge and attitudes the trainee should have for effective learning in that

workplace. Having a cooperative attitude may greatly aid the learning process in cutting, as well as having theoretical knowledge about leather and being able to create a cutting layout or hold a hand cutting knife. A trainee can learn all the practical skills from involvement in the work process. In order to organise an effective progression through the different learning stations, LSAs can also serve to create a reliable assessment tool, led by two key questions:

- What skills can be acquired at the particular learning station and which elements of this skill spectrum will be required for which subsequent learning station?
- What skills and competences must the trainee already possess in order to increase the chances to achieve a substantial learning gain?

These two questions have to be answered for each LSA. It is key to identify the initial entry level requirements for each learning station a trainee must meet, as well as to identify the expected learning outcome (skills and knowledge the trainee should have acquired after the training at a particular learning station). The learning outcome of one learning station is the pre-requisite to enter into the subsequent learning station.

A comprehensively accomplished LSA in a plant will result in a logical organisation of the necessary learning steps that can be achieved by a particular progression through different organisational work processes. The evaluation should therefore take "the internal linkage of all working processes" into account. The development steps of trainees have to be aligned with how trainees can move through the organisational work processes.

The training quality will also depend on the time a trainee can spend at each learning station. Evidently, short trainings (few days/weeks) can only quickly touch on each process step will impart very little about the process itself. Short-time trainees will be able to report what he/she has heard and seen, but cannot develop a deep understanding or know-how because of the lack of substantial experience. A rapid progression through work processes can only produce superficial knowledge.

The flow through learning stations is guided by a pedagogic rationale. We should be aware that the core competences may require hierarchical structuring because of increasing levels of difficulty and increasing amounts of time to learn. Therefore it makes sense if less complex component elements

of a major task are learned at an earlier stage. LSAs investigate the potential of concrete work processes to provide support for competence development of apprentices.

LSAs answer the following questions:

→ What can be learnt at a specific learning station?

→ Which skills and knowledge should a trainee already have acquired before entering a new learning station in order to achieve optimal learning outcomes?

→ Findings are recommendations; concrete implementation might be affected by frame conditions (e. g. number of placements at a time).

2.5 Template

The template below is based on Table 1. It is half open, meaning that it offers at any time the possibility to make additional entries.

Description	**Learning station:**	
	Date:	
Location / site	**Vocational profile**	
Allocation	To curriculum	
Process environment	Type of product/service	
	Internal supplier	
	Order- / material acceptance	
	Direct user of product/service	
	Client of product/service	
	Production steps already performed	
	Interfaces with other process steps	
	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	
Process steps (detailed description)		
Workplace	Shop floor	
	Lighting conditions / environment	

	Posture			
	Specifics			
Organisation	Employees at workplace per shift			
	Employees in department			
	Hierarchy			
	Cycle time			
	Shifts			
	Similar work stations			
	Cooperation			
	Specifics			
Interfaces	... to other activity fields?			
	... to other learning places?			
	Separate trainee workshops / theoretical knowledge?			
	Miscellaneous			
Vocational training	Vocational year / duration			
	Preconditions / previous stations			
	What should they learn?			
	Specifics of training (individualisation, duration, timing)			
	Experience with trainees & young skilled workers			
	Assistance / working tasks			
	Is the existing potential used?			
	Possibilities for improvement			
	Number of trainees per learning station			
Highest level of autonomy reachable	Support	With instruction and guidance	Under surveil-lance	Indepen-dently

Table 2: Template LSA

2.5.1 LSA-Example

During ICSAS project, project partners performed ~14 LSA in Germany, Romania and Portugal, each. In this book only one example is documented, the

others can be consulted and downloaded from project webpage icsas-project.eu.

Description	**Learning Station**	Cutting / Prototype production
	Date	January 2018
Location / Site	**Vocation**	Industrial Shoe Maker and Finisher
Allocation	**Time frame / Occupational profile (vocational position n°)**	A 2. Cutting and clicking of materials for upper manufacturing (§ 4 paragraph 2 number 2), 18 weeks A 1. Assessment and use of materials and auxiliary materials for upper manufacturing (§ 4, paragraph 2 number 1), 14 weeks A 3. Preparation of upper parts (§ 4, paragraph 2, number 3), 10 weeks
Process environment	Products	Cut upper parts (outer upper, interlining, lining)
	Type of product / service	Semi-finished products
	(Internal) supplier	Leather / materials warehouse
	Order- / material acceptance	Batch box with work order and cardboard patterns
	Direct user of product / service	Stitching (at Gabor Rosenheim this is also where quality control of the upper parts prepared to be stitched takes place)
	“End” user of product / service	Final inspection / shipment to customer
	Production steps already performed	Design, pattern making (including digital object data for automated cutting tables), cardboard patterns (from the grading room), production planning (creating work orders for production including all production steps / stating all materials and components),

		preparation of materials to be cut (for serial production, the material is being prepared for the cutters, but for prototype production the cutters fetch the material they need from the warehouse themselves)
	Interfaces with other process steps	-
	Particularities	At the Rosenheim site, Gabor produces exclusively prototypes. In consequence, there is no piecework rate. The reason for this is that the workers do not only need to concentrate on the correct execution of all work steps for the new patterns (no routine work), but they also need to verify that all information in the work order is coherent and complete. This could not be done under time pressure. Sometimes the workers need to make own decisions. As concerns prototype production, the cutters are responsible to choose the needed materials (upper, interlining, lining) in the warehouse (whereas for serial production, the cutters will receive the prepared batch boxes with all materials at their work place).
Process steps Detailed description	The cutter receives the first draft for a new prototype from the designer. The work sheet contains information on: • who created the design (name) • date • article name • pair or piece • upper material, lining, seam colour, elastics • sometimes only the outer upper material is defined and interlining and lining are determined only later	

	• patterns If **cutting** is done by hand, the cutter cuts interlining and lining, whereas the upper leather is cut on the automated cutting table (oscillating knife). All pattern stencils carry designations: O or OB = outer upper leather, V = interlining, F = lining. The marking pattern stencils are of particular importance for the stitching department (to provide guidance to the stitchers on how to join the upper pieces). Sometimes prototypes are produced without a final decision on interlining and lining. The final decision is taken when design and marketing will discuss the article. Only after this meeting all materials are defined. Cutting of upper leather is done on the cutting table: All upper leather parts are cut from leather hides or skins (no need for pattern stencils as the CAD system communicates the geometry data to the cutting table). The work starts on the nesting table to define the cutting layout. First, the barcode on the work order is scanned to identify the shoe model and call up the geometry data from the CAD system. Then the cutter places the leather hide/skin on the layout table and decides on the nesting of the parts (which are projected on the leather). Next, the hide/skin is put on the cutting table (which is positioned in a right angle next to the layout table) and the cutting process starts. A positioning cross serves as reference to make sure that the position of the hide/skin for both layout and cutting will match. On the cutting table, the leather is kept it in the exact position by vacuum suction. To improve the suction effect, a plastic sheet is placed on the hide/skin (leather is air permeable which reduces the suction effect if no plastic sheet is used). **Stamping:** All cut parts are stamped on their back with gold foil (article number, size, pictogram etc.). The stamping specifications must be respected (notice next to stamping machine). The stamping machine must be set up correctly and the appropriate stamping foil must be chosen. **Splitting:** Thickness homogenisation of cut parts (e.g. leather heel cover must be split down to 0.45 mm). **Clicking of sock liners:** At clicking press with bi-manual release. The cutter needs to go fetch clicking dies (the reference number of the die is given on the work sheet, e.g. 9602) from a shelf, where the cutting dies are stored according to size in dedicated compartments, and the material to be cut (for example pigskin colour caramel). The cutter needs to adjust

	the clicking press (i.e. clicking stroke height, clicking force). With a second die, the cutter will cut a sheet foam material (the exact type is also defined on the work sheet). The foam sock liner paddings are slightly smaller than the leather sock liners. The leather sock liners and the foam parts are bonded (with glue). The effect when the foot enters into the shoe is a sensation of comfort and cushioning. Insoles are not cut in the cutting department; they are purchased as ready-made components.	
Workplace	Shop floor	Prototype production
	Lighting conditions / environment	-
	Posture	-
	Specifics	-
Organisation	Group work?	No
	Employees at workplace per shift	1
	Employees in department	6
	Hierarchy	Fore(wo)man, workers, apprentice(s)
	Work places in department	5 hand cutting work places, 2 tables which make up the computer optical system (COS) = 1 for nesting, 1 for cutting, 2 swing beam clicking presses, 1 stamping machine, 1 splitting machine
	Shifts	1
	Similar work stations	-
	Specifics	-
Interfaces	... to other vocational positions?	B 6 handling of tools, machineries, and devices (8)
	... to other learning places?	Stitching Work preparation
	Separate trainee workshops / theoretical knowledge?	LF 2 Cutting leather LF 3 Cutting textile LF 4 Preparing upper parts
	Other	

Vocational training	Vocational year / duration		2 x 3 months within the first half of the apprenticeship	
	Preconditions / previous stations		Theoretical knowledge about leather and materials as well as about footwear parts and components (vocation school and also in-company tutoring; the basics of work safety (picto-grams) are imparted at vocational school and are being recalled in each department at each new machine.	
	What should they learn?		All specific work steps in the cutting department	
	Specifics of training (individualisation, duration, timing)		-	
	Experience with trainees & young skilled workers		Very positive	
	Assistance / working tasks		All tasks in the department	
	Number of trainers		2	
	Maximum number of apprentices		1-2	
	Other		Specifics at Gabor: About 1/3 of all skilled workers are officially qualified to train apprentices	
	Is the existing learning potential used?		Yes	
	Possibilities for improvement		Nope	
Highest level of autonomy that can be attained	Support	With instruction and guidance	Under surveillance	Independently (cutting table)

Table 3: Example of LSA

3 National validated WBL curricula

3.1 Romania

3.1.1 Introduction

The curriculum design for VET is a process regulated by national legislation and related set of methodologies approved by Ministry of National Education Order (OMEN). The National Curriculum is developed based on/and only for a specific Standard for Professional Qualification (SPP). The national legislation for this activity is described by the following norms:

- Standards for Professional Qualifications - OMENCS 4121 (2016)
- Educational plans and curriculum - OMENCS 4457 (2016)
- Methodologies guidelines on designing the Local Developed Curriculum (LDC) required by OMEN 3914 (2017). ANNEX no.1.2 for the 9th and 10th grades, the lower cycle of the VET school, the technological branch and the vocational education.

The hereby WBL curriculum is designed within the framework of the ICSAS project in order to comply with ALL national regulations. The project Advisory Board (RO) have checked this requirement.

According with national register of qualifications (COR), the Romanian VET schools could provide study programs of EQF level 3 addressing to the footwear sector for following occupations:

753602 – Operator for leather products (industrial shoemaker)
815603 – Cutting operator
815604 - Pre-stitching operator
815605 – Stitching operator
815606 – Lasting operator
815607 – Soling operator
815608 – Finishing operator

Over the last years many schools have closed their footwear programs, especially due with the reduced number of qualified teachers for footwear related subjects. Thus, the footwear companies face a huge gap in terms of

recruiting qualified operators in the field, especially young graduates of VET schools. The ICSAS project proposes a solution for this situation by implementing a Work Based Learning (WBL) program based on Locally Developed Curriculum (LDC) those learning outcomes are designed for the footwear manufacturing. This way, the pool of textile and clothing VET schools over the country could provide necessary qualified operators for footwear companies. LDC is the curricular provision specific to each vocational and technical education establishment and it is delivered in partnership with the economic operators. This curricular provision ensures the necessary framework for adapting students' training to the demands of the local labour market. The design and evaluation of the Locally Developed Curriculum involves the engagement of social partners (economic operators, local employer and / or employee associations / organisations) in the process concerned with the identification of specific competences for the local labour market and of the learning situations offered to students. The Locally Developed Curriculum is approved by the board of the County School Inspectorate.

Identification data:

1. Educational institution: "ION HOLBAN" TECHNICAL COLLEGE OF IASI
2. The name of the economic operator / public institution: Angela International (Papucei) and "Gheorghe Asachi" Technical University of Iasi
3. Curriculum name: "Footwear manufacturing technologies"
4. Curriculum type: Local Developed Curriculum (LCD)
5. Profile / Field: TECHNICAL/TEXTILE AND LEATHER INDUSTRY
6. Professional qualification: TEXTILE-LEATHER OPERATOR
7. Grade:10th
8. Number of hours: 9 weeks x 5 days x 6 hours = 270 hours/year|
   32 weeks x 2 days x 6 hours = 384 hours/year|
   Total: 654 hours/year
9. Authors

   Educational institution: Ion Holban" Technical College of Iasi

   Economic operator: SC Angela International (Papucei)

   Public institution (consultant): "Gheorghe Asachi" Technical University of Iasi

3.1.2 Presentation Note

The module Footwear manufacturing technologies is a component of the educational (curriculum) proposal for vocational qualifications in the Textile and Leather Industry, which is part of the specialized culture and practical training related to the 10th grade, state-owned vocational education last 3 years.

The module focuses on learning outcomes and aims at acquiring the knowledge, attitudes and competences necessary to engage in the labour market in one of the occupations specified in the professional training standards corresponding to the third level of professional qualifications in the Textile and Leather Industry training or continuing training in a higher-level qualification. It aims to meet the local needs and students' interests in order to diversify and customize the 10th grade training courses for professional qualification: *„Textile-leather operator"*.

In determining the types of applications, it will be considered to correlate them with the students' general education field, so that workload solving will be done either through individual applications or through group activities, favouring teamwork and responsibility for the received task.

This curriculum is being studied during a school year and goes through a total of 654 hours (9 weeks x 5 days x 6 hours = 270 hours / year and 32 weeks x 2 days x 6 hours = 384 hours / year) at the economic operator during practical training sessions.

Footwear manufacturing technologies module has been developed in a partnership between school and community, taking into account the following:

- The professional training standards imposed by OMENCS 4121/ 13.06.2016;
- Educational plans and curriculum imposed by OMENCS 4457/ 05.07.2016;
- The need to provide adequate responses to social requirements;
- Methodological benchmarks for LDC design required by OMEN 3914/ 18.05.2017
- The new structure of the education system in Romania.

The option for such a component of the curriculum integrates with the decentralization strategy, according to which local public authorities should play an important role in vocational and technical education due to their responsibility and commitment to the requirements of the local labour market.

The purpose of the Local Developed Curriculum (LDC) can be synthesized into the following:

- The acquisition by the graduates of the necessary professional skills for adaptation to the present and especially future requirements of a rapidly changing labour market;
- Widening the occupational field, but also deepening key competences: communication, teamwork, assuming responsibilities;
- The acquisition by graduates of transferable key skills required for social integration, as well as fast and successful integration into the labour market;
- Acquiring the knowledge and skills of developing an own business starting from training in a qualification.

The Local Developed Curriculum (LDC) offers the following benefits / advantages:

- Facilitates students' transition from school to active life by adapting students' professional training to local labour market needs;
- Contributes to the increase of the social and professional insertion rate;
- Provides opportunities for sustainable development at local community level through the active contribution of social partners to develop human resources at local level;
- Contributes to greater receptivity of schools to the needs of the local community;
- Creates opportunities for formalizing the relationships between the school and the local labour market.

3.1.3 Table of correlation between learning content and outcomes

Cutting

<table>
<tr><th>Learning content</th><th>Learning situation</th></tr>
<tr><td>• Cutting rules on leather
  ○ Quality zones
  ○ Stretch direction
  ○ Nesting the shoe parts
• Cutting the textile materials
• Cutting the leather substitutes
• Cutting the bottom materials
• Cutting machines and tools
• Cutting knives
• Cutting machines with clicking dies
• Clicking dies and cutting boards
• Automat cutting machines – CAM
The process of cutting in the company</td><td>Practical exercises specific for cutting manufacturing process.</td></tr>
<tr><td colspan="2">Knowledge</td></tr>
<tr><td colspan="2">Knowledge of the concepts, methods and activities specific for the production process in the Cutting department.</td></tr>
<tr><td colspan="2">Abilities</td></tr>
<tr><td colspan="2">• analysing and understanding the order according to the technological data sheets;
• making nesting on different types of materials;
• setting and adjusting the work parameters of the specific machines from cutting department;
• performing cutting operations according to the technological process specification;
• checking the parts; identifying and fixing defects.</td></tr>
<tr><td colspan="2">Attitudes</td></tr>
<tr><td colspan="2">• accountability and compliance with internal procedures and rules regarding the company's quality standards;
• compliance with the health and safety legislation at work (HSE) in carrying out the operations (code 5.3.6. from SPP Annex nr.2 OMENCS 4121/13.06.2016);
• compliance with fire safety legislation and environmental protection;
• collaboration with team members to accomplish tasks at work (code 5.3.8.SPP Annex nr.2 OMENCS 4121/13.06.2016);
• taking over from the workplace team responsibilities for the received tasks (code 5.3.9. SPP Annex nr.2 OMENCS 4121/13.06.2016).</td></tr>
</table>

Pre-stitching

Learning content	Learning situation
• Skiving • Splitting • Punching • Marking • Dyeing • Folding • Parts reinforcement • Introducing reinforcement tape • Smoothing the stitch	Practical exercises specific for pre-stitching manufacturing process.
Knowledge	
Knowledge of the concepts, methods and activities specific to the production process in the pre-stitching department.	
Abilities	
• analysing and understanding the order according to the technological data sheets; • setting and adjusting the work parameters of the specific machines from pre-stitching department; • performing pre-stitching operations according to the technological process specification; • checking the components; identifying and fixing defects.	
Attitudes	
• accountability and compliance with internal procedures and rules regarding the company's quality standards; • compliance with the health and safety legislation at work (HSE) in carrying out the operations (code 5.3.6. from SPP Annex nr.2 OMENCS 4121/13.06.2016); • compliance with fire safety legislation and environmental protection; • collaboration with team members to accomplish tasks at work (code 5.3.8.SPP Annex nr.2 OMENCS 4121/13.06.2016); • taking over from the workplace team responsibilities for the received tasks (code 5.3.9. SPP Annex nr.2 OMENCS 4121/13.06.2016).	

Stitching

Learning content	Learning situation

• Sewing rules
  ○ Types of stitches and seams
  ○ Needles and threads
  ○ Parameters of stitch
  ○ Calculating the seam allowances
• Sewing machines for uppers
• Stitch and seam defects
• Sequential process of stitching operations for a Derby shoes
	Practical exercises specific for stitching manufacturing process.

Knowledge	
Knowledge of the concepts, methods and activities specific to the production process in the stitching department.	
Abilities	
• analysing and understanding the order according to the technological data sheets; • setting and adjusting the work parameters of the specific machines from stitching department; • performing stitching operation according to the technological process specification; • checking the components; identifying and fixing defects.	
Attitudes	
• accountability and compliance with internal procedures and rules regarding the company's quality standards; • compliance with the health and safety legislation at work (HSE) in carrying out the operations (code 5.3.6. from SPP Annex nr.2 OMENCS 4121/13.06.2016); • compliance with fire safety legislation and environmental protection; • collaboration with team members to accomplish tasks at work (code 5.3.8.SPP Annex nr.2 OMENCS 4121/13.06.2016); • taking over from the workplace team responsibilities for the received tasks (code 5.3.9. SPP Annex nr.2 OMENCS 4121/13.06.2016).	

Pre-lasting

Learning content	Learning situation
• Applying the toe puff • Applying the stiffener • Back-part pre-moulding • Dressing the insole • Preparation of the lasts • Conditioning the uppers • Applying the insole to the last • Forepart pre-moulding	Practical exercises specific for pre-lasting manufacturing process.
Knowledge	
Knowledge of the concepts, methods and activities specific to the production process in the pre-lasting department.	
Abilities	
• analysing and understanding the order according to the technological data sheets; • preparation of lasts, semi-finished products and components; • setting and adjusting the work parameters of the specific machines from pre-lasting department; • performing pre-lasting operations according to the technological process specification; • checking the components; identifying and fixing defects.	
Attitudes	
• accountability and compliance with internal procedures and rules regarding the company's quality standards; • compliance with the health and safety legislation at work (HSE) in carrying out the operations (code 5.3.6. from SPP Annex nr.2 OMENCS 4121/13.06.2016); • compliance with fire safety legislation and environmental protection; • collaboration with team members to accomplish tasks at work (code 5.3.8.SPP Annex nr.2 OMENCS 4121/13.06.2016); • taking over from the workplace team responsibilities for the received tasks (code 5.3.9. SPP Annex nr.2 OMENCS 4121/13.06.2016).	

Lasting

Learning content	Learning situation
• Footwear construction systems: Cement/flat lasting • The last • Attaching the insole to the last • The glue / adhesives • Toe puff moulding / uppers' forepart moulding • Forepart lasting • Side and seat lasting • Conditioning units / heat setting • The process of lasting in the company	Practical exercises specific for lasting manufacturing process.
Knowledge	
Knowledge of the concepts, methods and activities specific to the production process in the lasting department.	
Abilities	
• analysing and understanding the order according to the technological data sheets; • setting and adjusting the work parameters of the specific machines from lasting department; • performing lasting operation according to the technological process specification; • checking the components; identifying and fixing defects.	
Attitudes	
• accountability and compliance with internal procedures and rules regarding the company's quality standards; • compliance with the health and safety legislation at work (HSE) in carrying out the operations (code 5.3.6. from SPP Annex nr.2 OMENCS 4121/13.06.2016); • compliance with fire safety legislation and environmental protection; • collaboration with team members to accomplish tasks at work (code 5.3.8.SPP Annex nr.2 OMENCS 4121/13.06.2016); • taking over from the workplace team responsibilities for the received tasks (code 5.3.9. SPP Annex nr.2 OMENCS 4121/13.06.2016).	

Assembly

Learning content	Learning situation
• Roughing • Cementing • Preparing a covered heel • Preparing an insole with a bound edge • Attaching the sole • Remove the last • Attaching the heel • Attaching the heel tip	Practical exercises specific for assembly manufacturing process.
Knowledge	
Knowledge of the concepts, methods and activities specific to the production process in the assembly department.	
Abilities	
• analysing and understanding the order according to the technological data sheets; • setting and adjusting the work parameters of the specific machines from assembly department; • performing assembly operations according to the technological process specification; • checking the components; identifying and fixing defects.	
Attitudes	
• accountability and compliance with internal procedures and rules regarding the company's quality standards; • compliance with the health and safety legislation at work (HSE) in carrying out the operations (code 5.3.6. from SPP Annex nr.2 OMENCS 4121/13.06.2016); • compliance with fire safety legislation and environmental protection; • collaboration with team members to accomplish tasks at work (code 5.3.8.SPP Annex nr.2 OMENCS 4121/13.06.2016); • taking over from the workplace team responsibilities for the received tasks (code 5.3.9. SPP Annex nr.2 OMENCS 4121/13.06.2016).	

Finishing

Learning content	Learning situation

• Types of finishing
• Operations common to different types of finishing
  ○ Insole fixation
  ○ Tops dyeing
  ○ Shoe cleaning
• Finishing (particularities)
  ○ Cream application
  ○ Shoe brushing
  ○ Shoe painting
  ○ Shoe ironing
• Control, packaging and marking of finished products
• Shipping procedures
	Practical exercises specific for finishing manufacturing process.

Knowledge	
Knowledge of the concepts, methods and activities specific to the production process in the finishing department.	
Abilities	
• analysing and understanding the order according to the technological data sheets; • setting and adjusting the work parameters of the specific machines; • performing finishing operations according to the technological process specification; • checking the footwear products; identifying and fixing defects.	
Attitudes	
• accountability and compliance with internal procedures and rules regarding the company's quality standards; • compliance with the health and safety legislation at work (HSE) in carrying out the operations (code 5.3.6. from SPP Annex nr.2 OMENCS 4121/13.06.2016); • compliance with fire safety legislation and environmental protection; • collaboration with team members to accomplish tasks at work (code 5.3.8.SPP Annex nr.2 OMENCS 4121/13.06.2016); • taking over from the workplace team responsibilities for the received tasks (code 5.3.9. SPP Annex nr.2 OMENCS 4121/13.06.2016).	

Quality Assurance

Learning content	Learning situation
• Control of the aesthetic appearance • Control of footwear fit • Control of technical aspects • Quality Standards Manual • Production Planning • Design and Technical Development of Shoes • Upper Development / Pattern Making • Bottom Parts Development • Upper Coordination	Practical exercises specific for quality assurance, production planning and design and technical development of shoes in the manufacturing process.
Knowledge	
Knowledge of the concepts, methods and activities specific to the production process in the Quality Assurance, Production Planning and Design and Technical Development department.	
Abilities	
• Performing quality assurance tasks, including: Establishing a sampling plan; Inspection of the aesthetic appearance; Control of footwear fit; Preparation of a quality standards manual • Identify main data the production planning operates with: models, materials, clients, orders. • Performing operating tasks in relation with design and technical development	
Attitudes	
• accountability and compliance with internal procedures and rules regarding the company's quality standards; • compliance with the health and safety legislation at work (HSE) in carrying out the operations (code 5.3.6. from SPP Annex nr.2 OMENCS 4121/13.06.2016); • compliance with fire safety legislation and environmental protection; • collaboration with team members to accomplish tasks at work (code 5.3.8.SPP Annex nr.2 OMENCS 4121/13.06.2016); • taking over from the workplace team responsibilities for the received tasks (code 5.3.9. SPP Annex nr.2 OMENCS 4121/13.06.2016).	

Table 4: Table of correlation between learning content and outcomes

Minimum list of material resources (equipment, tools, models, raw materials and materials, technical, economic, legal documentation, etc.) necessary to acquire learning outcomes (existing in school or at economic operator)

- Catalogues and publications;
- Work and safety legislation;
- Parts, semi-finished goods and footwear products;
- Samples of materials: leather, textile and auxiliary;
- Work tools;
- Equipment;
- Raw materials and components;
- Internet;
- Specific protective equipment;
- Manuals, curriculum auxiliaries, worksheets, documentation sheets, teaching boards, specialized journals, technical documentation;
- Video projector, computer, educational software.

3.1.4 Methodological suggestions

The contents of the Footwear manufacturing technologies module must be approached in an integrated manner, correlated with the peculiarities and initial level of education of the students.

The number of hours allocated to each subject depends on the difficulty of the units, the level of prior knowledge of the learner, the complexity of the teaching content, the didactic strategy and the rhythm of assimilation of knowledge by the trained team. The recommended distribution of hours is given in the following table:

Learning Spheres	Learning Content	No. hours
Core Spheres	Cutting	150
	Pre-stitching	90
	Stitching	114
	Pre-lasting and Lasting	84
	Assembly	96
	Finishing	48

Learning Spheres	Learning Content	No. hours
Optional Spheres	Design Technical development Quality assurance Production planning	72

Table 5: Division of hours

The module has a flexible structure, so it can incorporate new teaching resources at any time in the educational process. Is recommended to spend the training in the specialized stations within educational unit or economic operator, according to the recommendations of the Professional Training Standards (in rom. Standard de Pregatire Profesionala - SPP, according with Annex nr.2 OMENCS 4121/13.06.2016).

Didactic strategies applied by teachers need to provide students with the opportunity to be actively involved in the training process, to acquire knowledge and skills that they can use either to access higher levels of qualification or to integrate efficient in the production / service sector. The student-centred training is recommended to be applied by designing various learning activities to take into account the individual learning styles of each student, including adaptation to students with special educational requirements. These learning activities aim at:

- Application of student-centred methods, activation of cognitive and operative structures of pupils, exercise their psycho-physical potential, transformation of the student into co-participant in their own training and education;
- Combining and systematically changing the activities based on the individual effort of the student (documenting by various sources of information, personal observation, personal exercise, scheduled training, experiment and individual work, work technique with cards) with activities that require collective effort (team, group);
- The use of methods that favour the pupil's direct relationship with the objects of knowledge, by using concrete models such as the experimental model, documenting activities, modelling, guided observation/ investigation etc.;
- The acquisition of independent information and documentation methods (e.g. individual study, scientific investigation, case study, method of presentation, method of project, etc.), which offers openness to self-training, continuous learning (use of information sources: e.g. libraries, internet, virtual library).

To achieve the objectives, it is recommended to use active and interactive, student-centred instructional methods with a higher share of practical activities and less theoretical ones, such as:

- Action-based methods:
  - group practical application;
  - individual or team work;
  - practical demonstration.
- Exploratory methods:
  - direct observation;
  - Independent observation;
  - Training and documentation visits;
  - Heuristic conversation, exam, fixation;
  - Guided discovery.
- Exposure methods:
  - Explication;
  - Specific training at the workplace;
  - Description;
  - Examples.

3.1.5 Suggestions for Evaluations

Evaluation is the final part of the didactic design approach whereby the teacher will measure the effectiveness of the whole instructional-educational process. The evaluation determines the extent to which students have achieved the learning outcomes set in the training standards.

It is recommended to use both formative and summative assessment in order to verify the achievement of learning outcomes.

1. Formative assessment:
   - Students will be evaluated for achieving the learning outcomes at the end of each module. It will be done by the teacher on the basis of evidence that explicitly refers to the knowledge, skills and attitudes specified in the training standard. We suggest the following assessment tools: observation sheets, worksheets, documentation sheets, portfolio with practical exercises.

- The formative feedback forms (presented at the end of each Trainer Manual) are recommended to be filled by trainers/tutors.
- Planning of the evaluation should take place after a set schedule, avoiding the crowding of several evaluations over the same time period.

2. Summative assessment:

   The summative assessment gives the extent to which the student has achieved the outcomes for the work based learning (WBL) program and it is achieved by the following tools:

   - Test quiz at the end of the work based learning (WBL) process. The test will cover all the learning outcomes. Students will have access to marking criteria before they start their summative assessment.
   - Portfolio will contain the pieces of work performed by learner in each learning station according to the exercises and practical work defined in Learning and Teaching Activities.
   - Practical test consists in manufacturing a pair of shoes, which allows the students to demonstrate their skills in all learning stations: cutting, pre-stitching, stitching, lasting and assembling, finishing and quality control.

3.2 Portugal

3.2.1 Introduction

In 2007, Portugal National Qualification Agency (current ANQEP, IP) was created in articulation with the European Qualification Framework, aiming at coordinating the National Qualification System, jointly with other competent bodies in the area of vocational education and training (in particular the Ministry of Education, and the Ministry of Labour and Solidarity).

The National Qualification System covers all programs leading to obtain formal qualifications, and it's supervised by both mentioned Ministries.

The National Catalogue of Qualifications includes school-based VET programs (although with a work-based learning component), which are dependent on the Ministry of Education and Science, and work-based VET programs which are financed by the IEFP – Employment and Vocational Training Institute, dependent on the Ministry of Labour. The first type of programs belongs to the Vocational Education System and the second one to the so-called Learning System.

What does exist in terms of VET programs in the educational systems?

- Vocational training of double certification (Education and Training Courses – CEF) for young people who have completed the 2nd cycle of basic education (5th and 6th grades) or who are attending the second (last) year of that cycle. These courses provide a level 2 qualification according to the NQF.
- Vocational training of double certification (Education and Training Courses – CEF) and Vocational Courses for young people (13 years old) as part of the 3rd cycle of basic education: these courses have a modular structure and a duration of between one and two years. They provide level 2 qualification according to the NQF and give access to general secondary education and to vocational programs of secondary level.
- Vocational training of double certification (Education and Training Courses – CEF) and Vocational Courses for young people (from 15 years) as part of higher secondary education: these courses are devoted to students who have completed the 3rd cycle of basic education. They are three years long and provide level 4 qualification according to the NQF and a diploma of secondary education.

- Professional Training Courses: these programs are intended for students who have completed the 3rd cycle of basic education and did not concluded their secondary education. The maximum workload is 3,100 hours and the technical training workload is 1,600 hours. 420 hours out of those 1,600 hours should be at least devoted to work-based learning. These courses last three years and provide level 4 qualification according to the NQF and a diploma of secondary education.

Completion of Education and Training Courses, Vocational Courses and Professional Training Courses of secondary level give access to post-secondary non-tertiary vocational education (Technological Specialization Courses – CET) and to higher education.

- Post-secondary non-tertiary vocational education for young people with 18-19 years and for young adults until 23 years: these courses have a duration of one year and provide level 5 qualification, according to the NQF. The candidates to these courses are youngsters with diplomas of secondary education or equivalent, students with 10th and 11th grades and frequency of the 12th year, holders of level 3 qualifications and holders of technological specialization diplomas or degrees of higher education. Technological Specialization Courses are mainly provided by Polytechnic Institutions (higher education) and other certified institutions.

What does exist in Employment System?

These programs belong to the so-called learning system, which was launched in 1984 as an alternative to the traditional training system. Initially, it was intended to support the qualification and certification of young people who, for various reasons, prematurely abandoned the education system. It is a double certification system, where there is strong interaction between theoretical and practical training components. Practical training is mainly in company/in sectoral training centres work-based learning.

The learning system depends exclusively upon the Employment and Vocational Training Institute (IEFP). In this work-based learning system companies are recognized as privileged spaces for training, since they allow students' learning in a real work environment. In these courses, learning processes are divided into four components: socio-cultural, scientific, technological and practical. The workload of these programmes varies

between 2,800 and 3,700 hours, depending on the specificities and the degree of complexity of the learning process. The workload of in-company training cannot be lower than 40% of total workload, varying though between 1,100 and 1,400 hours.

The venues where these programmes can be taught are:

- Public secondary schools which perceptive authorization (Professional Training Courses).
- Private vocational schools with license (Professional Training Courses).
- Vocational Training Centres overseen by the IEFP (Learning Courses).
- Companies with professional training centres, authorized by the IEFP and certified by ANQEP (Learning Courses).

In the case of public secondary schools and private vocational schools, they must stablish agreements with companies in order to students carry out the compulsory work-based learning period.

3.2.2 Footwear qualification framework in Portugal

The National Qualifications Framework (NQF) is a single reference tool to classify all the qualifications produced in the national educational and training system. It's an instrument articulated with the EQF for lifelong learning.

The NQF comprises 8 Qualification Levels, each one defined by a set of indicators that specify the learning outcomes corresponding to the qualifications at that level in terms of Knowledge, Skills/competences and Attitudes.

The NQF adopts the qualification levels and respective descriptors of the European Qualifications Framework (EQF).

National Catalogue of Qualifications www.catalogo.anqep.gov.pt/ (Anqep 2018) is a dynamic instrument for the strategic management of non-higher national qualifications, managed by ANQEP (National Agency for the Qualifications) aiming at:

- Regulating of the double certification training offer
- Promoting of the effectiveness of public financing

- Integrating unique qualification references for double certification training and for processes of recognition, validation and certification of competences (RVCC)
- Including a large number of qualifications for 39 education and training areas and presents the associated Professional Profile and Training References for each qualification

The National Catalogue of Qualifications www.catalogo.anqep.gov.pt/ available on the internet for all people wanting to consult it and a valorous tool for the training planning and certification.

Figure 1: Landing page Catálogo Nacional de Qualificações

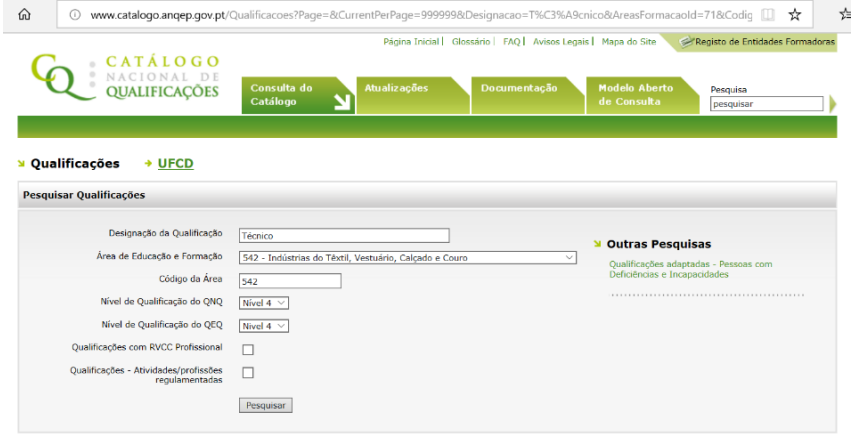


Figure 2: Example of qualification search

The objectives of the National Catalogue of Qualifications are:

- To promote the production of critical competences for the competitiveness and modernisation of the economy and of organisations;
- To facilitate the construction of learning paths that ensure school and professional progression;
- To enable the recognition of qualifications irrespective of the manner in which they are acquired;
- To contribute towards the development of a legible and flexible framework that favours the comparability of qualifications on both a national and international level.

The National Catalogue of Qualifications includes:

- 310 qualifications: 110 Level 2 (operator); 156 Level 4 (Technician); 44 Level 5 (Specialized Technician)
- 22 adapted qualification (for people with special needs)
- 30 qualifications for Textile, Cloths, Leather and Footwear;
- Modularised qualifications

According to the National Catalogue of Qualifications the main VET profiles (which correspond to specific programs) in the footwear sector are the following:

- Footwear Manufacturing Technician – Level 4 (NQF)
- Technician of Footwear and Leather Goods Production Management – Level 4 (NQF)
- Technician of Footwear and Leather Goods Machines Maintenance – Level 4 (NQF)
- Footwear Patter Making Technician – Level 4 (NQF)
- Footwear Manufacturing Operator – Level 2 (NQF)
- Footwear Designer – Level 5 (NQF)

For qualifications level 4 (9 years school required) it's available:

- Curriculum for VET schools (key skills + hard skills 1100h)
- Curriculum for Apprenticeship (key skills 980h + hard skills 1000h + WBL not specific curricula of 1500h)

For qualifications level 2 (6 years school required) it's available:

- Curriculum of 600h – 850h

There's no detailed curricula for WBL component.

3.2.3 ICSAS approach to curriculum design for piloting

Although in Portugal there exist VET programs in the education system and in the employment system, as described above, the first ones have a reduced component of in-company training, therefore in reality they are not work-based learning programs. In fact, in the case of the footwear sector, the work-based learning programs belong all to the learning system, controlled by the Employment and Vocational Training Institute (IEFP).

Another fact to retain is that in Portugal and for VET programs there is no employment contract between the student/trainee and the entity in which the in-company training is carried out. Students/trainees are covered by a school insurance paid by schools (school-based system) or the labour administration (learning system). In the case of learning system there is a learning contract between the company and the student/trainee (there is no employment contract; students/trainees are not employees of the company). There is no financial compensation in the form of salary.

Taking into account the goals of the project, the most relevant program could be:

- Footwear Manufacturing Operator,
- Footwear Manufacturing Technician,
- Footwear Patter Making Technician,
- Footwear Designer.

The first one is level 2 (basic education level), the second two are mid-level (secondary education) programs and the last one is a high-level (post-secondary non-tertiary) program. In addition, it should be underlined that the Footwear Manufacturing Technician level 4 corresponds to a profile where the production is entirely manual, close to craftsmanship and not adequate to the nowadays footwear industry needs.

For this purpose, the first curriculum is the most appropriate to be a basis of the curriculum for the national piloting under the scope of ICSAS.

Therefore, the most adequate curriculum to be the basis to set up the new WBL curriculum is the Footwear Manufacturing Operator – EQF level 2.

3.2.3.1 Footwear Manufacturing Operator – EQF level 2

It was recognized and certified by ANQEP (National Agency for Qualification and Employment) after the approval of the sectorial counselling group for fashion industries, involving all technical experts and social partners. It was published in the Employment and Labour Gazette n.º 29 in 8th August 2013.

Footwear Manufacturing Operator	**EQF Level 2**
General Description: To perform all footwear cutting, stitching preparation, stitching, closing, assembling/lasting and finishing operations, using different materials, equipment and techniques, in accordance with the quality standards, maintenance, environment, and health and safety requirements.	
Activities	
The profile involves activities to be performed by the operator, knowledge that he/she has to get, skills and competences that he/she has to demonstrate, as following: 1. To cut he different pieces of the footwear model. • To analyse the raw-material, identifying the defaults and surface defects • To do the nesting – positioning the moulds /cutting devices on the raw-material's surface, having into account the defaults previously detected and signalized, in order to optimize the raw-material • To cut the pieces using a knife, clicking machine and automatic cutting machine 2. To do all pre-stitching operations, namely skiving, splitting, crimping, punching, folding, apply reinforces, metallic accessories 3. To perform all stitching operations with column and flat stitching machines • To program the equipment according to the material and the operation technical description • To select the machine accessories, putting them in the right place and adjust them to the machine • To put accurately he pieces to stitch on the machine, and to guide all the stitching operation 4. To perform all the assembling operations, included in Cemented footwear construction • To mould the stiffener and toe puff • To apply glue in due upper surfaces • To last the fronts, sides and backwards using adequate equipment • To rough and apply glue to the treated surfaces of soles and uppers • To bond sole/bottom directly to the assembled upper • To apply the heels • To stitch the sole/bottom to the upper 5. To perform all finishing operations, namely, to clean, to brush, to polish, to ink the edges, to apply the due finishing products, using the adequate tools and the adequate products, controlling the quality of the work done and proceeding to the necessary adjustments.	

Knowledge
Notions about: • ICT at user level • Environment, security and hygiene at work • Workplace organization Good knowledge about: • Portuguese Language • Raw materials Characteristics and behaviours • Footwear Components manual processes and technology manufacturing • Footwear Cutting processes • Footwear Pre-stitching processes • Footwear Stitching processes • Footwear assembling processes • Footwear finishing processes • Quality control Procedures and standards Deep knowledge about: • Footwear Manual cutting techniques • Footwear Manual pre-stitching techniques • Footwear Manual stitching techniques • Footwear Manual assembling techniques • Footwear Manual finishing technique
Skills/Competences
• To identify and recognize the characteristics and behaviours of the raw materials • To identify and recognize the different types of defaults of the raw-materials • To identify and characterize the footwear components manufacturing process • To apply cutting methods and techniques • To apply pre-stitching and stitching methods and techniques • To apply assembling methods and techniques • To apply finishing methods and techniques • To identify and use the adequate machines and tools involved in the stitching processes • To optimize the leather and other materials cutting • To detect defaults regarding footwear pieces and components • To detect defaults of the equipment • To perform equipment and tools cleaning processes and conservation • To apply footwear manufacturing quality control procedures and standards • To apply environment, security and hygiene at work procedures and standards

Attitudes
• To be able to adapt to different organizational contexts • To be able to adapt to new technologies and materials • To be able to organize his/her own workplace • To be able to take the initiative to find adequate solution to the problems solving at operational level • To be able to work in a team and to cooperate toward common aims.

Table 6: Description Footwear Manufacturing Operator

Characterization of the Training curriculum:

Training curriculum is composed by 3 parts namely: sociocultural component, technological component and practice component.

- Sociocultural component (key skills development): depending on the methodology of training adopted, it can achieve 650 hours and involves modules related to the domain of Portuguese as a native language, communication in other foreign language, normally English, personal development, social and cultural development and ICT aspects.
- Technological component: it's indeed the vocational part and represents 850 hours and it's detailed below.
- In-company training involves 120 hours of training supervised by company tutors.

Detail of the Technological component:

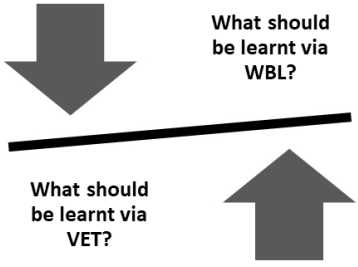
Modules /Training Units	Duration (Hours)
8430 - Footwear models technology and applied materials for footwear	25
8431 - Processes and techniques of footwear Cutting	**50**
8432 - To apply footwear cutting techniques on different materials	50
8433 - Cutting of different footwear models	50
8434 - Footwear splitting and crimping operations	25
8435 – Stamping, referencing and marking operations	25
8436 - Skiving, punching and reinforcing footwear pieces	**50**
8437 – Folding and bonding Footwear models' pieces	50
8438 – Preparation for stitching different footwear models	50
8439 – Stitching, materials and equipment	50
8440 - Processes and techniques of footwear Stitching	**50**

8441 – To apply stitching techniques to different footwear models	50
8442 – Stitching of different footwear models	50
8443 - Application and modelling of footwear lasting reinforces	25
8444 - Footwear assembling - cemented	**50**
8445 – Preparation of soles and uppers' surfaces	25
8446 – Lasting footwear soles and uppers	50
8447 – Assembling of different footwear models	50
8448 - Footwear finishing	**50**
8449 - Footwear Packing and Quality Control	25
TOTAL	**850**

Table 7: Technological component in training curriculum

In the construction of the national curriculum for the work-based learning piloting, national requirements and values were taken into account together with the partners CTCP, ADC and the companies involved and the and advisory board composed by IEFP (Public Institute for the Training and Employment, regulation body) and APPICCAPS (Footwear Associations) under the eye and lessons learnt of Germany and Spain experiences.

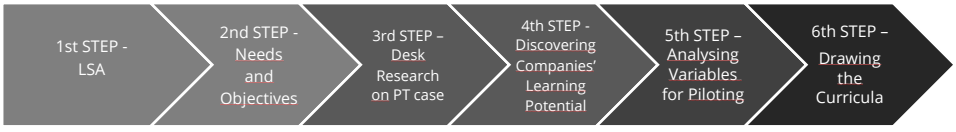
A question should be answered: "What should be learnt via WBL."



WBL curricula in PT should be completely innovative, and include a very high transferability potential to other companies.

3.2.4 Portuguese approach to Curriculum design in ICSAS

The approach used by the Portuguese partners to build the new WBL curriculum can be schematized into 6 steps to know:



1st STEP – Implementation of Learning Station Analysis (LSA)

It was held in the partner CARITÉ, according to a defined methodology, by CTCP and ADC/CFPIC, consisting in the description of the activities and identification of potential of learning.

Figure 3: Images of learning stations

There were found 10 learning stations (LS) related to the 5 core spheres of activity (cutting, stitching, lasting, assembling, finish) and 6 learning stations related to the peripheral spheres (design, technical development, production planning, quality assurance) and both sets were described according to the methodology.

Core Spheres	Peripheral Spheres
Mechanical cutting Automatic cutting Stitching preparation Stitching Lasting preparation Lasting Sole attaching Finishing Packing Quality Control	Design Development Planning Production management Quality management Supply chain management

Table 8: Core and Peripheral Spheres

2nd STEP – Needs and Objectives

- Determine the sector needs: manufacturing skills
- Define activities and tasks that the new job profile should meet: to be able to cut, stitch, assembly and finish footwear models

3rd STEP – Desk research

It was held a "desk research" on Portuguese reality concerning:

- The existing curricula in VET (for Footwear) and how is it available to training entities and companies
- National regulations / rules regarding curricula design (contents, assessment, etc.) – approach to LO and K, S/C, A
- Analysis on what parts of the curricula are able to be taught inside the companies and by who (companies' trainers?)
- Analysis of the certification issues

Existing qualifications / curricula are the following according to already mentioned above:

- Footwear Manufacturing Operator – Level 2 (NQF)
- Footwear Manufacturing Technician – Level 4 (NQF)
- Technician of Footwear and Leather Goods Production Management – Level 4 (NQF)
- Technician of Footwear and Leather Goods Machines Maintenance – Level 4 (NQF)
- Footwear Patter Making Technician – Level 4 (NQF)
- Footwear Designer – Level 5 (NQF)

It was analysed the time load, the structure, the learning venues and pre-requirements.

4th STEP – Discovering the companies' learning potential through LSA

For each Core and peripheral spheres were assigned specific good practices encountered in the company that can constitute potential of learning and be able to substitute the classical training.

10 LS related to Core spheres:	Good practices / specificities
Mechanical cutting	High-end materials, leather economy threshold
Automatic cutting	Leather pieces control after cutting with the cardboard pieces from the pattern making. State-of-art equipment
Stitching preparation	Special requirement in terms of quality, high-end materials
Stitching	State-of-art equipment. Specific requirements in terms of quality, use of high-end materials, specific models
Lasting preparation	Specific quality requirements, state-of-art equipment
Lasting	Different construction types, high-quality
Sole attacking	Production variables, products, equipment
Finishing	Special techniques and finishing products. High-end quality finishing
Packing	Specificities from the clients (private label)
Quality Control	Procedures

Table 9: Core spheres in Portugal

6 LS related to peripheral spheres	Good practices / specificities
Design	Private label. A creative sector and planification of own brands.
Development	Technical sheets (technical information, very detailed), use of CAD technology. It's a very wide sphere, defined and documented
Planning	Procedures, specific software
Production management	Procedures, managements systems implemented
Quality management	Specific procedures, certification according ISO 9001
Supply chain management	Interconnections with other areas, specific software

Table 10: Peripheral spheres in Portugal

5th STEP – Analysing variables for piloting

- Possible future integration in apprenticeship system? Duration 1000-1500?
- Cover all Learning Stations or focus on some of them most important and constituting needs for the company? It was decided to focus on the Production: Cutting, Stitching, Assembly, and Finishing.
- What is the target-group? Employed, between 18-30, with 6 or 9 years school.
- Option: Companies specificities or more transferability? It was decided to apply for transferability.
- In the VET component and on the specificity of the WBL component.

6th STEP – Drafting the curriculum (based on)

- Total duration: 1000 hours.
- Modular training, based on Level 2 "Footwear Manufacturing Operator" www.catalogo.anqep.gov.pt/Qualificacoes/Referenciais/1123 Anqep (2013)
- Pick up from the existing level 2 curricula the learning units which are more interesting and needed for the company in piloting.
- 75% of WBL delivered by tutors and 25% of theoretical learning delivered by certified trainers from VET school.
- After the training: automatic certification of VET component.
- All the trainees enrol in RVCC (recognition, Validation, Certification of Competences) process to validate the skills acquired through the WBL (for the overall job profile), according to the rules.
- Both components to be delivered in the company.
- To validate this plan near the Advisory Board and the company involved CARITÉ.

3.2.5 The curriculum – Final version to be tested

DURATION: 1000 hours /
Theory = 250 hours / Work Based-Learning = 750 hours

Profile / curricula from National Catalogue of Qualification:
Footwear Manufacturing Operator / Level 2

Learning Station: CUTTING	
Theory / VET school	= 50 hours
Work Based-Learning / Company + VET school monitoring	= 150 hours
Total	= 200 hours

Unit (corresponding to the Curricula in National Catalogue of Qualifications)	Duration (h)	Local/ delivered by
8431		
Processes and techniques of footwear Cutting Objectives: • To identify the different footwear model pieces • To identify materials used • To describe manual and mechanical techniques of footwear cutting Contents: Manual cutting: • Equipment and tools • Cutting technique • Marks to guide the stitching Mechanical cutting: • Equipment and tools • Types of cutting dies • Cutting methodology Automatic cutting: • Technology and equipment • Software • Projection of image/nesting • Cutting methodology • Changing tools Ergonomic and workplace organization Environment, security and health Preventive maintenance	50	Company, delivered by VET school
Work Based-learning: • Application of shoe cutting techniques in different parts and materials • Cutting of different models of footwear • Splitting and crimping footwear pieces • Stamping and marking of footwear pieces	150	Company delivered by inside company tutors and monitored by Research Centre + VET School

Table 11: Learning station: Cutting

Learning Station: STITCHING PREPARATION & STITCHING	
Theory / VET school	= 100 hours
Work Based-Learning / Company + VET school monitoring	= 300 hours
Total	= 400 hours

Unit (corresponding to the Curricula in National Catalogue of Qualifications)	Duration (h)	Local / delivered by
8436		
Skiving, punching and reinforcing footwear pieces Objectives: • To identify and characterize different operations and their aim • To perform skiving, punching and apply reinforcements in Footwear cut pieces • Apply the due ergonomic and health and security measures • Apply the due preventive maintenance rules • Control and evaluate the own performance Contents: • Different types of skiving operations • How to skive pieces of Footwear models: techniques and equipment • How to punch pieces of Footwear models: techniques and equipment • To apply reinforces in the pieces of Footwear models • To apply skiving, punching and reinforcing according to the requirements • Ergonomic and workplace organization issues • Preventive maintenance of the equipment • Quality control	50	Company, delivered by VET school

8440		
Processes and techniques of footwear Stitching Objectives: • To identify and characterize different types of stitches • To identify materials and accessories for the stitching, considering the correlation: material, thread, needle. • To identify different stitching processes and techniques considering different types of materials and the use of different equipment • To identify and describe the operations of preparation, regulation and setting of the equipment used. Contents: • Manual stitching techniques: type of stitches, threads, needles; • Different stitching techniques considering different types of stitches and different stitching machines; • Different types of needles: characterization and selection considering the material and type of stitch • Stitching techniques using equipment • Point formation • Preparation, regulation and setting parameters of the equipment.	50	Company, delivered by VET school
Work Based-learning: • Stitching, materials and equipment • Folding and pointing operations • Preparation of sewing of different models of footwear • Application of techniques in different pieces of footwear • Sewing of different models of footwear	300	Company / delivered by inside company tutors and monitored by Research Centre + VET School

Table 12: Learning station: Stitching preparation and stitching

Learning Station: ASSEMBLY & FINISHING	
Theory / VET school	= 100 hours
Work Based-Learning / Company + VET school monitoring	= 300 hours
Total	= 400 hours

Unit (corresponding to the Curricula in National Catalogue of Qualifications)	Duration (h)	Local / delivered by
8444		
Footwear Lasting and Assembly Objectives: • To identify and characterize techniques and equipment of lasting the front, sides and back parts of the upper • To perform the lasting of the front, sides and back parts of the upper in basic Footwear • To apply principles of ergonomics, workplace organization and health and security at work • To control and assess the quality of the work developed Contents: • Lasting of the front, sides and back parts of the upper in basic Footwear: operations, materials, equipment • Types of adhesive • Bonding technology and equipment • To perform the lasting of the front, sides and back parts of the upper in basic Footwear considering materials, setting and regulation of the equipment, techniques and quality requirements • To apply principles of ergonomics, workplace organization and health and security at work • To apply preventive maintenance of the equipment • To control and assess the quality of the work developed	50	Company, delivered by VET school

8448		
Footwear Finishing Objectives: • To identify and characterize different types of footwear finishing • To identify and characterize different materials and products used for footwear finishing • To apply finishing techniques in different footwear models • To apply principles of ergonomics, workplace organization and health and security at work • To control and assess the quality of the work developed Contents: • Different types of footwear models: analysis of the different types of finishing • Traditional finishing types: waxy, oily, plasticized, etc. • Technology of materials and finishing products • Finishing techniques and equipment • Perform different finishing operations • Apply principles of ergonomics, workplace organization and health and security at work • Apply preventive maintenance of the equipment • Control and assess the quality of the work developed	50	Company, delivered by VET school
Work Based-learning: • Application and moulding of shoe-fitting reinforcements • Preparation of the surfaces of the soles and uppers • Fixing of soles to uppers • Assembly of different models of footwear • Quality control and packaging of footwear	300	Company / delivered by inside company tutors and monitored by Research Centre + VET School

Table 13: Learning station: Assembly and finishing

The methodology and results envisage the following impact:

- active people upskilled
- youngsters increasing their employability
- final proposal to create the job profile and qualification referential of the level 2 Footwear Manufacturing Operator into level 4 Footwear "Industrial" Manufacturing Technician

Some proposals to improve National Qualifications Catalogue:

- Curriculum Footwear Manufacturing Technician – Level 4 (NQF) – to make it more adapted to the real needs of the industry according to the actual state-or-the-art
- Footwear Manufacturing Operator – Level 2 (NQF) – to upgrade the qualification to level 4 at least - Footwear "Industrial" Manufacturing Technician
- Titles of curriculum / qualifications – to change in order to capture more youngsters
- To include additional modules in level 4 and level 5 qualification – related to Comfort Footwear and Sustainability (or a new qualification for Comfort & Healthy Footwear – Level 5)
- To include WBL curricula

How to improve:

- National Skills Council for the Fashion Industries, includes public institutes, ANQEP, social partners, CTCP and CFPIC/ADC is the adequate instance to propose changes.

Stakeholders involved in the curriculum design for ICSAS

- Centro Tecnológico do Calçado de Portugal - CTCP
- Centro de Formação Profissional da Indústria de Calçado – CFPIC / ADC
- Fábrica de Calçado Carité, Lda
- IEFP – Instituto de Emprego e Formação Profissional (Organismo Público, Entidade reguladora)
- APICCAPS – Associação Portuguesa dos Industriais de Calçado, Componentes, Artigos de Pele e seus Sucedâneos.

(Both last stakeholders compose the project Advisory Board)

Validation process:

The Curriculum was validated by the Advisory Board who participated in its definition and the company CARITÉ, specially the trainers/tutors in a special session of dissemination and validation of project methodologies.

4 Train-the-Trainer Manual: Cutting

The main output of ICSAS-project are 11 “Train the Trainer” manuals for the nine core and peripheral spheres (two manuals for stitching and lasting each due to size) and seven corresponding Learning-Teaching exercises. Due to limited space in this handbook only one manual is documented, the others can be consulted on the projects` webpage icsas-project.eu.

4.1 Introduction

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.

4.2 Didactic Design Options

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).

4.2.1 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 14. 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 14: 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 15: Possible didactic guidelines

Each considered dimension could potentially be optimised according to the guidelines documented in Table 15. 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; 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.

4.2.2 Optimisation dimension 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:

- 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 optimization 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.

4.2.3 Optimization 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 organisation 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 organization 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.

4.2.4 Optimisation dimension Apprenticeship Programme

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.

4.3 Cutting Manual

4.3.1 Aims of the ICSAS Project

The aims of the Erasmus+ project «Integrating Companies in a Sustainable Apprenticeship System» are to

- Show ways how the existing Vocational Education and Training (VET) systems to train skilled workers for footwear manufacturing in Romania and Portugal can evolve towards work-based learning (WBL), and improve the sector-specific tutor training in Spain and Germany
- Develop a sector qualification framework and the referencing of national qualifications of Germany, Portugal, Romania, and Spain.

4.3.2 Eleven Manuals to Guide In-Company Tutors

In dual training schemes, the work-place specific know-how is imparted by skilled workers from the respective departments. As outlined in the ICSAS project application, the project consortium has committed to issuing eleven manuals, the purpose of which is to prepare designated in-company tutors in WBL for their role and provide support for the work-based learning phases of the apprenticeship. The tasks of a tutor are to:

- Demonstrate the operations which the apprentices are expected to learn to perform;
- Introduce the apprentices to each new task and supervise them during their first approaches;

- Accompany them as their skills are becoming more and more advanced;
- Guide them towards an independent performance of the task.

Furthermore, each company enrolled in work-based learning shall appoint a Head of Training who is responsible for:

- Drawing up an individual training schedule for each apprentice (how long each apprentice will be trained at each learning station and in which order an apprentice will run through the departments – not all apprentices can start, for example, in cutting);
- Assessing and documenting the learning progress of each student at each learning station.

The manuals are not meant to replace a textbook. They are meant to provide support to the trainers to plan the work-based learning activities with the trainees. The workplace trainers are invited to gather more information from other sources.

4.3.3 Take Your Apprentices on a Guided Tour

Before you start the hands-on training in a specific department, please make sure that the apprentice has been given a tour of the entire company including all departments.

For example, the apprentices should be introduced to the types of products the company manufactures and their intended use, the different customer segments, the distribution channels etc. They should be allowed insight into the product creation and manufacturing processes, i.e. product design, pattern making, purchasing department, production planning, and all production departments to warehouse and logistics.

Point out the details of a typical shoe model which the company produces (see Figure 4). Your trainees will better understand the complexity of the product “shoe”.

Figure 4: Views of shoe parts to understand the complexity of a shoe

4.3.4 Cutting: Start in the Leather Warehouse

In the leather/materials warehouse the apprentices can be made familiar with the various types of leather as well as with all other upper materials that can be processed in the cutting department. Focus on the characteristics of each material.

Explain the different leathers, synthetics, and textile materials which your company uses to make uppers, soles or other shoe components, explaining their specific properties, origins, production process (tanning and leather finishing methods), quality management procedures to detect leather blemishes etc..

This document does not focus on leather production as the VET school will extensively cover this very important learning field. If you would like to revise the basics of leather production again, please feel free to familiarise with the textbooks that the VET school which your apprentices are attending uses.

4.4 Cutting of Shoe Materials

First thing when introducing an apprentice to the cutting department: Please remember to (re-) explain the safety rules and the dangers that the different cutting methods, machines and tools represent.

Cutting shoe parts from a leather hide does not just mean cutting parts of the correct geometry from any part of the hide. Leather cannot be cut in multiple layers by machines. Cutting leather requires specialised and experienced workforce. There are many factors to be respected in order to deliver quality work. Know-how and expertise of the workers in the cutting department are decisive for the quality of the shoes produced. Firstly, because their skills and knowledge have an impact on the number of reworks and rejects, and secondly, because leather is expensive. An experienced cutter can save his/her company lots of money: If the cutting waste can be reduced to a minimum by choosing the ideal cutting layout of the shoe parts on the hide or skin, this results in considerable savings for the company.

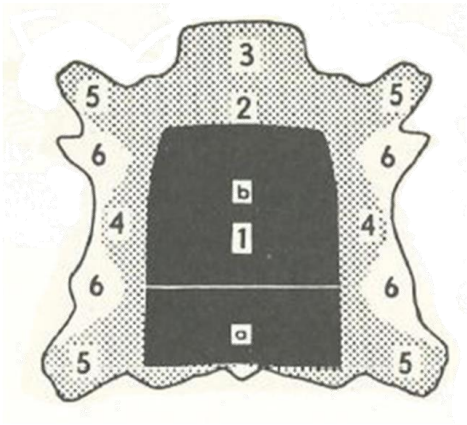
Leather is a natural product and is produced by tanning animal hides (which are usually a by-product of meat production). We speak about “hides” and “skins”. The term “hides” designates leather from rather big, grown-up animals. “Skin” designates leather from young or rather small animals. Therefore, we talk about bovine (cow or buffalo) hides but calf, goat, sheep, pig or even fish skins.

Each hide or skin is different in terms of size, homogeneity of thickness or dye, quality zones, and in terms of defects. Certain leather types are considered to be somewhat easier to cut than others (such as patent leather or black bovine leather), and there are leather types which require a higher degree of expertise (such as coloured glaze kid or reptile leathers).

4.4.1 Cutting Rules for Leather

Although there are basic cutting rules to be respected, there is no strict cutting scheme which can be applied and repeated for each hide. It is the key task of a cutter to understand the individual characteristics of each hide and utilise the material in the best possible way by finding the ideal placement and interlocking, the so-called “nesting” of the shoe parts to be cut. It is quite an art to arrange the cutting layout in a way to minimise waste and to conceal small blemishes in areas of shoe parts where they are less or not at all visible.

Quality Zones



1= = Butt
a = Bend
b = Back
2 to 5 = Not part of the butt
2 = Shoulder
3 = Neck / Head
4 = Belly
5 = Legs
6 = Leg pits

Figure 5: Parts of a hide or skin

Figure 5 visualises the quality zones of a calf hide. The butt represents the best quality. In this zone the leather is firm and its fibre structure very dense. The next best zone is the shoulder, followed by the neck. Belly, legs and leg pits are of rather inferior quality. Other important quality factors apart from the zone of the hide / skin are the homogeneity of grain and dye as well as the absence of defects such as holes, scars, cuts, loose grain etc..

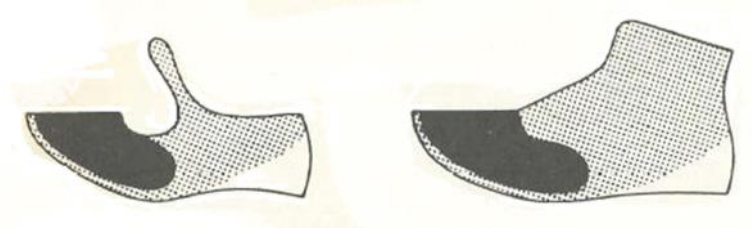


Figure 6: Upper parts which should be cut from the butt

Figure 6 relates to Figure 5 and explains which parts of the shoe upper should be cut from the butt. The vamp represents the part of the shoe which is exposed to high mechanical stress (during production: elongation at lasting; during wear: mechanical impacts, walking creases). At the same time, the vamp is the “face” of the shoe. Therefore, it should be cut from the best hide part, the butt. The rear parts of the upper (such as quarters) are less exposed to stress. In addition, the quarters will be reinforced by the heel counter. Therefore, they can be cut from hide zones of inferior quality. When cutting quarters from a leather hide or skin, the front upper part of each quarter

should always point towards the butt and the lasting allowance should point towards the edge of the hide / skin.

Fat creases of the neck should always be placed in the longitudinal direction of a quarter in order to be able to pull them out during lasting.

Figure 7 shows how to place slight leather blemishes on upper and lining parts to reduce leather waste.

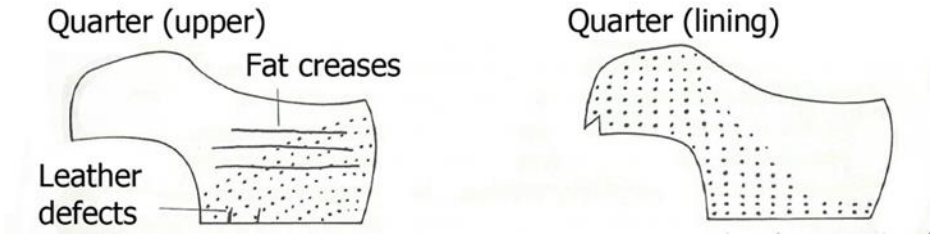


Figure 7: The dotted zones on are less exposed to mechanical stress

Stretch direction

One of the characteristics of leather is that it has a stretch direction. In order to ensure that shoe parts will "work" correctly on the final product, it is important to respect the stretch direction of the material to be cut.

Figure 9: Upper parts must not stretch in longitudinal direction

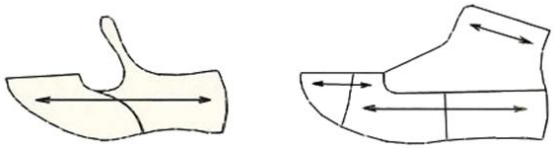


Figure 8: The arrows indicate the direction of the least stretch

Figure 9 shows a calf hide. The arrows indicate the direction of least stretch. The arrows on the shoe uppers (Figure 8Figure 8) indicate how to place the direction of least stretch.

- An upper must not stretch in longitudinal direction.
- Stretch is necessary in the transverse (=cross) direction of the vamp and in the waist area in order to be able to pull the upper tightly to the last.
- Heel covers must not stretch in transversal direction.
- Tongues and boot shafts must not stretch in longitudinal direction.

Nesting of Shoe Parts on Leather: Always Think in Pairs

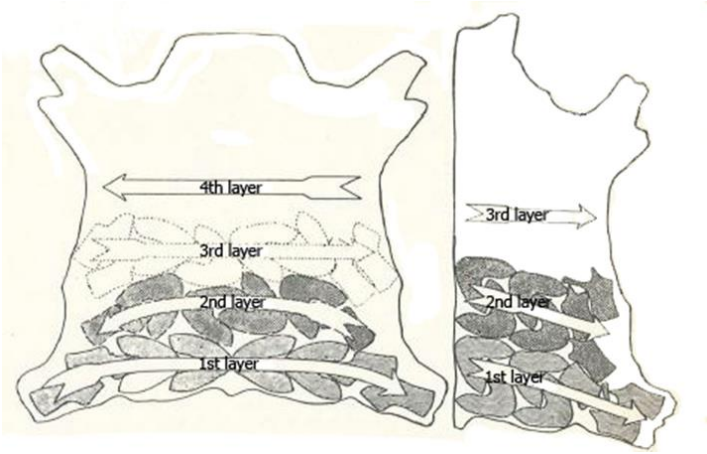


Figure 10: Always place upper parts for left and right shoes in pairs

Figure 10 shows how vamps and quarters are placed respecting stretch and quality rules. The third important rule is that all parts of a pair must be of homogenous thickness, colour, and structure (for nubuck a suede leather, the fibres should smoothen with the grain from shoe tip to heel). In consequence, the two vamps of a shoe pair, for example, should be cut from the same area. The cutter always needs to think in pairs, as Fig. 11 to 13 show. The images also visualise that a cutter always tries to place cutting waste in the less valuable zones of a hide. Experienced cutters are able to place leather blemishes in lasting allowances lap seam areas.

Figure 11 to Figure 13 show examples of cutting layouts of a basic men's shoe model, a men's boot, and of different ladies' models.

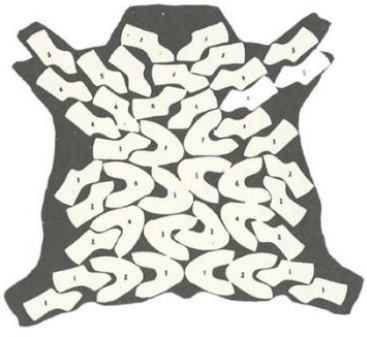


Figure 11: Basic men's shoe model

Figure 12: Men´s boot

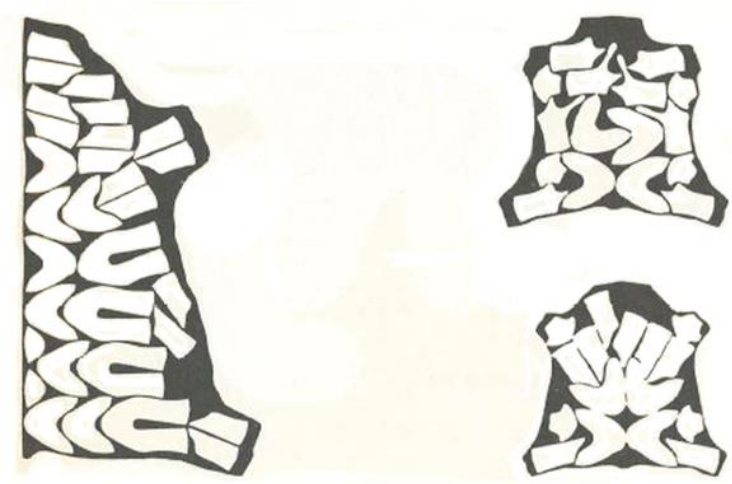


Figure 13: Half patent leather hide (left) and two goat skins (right)

Leather Lining

Cutting lining leather is different from cutting upper leather: The best leather must be placed in the rear of the shoe because this is where it has to be the most wear resistant. When cutting lining quarters, their rear should always point towards the butt. Vamp linings should not be cut from the butt.

4.4.2 Cutting of textile materials

In textile cutting, the stretch direction is equally important as in leather cutting: Just as for upper leather, a textile shoe part must be cut in a way that there is the least possible longitudinal stretch (Figure 14), i.e. in the direction of the warp thread. If this rule is not respected, the textile upper risks breakage during lasting.

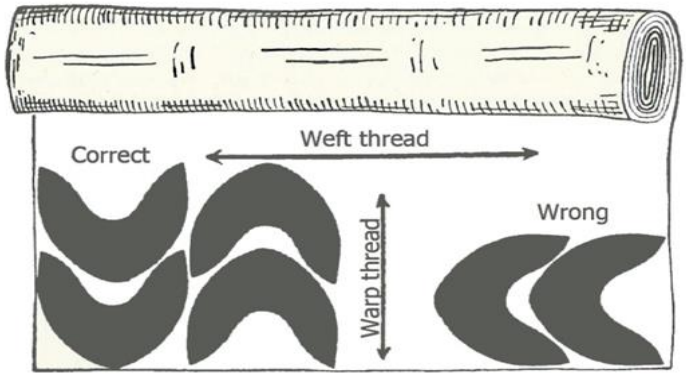


Figure 14: How to place upper parts on textile materials

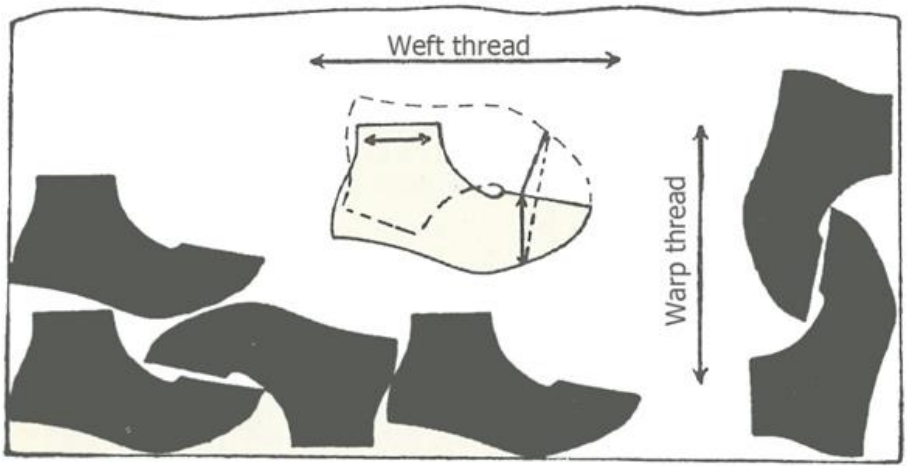


Figure 15: How to place lining parts on textile materials

Figure 15 shows a very common way of placing lining parts on textile material: The four parts in the bottom left corner are cut in a double layer. When unfolding the lining part after cutting (see dotted line), you will see that the middle line of the lining part is not parallel to the weft thread direction but in an obtuse angle which is important enough to ensure that the part will not tear during lasting.

4.4.3 Cutting of Synthetic Leather

Synthetic leather with a textile base is cut in the same way as textile materials. Leather trims (leather toe or heel caps) or toe puff materials are placed diagonally on the material (Figure 16).

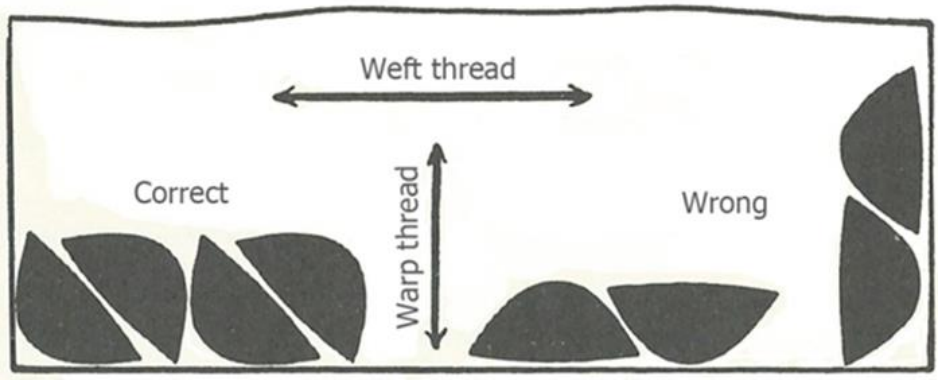


Figure 16: How to place toe caps or toe puffs on synthetic materials

4.4.4 Cutting of Leather Bottom Materials

Visualise how to place shoe bottom parts on a hide:

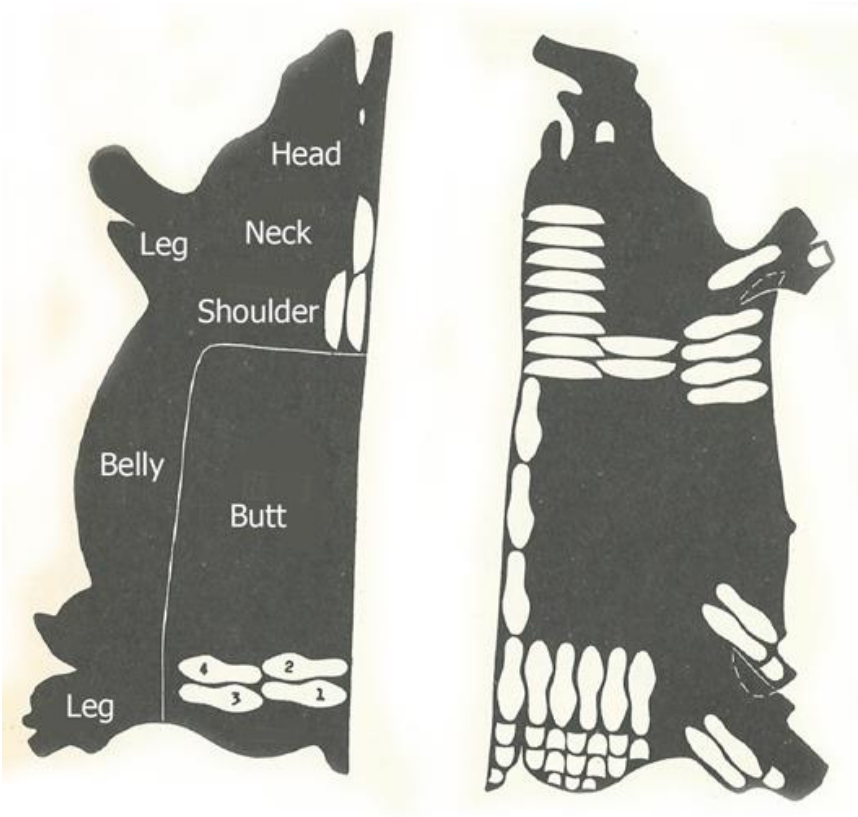


Figure 17: How to place bottoming parts on a hide

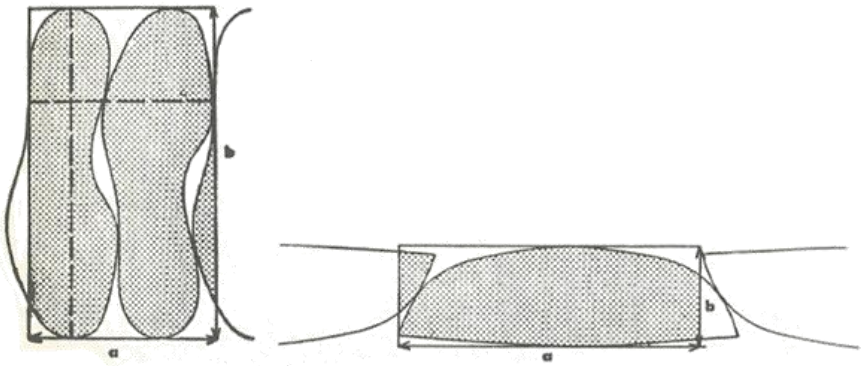


Figure 18: Calculating leather consumption for bottoming parts

4.5 Cutting Machines and Tools

4.5.1 Cutting Knives

Specific knives are used for hand cutting of leather (Figure 19).

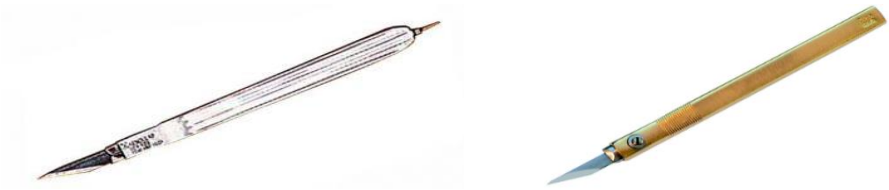


Figure 19: Knives for manual cutting

4.5.2 Cutting Machines with Clicking Dies

Several types of cutting / clicking machines require cutting dies. The first clicking presses were mechanical versions which used the force of a flywheel. These machines are not in use anymore because it is not possible to guaranty the safety of the operating personnel.

Figure 20: Swing arm clicking press

Figure 21: Beam cutting press

Modern cutting presses are powered by hydraulic pump systems. There are two basic builds: Beam presses, which are mainly used for cutting non-leather sheet materials, and swing arm types as they are commonly used for leathers. There are many variants of these two basic types.

Cutting Dies

Cutting dies must have the correct profile and correct dimensions, which both primarily depend on the shoe model and the material to be cut. Also to be considered are: pattern size, degree of complexity, number of cutting cycles, expected cutting pressure, and whether the material will be cut in single or

multiple layers. It is important to discuss the material to be cut and the intended cutting process with the die maker.

A large variety of different RDS profiles exists, from versatile types to very specific ones:

- BE = single layer cutting (leather)
- BD = single layer cutting, double edge for cutting left and right parts with one single die
- AE = symmetric profile for splitting knives
- AD = symmetric double edge steel
- TE-g = cutting of multiple layers (textile, fleece, lining, leatherette)
- SE-g = rigid material cutting (insole)
- ATE = cutting heavy textile materials in several layers
- BEN = back clearing dies (outsole)

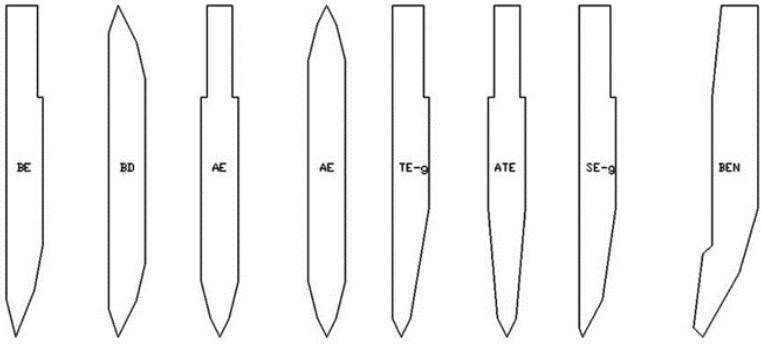


Figure 22: Different blade shapes

The production of cutting dies requires greatest care. Upper and bottom edge must be parallel even without minimum load. They must be properly stored. The blades must not touch other blades nor other metal or other hard material (Figure 23).

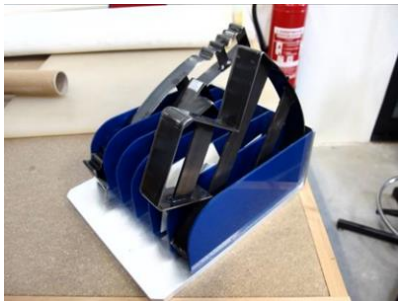


Figure 23: Correct storage of cutting dies is important

Cutting dies can carry punchers, pickers or markers.

Figure 24: Cutting dies can be equipped with punchers, pickers or markers

Cutting boards

The prevalent plastic material for cutting boards is polyamide (PA) blended with other thermoplastics. The crucial properties of cutting boards are:

- hardness (expressed in Shore / °Sh)
- thickness
- size

The most important property of a cutting board is its hardness. Depending on the supplier, there are different approaches to choose the appropriate cutting board for each specific cutting press and each specific material to be cut.

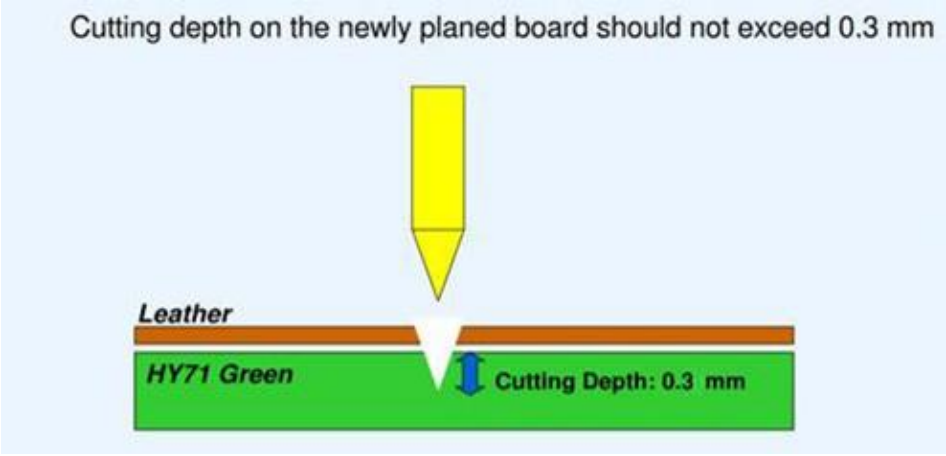


Figure 25: How to properly adjust a hydraulic cutting press

Cutting boards should be regularly flipped and turned. Correct storage is also key.

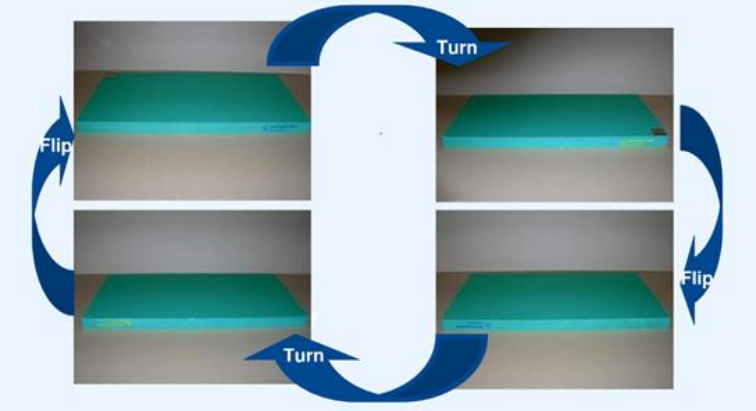


Figure 26: How to flip and turn a cutting board

Figure 27: Correct and wrong storage of cutting boards

Figure 28: Still in use: cutting boards made of end-grain wood

4.5.3 Dieless cutting tables – CAM

Today, dieless cutting is state-of-the-art even in cheap-labour countries. Of course, it must be carefully considered whether the investment and maintenance costs of a CAD/CAM system are worthwhile and whether its advantages (flexibility, speed, no costs for cutting dies and no waiting time for their production) outweigh those of the conventional cutting with cutting dies. CAM machines are mainly used for sample production because they offer great speed and flexibility. They are also a good solution for companies which are unable to find qualified skilled workers for traditional cutting.

The important feature of CAD/CAM cutting tables is that the positioning of the parts to be cut can be altered several times until the final cutting layout is approved. Cutting only starts when the operator is satisfied with the nesting of all parts on the hide. This is not possible with traditional cutting.

Most CAM systems allow for simultaneous marking, numbering and punching of the parts. When comparing the return on investment of a traditional cutting machine and a CAM machine, the possibility of grouping the above mentioned operations and the optimised utilisation of material to be cut should also be taken into regard.

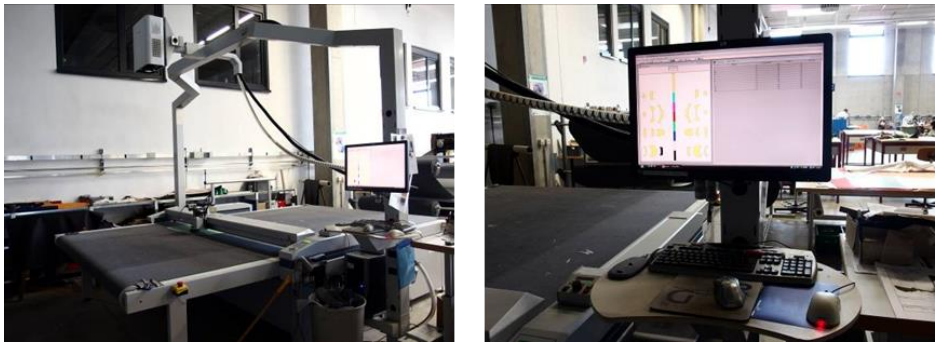


Figure 29: Dieless CAD/CAM cutting table (oscillating knife)

The CAD system communicates the geometrical data of the parts to be cut to the CAM cutting table. The material (leather hide) is placed on the working area of the cutting table and the geometry of the parts to be cut are projected onto the material. The parts are placed using desktop and mouse. The number of finished parts and the number of parts left to be cut is automatically displayed.

4.6 Example: Cutting Department at Gabor / Rosenheim

A box (Figure 30) arrives at the Cutting department. It contains a work ticket (Figure 31), a material specification (Figure 32) and the pattern stencils (Figure 33).

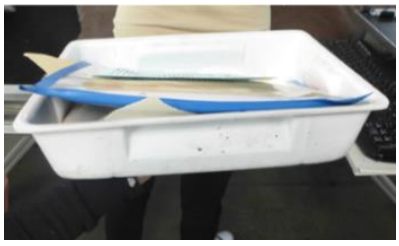


Figure 30: Box

Figure 31: Work ticket

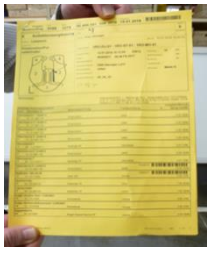


Figure 32: Material specification list

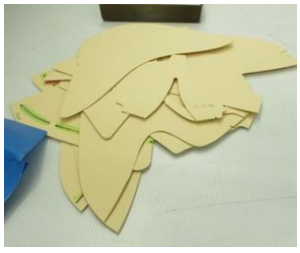


Figure 33: Pattern stencils

The cutting layout is created (Figure 34) and the upper parts are being cut (Figure 35). You can see the result in Figure 36.

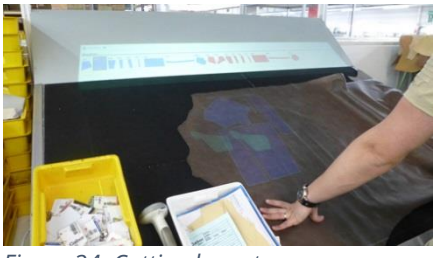


Figure 34: Cutting layout

Figure 35: Cutting of upper parts

Figure 36: Upper parts

The parts are split (Figure 37) to attain homogeneous thickness which is checked in a thickness gauge (Figure 38).

Figure 37: Splitting of parts

Figure 38: Thickness gauge

The parts are stamped with size, batch number etc. (Figure 39) and the sock liners are cut with cutting dies on a swing-arm clicking press (Figure 40). Finally, the foam paddings for the sock liners are cut (different cutting die; clicking press), which you can see in Figure 41.

Figure 39: Stamping of parts

Figure 40: Cutting on a swing-arm clicking press

Figure 41: Cutting of foam paddings

5 Documentation of Professional Skills in an Operational Context

This article deals with the reflections on the pilot project „Move Pro Europe“ that was published in Münk, Dieter; Severing, Eckart (Hrsg.) (2009): Theorie und Praxis der Kompetenzfeststellung im Betrieb – Status quo und Entwicklungsbedarf, Bielefeld: W. Bertelsmann Verlag GmbH & Co. KG (Arbeitsgemeinschaft Berufsbildungsforschungsnetz: AGBFN-Berichte zur beruflichen Bildung. Schriftenreihe des Bundesinstituts für Berufsbildung Bonn Nr. 7) P. 171-186.

5.1 Background

The concept of competence, which has been established in vocational and business education for decades, experienced a renaissance over the detour of Large-Scale-Studies in general education years ago – also in an operational context for the design and evaluation of Vocational Education and Training (VET). Both, approaches, which imply an atomisation of holistic competence and thus an exact, statistically reliable measurability (psychometrics), as well as approaches, that refer to key competences, only, and thus hide the context too far, miss the core of the matter. Based on the experience that instruments that are too abstract are often misunderstood by VET practitioners, a method is proposed that is consistently oriented towards the needs and abilities of the directly involved participants and stakeholders – and that moves the reference level of competence from the dimension of formulation to the dimension of evaluation.

The ICSAS project pursues the goals of ensuring and enhancing the competence development of industrial shoe manufacturing trainees in Portugal (PT) and Romania (RO) through a learning supportive arrangement and design of company learning stations, and to create transparency about existing skills as well as to document them.

These goals are based on two questions:

1. After having passed the final examinations in the respective education system, a trainee receives a qualification proof that confirms what he is allowed to do. Alone for reasons of time or capacity, he can and must prove only a small part of his professional skills through actions and speech during the examination – the question that remains unanswered is:

   What skills does a trainee have at the end of his training?

2. The second question takes up the constant legitimacy pressure that informal learning in the process of work has to face: The supposed added value of a dual, process-oriented training compared to school-based or modular systems should be made tangible and transparent to be able to present empirical evidence in systemic discussions. This leads to the question:

   How can these competences be described and evaluated?

Another path to the development of an instrument for transparency of competence resulted in the course of the project from the concrete work in the participating companies. The resulting conclusions of the work packages (IO) that have already been completed in the first 2 years of our 3 years project are briefly described in the following:

The first short step was to identify the spheres of activity in industrial shoe manufacturing. Methodically, this was done with the help of expert interviews in the four participating countries: Germany (DE), Romania (RO), Portugal (PT) and Spain (ES), in DE in Rosenheim (Gabor) and in Pirmasens (ISC); these spheres of activity were validated during the learning station analyses (LSA).

Core Spheres					
ICSAS	Cutting	Stitching	Lasting	Assembly	Finishing
Peripheral Spheres					
ICSAS	Design	Technical development	Production planning	Quality assurance	

Table 16: Updated spheres of activity of the Industrial Shoe Maker

The second step was the performance of learning station analyses (for methodology and detailed results see chapter 2 Learning Station Analysis (LSA)) at Carité (PT), Gabor (DE) and Papucei (RO). An exemplary documentation of one of these analyses can be found in chapter 2.5.1 LSA-Example. The main result of the analyses was that due to the manufactory-similar production methods all learning stations in all three plants have high and comparable learning potentials. Thus it is important to ensure that these potentials are exploited for vocational training and education.

The aim of performing the learning station analyses was to develop an optimised, learning supportive curriculum for the company learning stations in joint workshops of the involved stakeholders in PT and RO. By focusing on the spheres of activity, a close connection between coherent learning contents was of primary importance. However, these curricula (see chapter 3 National validated WBL curricula) show only a potential way of organising the flow of the trainees through the departments. In practice, individual training plans of trainees may vary due to frame conditions/restrictions of work processes. This also means that the competences of the trainees will not develop synchronously for all trainees of a year. For example, if a company has to deal with several apprentices, one trainee could start the apprentice-ship in the “Cutting” and a second one in the “Stitching” sphere. A successful formative evaluation of competences during the training course can then serve as a control instrument for the planning of the further flow through the departments of a company as the third step.

5.2 Dimensions of competence evaluation

For the evaluation of competences, a number of dimensions must be taken into account. In addition to the central aspect: Whose competences are to be evaluated and presented transparently, at least the following additional questions must be answered:

- **For whom** should competences become transparent?

Possible addressees would be, for example, the learners themselves, trainers or instructors, tutors, HR departments, national and international VET institutions (e.g. the German Federal Institute for Vocational Education and Training (BIBB), Chambers of Industry and Commerce, universities) or the national and international employment system. The answer on this question has direct

consequences on the formulation of competences (level of proficiency and abstraction).

- **How** are competences **evaluated**?

Survey instruments or procedures could be, for example: questionnaires, observation and discussion, test assignments, practical work tasks. In this regard, it is important to find a reasonable balance between the efforts of collecting and the quality of statements. Thus, if the number of cases is large (large-scale studies such as Pisa), the competence can certainly not be disaggregated and described to the same extent as in qualitative individual case studies where doubts on representativeness would be legitimate.

- **How** are skills **assessed**?

Conceivable would be a simple positive or negative confirmation of the existence of competence, quantitative as well as qualitative/descriptive or qualitative/performance-oriented statements on competence. A pure yes / no or quantitative scale increases the clarity, but significantly reduces the informative value. The definition and interpretation of what would correspond to 100% (an expert in the sphere, a good trainee?) as well as the decision on a threshold for "yes" are hardly objective to make. Therefore, qualitative scales are more meaningful despite their (obvious) subjectivity. Two types can be distinguished: on the one hand, qualitative/descriptive scales (see, for example, Markowitsch et al., 2006), in which the degree of competence is differentiated according to the difficulty of the tasks, for example, from "simply on schedule", "make necessary adjustments" and "take precautions" to "develop new procedures". On the other hand, qualitative/ performance-oriented levels, in which the complete, professional implementing of the complex action stands as a fixed point of reference. The description of the degree of competence acquisition is then in relation to this reference point, this means that a distinction is made as to whether a trainee "needs assistance" / "needs instruction" / "needs supervision" or "works independently" in a work activity.

- At which level of abstraction should competences be acquired?

The next subchapter is devoted to this central question.

5.3 Level of Competence Evaluation

Figure 42 visualises the theoretically possible levels of competence evaluation. The y-axis represents two dimensions: both (steadily increasing) the degree of abstraction and the specificity. Whilst the top two (Vocational proficiency and Spheres of activities) as well as the bottom two (knowledge/ skills and work tasks) levels are to be understood in general, the intermediate (Work-processes and Parts of work-processes (tact)) are characterised by their specificity due to work-organisation.

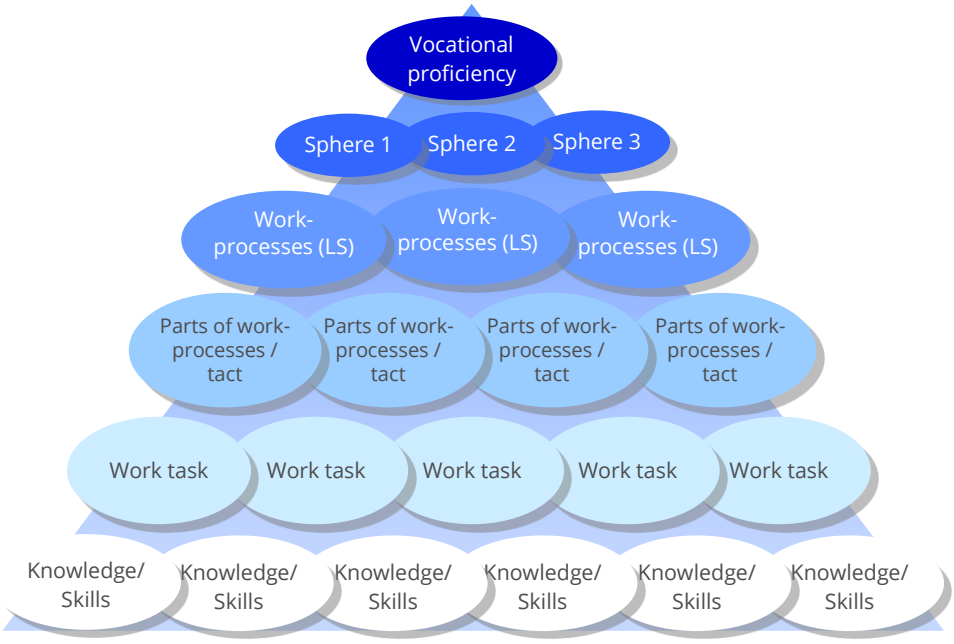


Figure 42: Possible levels of evaluation

Based on this graphic, the following principles can be set out:

1. Theoretically, all levels shown in Figure 42 could be used to assess competence (except for the lowest level, where it would be difficult to speak of competence).

2. The ellipses used for visualisation are neither to be understood as building blocks nor summative (in the sense of x working tasks result in a working process) nor linear in the sense that partial areas (modules) could be separated. The levels are to be considered as relational (not functional). The respective mastery of some of the elements of the lower level is a necessary, but not sufficient condition for the next higher level.

3. Vocational proficiency as a holistic construct cannot be evaluated in a meaningful way below a level of spheres of activity (classes of functionally identical, structurally similar tasks).
4. Ideally an evaluation of competence at the level of spheres of activity would therefore be desirable; due to the abstractness and complexity of spheres of activity it can be performed only exemplarily.
5. Parts of work-processes are not suited to evaluate competences due to their specificity; for addressees who are unfamiliar with concrete, job-specific processes, they are ineffectual to create transparency.
6. Work tasks – such as preparing a workplace or preparing parts for further processing, including organisation and quality assurance – are the smallest complete actions that are not tied to specific jobs and are not differentiated in knowledge, skills and competence.

5.4 The instrument

5.4.1 Introduction to Feedback Sheet

Unlike learning in formal environments as in classrooms or workshops, learning outcomes (LO) from work-based learning (WBL) in a learning station (LS) depend strongly on the actual equipment of the production line and the models and makes, which a shoe factory manufactures. If the shoe models produced do not require certain work tasks of a whole sphere (in stitching or assembly, for example), then it is simply not possible to acquire skills in this production line related to this method.

A systematic and transparent communication on concrete LOs acquired via WBL by a learner/apprentice between tutors, supporting the learner in the various departments, and the head of training, being responsible for the entire training programme, is of great importance in WBL.

With the intent to provide a concise and handy communication tool, we recommend using the matrices as shown below: They allow tracking the achievements of each trainee in each department in a quick and easy way. The matrices do not refer to any formal assessment; they simply state the degree of autonomy each trainee was able to reach within the given timeframe in each Sphere of Activity.

The matrices list the main work tasks and the performance that can be acquired in each department. The work tasks refer to the acquired skills; to indicate that they include key competencies and knowledge the underlying elements for some of the work task are listed.

How to use the matrices: In order to give feedback on the learning progress of each trainee, please tick off the level of autonomy the learner has reached for each work task (choosing between needs assistance / needs instruction / needs supervision / completely independent).

If the work task in the matrix was not part of the training, you can leave it out or erase the work task; if additional work tasks were trained, please feel free to continue the list of work tasks according to your training goals.

In the end, the matrices will document what each learner has been able to acquire and which level of autonomy she/he has reached. And again, although this has already been said: Please bear in mind that you may have to adapt the matrices according to the processes and to the operations in your department.

Table 17 documents the draft of our competence evaluation matrix for the sphere of activity “Cutting” (see subchapter 2.5.1 and chapter 4).

5.4.2 The matrix

Sphere of Activity: Cutting			
Work task:	Cutting by hand, including		
Reading & understanding work ticket; Providing & preparing the material [...]; Performing the task applying safety measures and asking for support if needed; Controlling own work and identifying possible defects; Preparing products for next task; Knowledge about materials; Cooperation with colleagues; [Please continue the list if you wish to add criteria].			
Evaluation			
Needs assistance	Needs instruction	Needs supervision	Completely independent
☐	☐	☐	☐
Place, Date	Signature		
Work task:	Clicking with cutting dies		
[Please set up the criteria in this section in line with your evaluation needs according to the example given above]			
Evaluation			
Needs assistance	Needs instruction	Needs supervision	Completely independent
☐	☐	☐	☐
Place, Date	Signature		

Work task:	Cutting with CAD-CAM machines		
[Please set up the criteria in this section in line with your evaluation needs according to the example given above]			
Evaluation			
Needs assistance	Needs instruction	Needs supervision	Completely independent
☐	☐	☐	☐
Place, Date	Signature		
Work task:	Splitting		
[Please set up the criteria in this section in line with your evaluation needs according to the example given above]			
Evaluation			
Needs assistance	Needs instruction	Needs supervision	Completely independent
☐	☐	☐	☐
Place, Date	Signature		
Work task:	Stamping		
[Please set up the criteria in this section in line with your assessment needs according to the example given above]			
Evaluation			
Needs assistance	Needs instruction	Needs supervision	Completely independent
☐	☐	☐	☐
Place, Date	Signature		

Final evaluation (in this department)	
Cutting; including all work tasks above	
Evaluation	
Needs further training	Can perform all work tasks (almost) independently
☐	☐
Place, Date	Signature

Table 17: Matrix for Sphere of Activity Cutting

For this purpose, the partners Gabor, Carité and Papucei listed all work tasks of the departments whose activities can mainly be assigned to the sphere of activity "Cutting" in the matrix. As a result, a list of all work tasks belonging to a sphere of activity was created. The identified work tasks are further detailed and described at the level of skills and knowledge aspects necessary for the complete action. The description at this degree of detail is disclosed in the proof of competence as an example for the work task “cutting by hand”. Thus, it becomes clear that the working tasks, in contrast to their brief and activity-oriented formulation, cover each a complete action together with the necessary knowledge and the respective interdisciplinary (key) competences.

The use of the competence evaluation matrices is characterised by the following essential elements: The persons responsible for the respective training section (i.e. the tutors in the departments) give their evaluation of the trainee's competence compared to experts` work. The selected four-level scale represents the various forms of cooperation within the community of practitioners and thus the confidence in a potential future colleague.

The information from the respective department about the evaluation of the work tasks and the confirmation date is transparent for the trainer or teacher who accompanies the trainee during the entire training course, but possibly also for a tutor in a later department. For example, it might turn out that a trainee has encountered a work task many months ago and in a department in which only simple variants of this work task occur. With this information, the upcoming department assignment, in which the same work task also occurs, can be adapted to the learning requirements of the young person.

The most important aspect of this instrument is that the evaluation and thus the responsibility for the confirmation of competence is moved to the respective community of practitioners, i.e. there are no artificial examination situations with external assessors. The respective expert-worker confirms the quality of the trainee's work with his signature.

At the end of the assignment in a department, it could be important to evaluate whether the trainee can already work independently in this department or if he still needs further support. For this purpose, the tutor can either record his evaluation of the last few weeks or alternatively give the trainee a typical task from the department and evaluate its implementation.

The filled-in matrices should be kept by the trainee, available for the instructor / teacher - they should neither replace exams nor become part of the final assessment.

After completion of the training, these evaluation matrices can provide double added value: on the one hand, the certificates can be used in-house as proof of ability of skilled work in the respective spheres of activities - the training effort after starting to work in a department is reduced and the assignment to difficult tasks can happen earlier.

On the other hand, this instrument allows for high transparency in job applications: if a skilled worker, who was trained in one of our participating companies, applies for a job externally, his diploma is certainly a necessary precondition - but human resources managers may be less interested in how the candidate has performed, for example, in stitching in the final examination, but rather what competences he has acquired in the sphere of activity for which he is to be recruited, for example in cutting, and our instrument makes this transparent in an easily understandable manner.

5.5 Summary and Outlook

In Table 18, the dimensions raised in Section Dimensions of competence evaluation 5.2 are illustrated. Columns 2 to 4 describe possible addresses for the results of any competence evaluation – but other addressees of a competence evaluation are possible, too.

A first variant of this model (the first task of the procedure described in section 5.4) is highlighted in the table in light blue: A transparent presentation of the

competence of trainees for those directly involved in the training (trainers/ teachers, apprentices and company training staff (tutors)) in a company-internal certification model. As a level of abstraction, the work tasks were chosen, as these can be comprehensively assessed by the respective skilled workers on the one hand, and on the other hand, they do not yet have any product or process-specific characteristics. Finally, the evaluation is carried out by means of observation and supplementary discussions, which lead to a qualitative performance-oriented evaluation.

Dimension of competence evaluation	**Possible Design**			
Addressee	Trainer/ trainee	Tutor	Company	TVET institutions
Level	Sphere of activity	Process	Part of work process	Task
Data collection	Questionnaire	Observation	Test	Practical task
Evaluation	Yes / No	Quantitative	Qualitative-descriptive	Qualitative performance-oriented

Table 18: Integration in the dimensions of competence evaluation

The second application variant briefly outlined in the last section is marked in medium blue: if a trainee is able to carry out the essential work tasks for a sphere of activity independently or at least under observation, he can acquire a "sphere of activity certificate" by working on a practical task, which, if necessary, can find consideration and use in another addressee group, for example training company / other companies of the same or related industries.

In dark blue, the matrix element "vocational training institutions" is marked – as a motivation to consider whether this approach of competence evaluation might become an element of competence evaluation when comparing the efficiency of VET systems.

6 Experience Reports and SWOT

6.1 Germany

6.1.1 Introduction

In contrast to Romania and Portugal, where Work-Based Learning (WBL) is a real innovation in the industrial shoe production sector, dual training has been established in Germany for decades. This is also the case at Gabor's main plant in Rosenheim, where an average of five shoe-production apprentices are hired each year and trained in accordance with the relevant regulations, currently the "Ordinance on Vocational Training for Shoe Producers" („Verordnung über die Berufsausbildung zum Schuhfertiger und zur Schuhfertigerin“, BIBB 2017). Apprentices in shoe production spend around 4,500 hours in the company and 1,000 school hours (i.e. 750 hours, or only around 20 per cent of the training period) at vocational school during the three-year training period.

In the context of the ICSAS project, the training practice was accompanied for a good year to test and evaluate the developed manuals (cp. chapter 4) and feedback matrices (cp. chapter 5.4).

Gabor describes the range of training as follows: "Manual training as a shoe maker is the best basis for a professional career in the shoe industry. You will learn to produce fashionable shoes with the best wearing properties and in high quality. In addition to manual work, this also includes the use of machines and modern CAD technology. The work with the many different materials such as leather, high-tech and lining materials is particularly exciting. In our prototype production, the approximately 250 individual parts are assembled in 140 work steps to form a finished pair of shoes. After quality control and finishing, the shoes are prepared for shipping and sale."

6.1.2 Apprenticeship @Gabor

Trainees at Gabor pass through all departments, ideally according to the following internal training plan:

1. Year of training	2. Year of training	3. Year of training
3 months cutting 3 months stitching 3 months gradation room 3 months lasting	3 months assembly 3 months finish 3 months upper manufacturing 3 months model department	3 months technical model department soles 3 months technical model department CAD 3 months - depending on requirements 3 months exam preparation

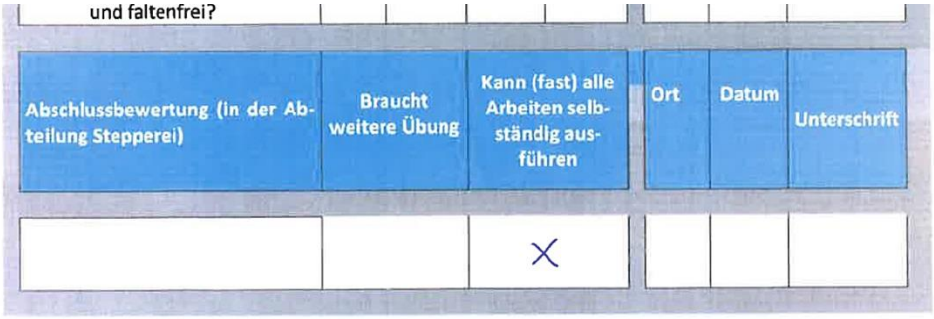
Table 19: Internal training plan of Gabor

The practical training follows the approach of internal flexibility, i.e. the outlined training plan is adapted individually as required and the apprentices are deployed where there is still a need to catch up. Particularly noteworthy is the fact that at Gabor in Rosenheim at least one colleague in each department has passed the Ordinance on Trainer Aptitude (AeVO 2009) and that apprentices have the opportunity to visit and get to know the production facilities in Slovakia and/or Portugal for a couple of weeks.

6.1.3 Experience report

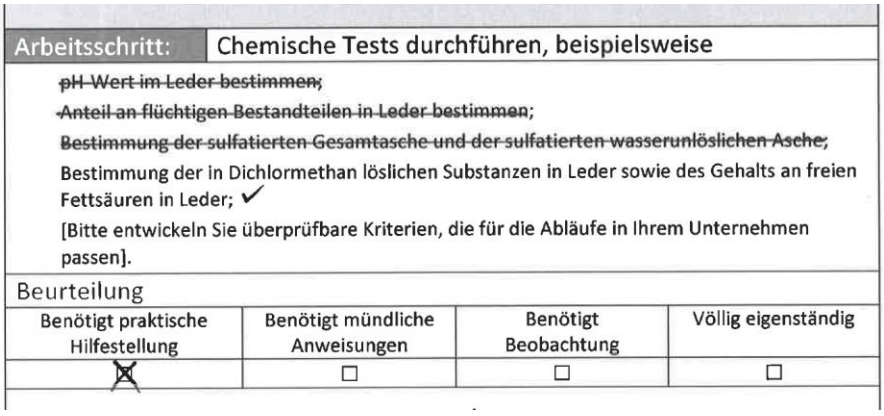
The content and form of the documents to support company trainers, such as the 11 manuals (cp. chapter 4), are highly valued and are partly used internally for trainers and apprentices. Even though a large portion of the content is of course implicitly known by colleagues, the documents represent a first-time explication.

The matrices (cp. chapter 5.4) are particularly useful for the production-relevant (core) "spheres of activity". An assessment is less important for the peripheral spheres. In quality assurance/research and development in particular, it could not be assumed that apprentices would be able to perform tasks independently at the end of their stay in the department. This evaluation is also consistent with the assessments that were submitted, Figure 43 and Figure 44 document two of these sheets:



und faltenfrei?					
Abschlussbewertung (in der Abteilung Stepperei)	Braucht weitere Übung	Kann (fast) alle Arbeiten selbständig ausführen	Ort	Datum	Unterschrift
		X			

Figure 43: Assessment on core sphere of activity "Stitching"



Arbeitsschritt:	Chemische Tests durchführen, beispielsweise
~~pH-Wert im Leder bestimmen;~~ ~~Anteil an flüchtigen Bestandteilen in Leder bestimmen;~~ ~~Bestimmung der sulfatierten Gesamtasche und der sulfatierten wasserunlöslichen Asche;~~ Bestimmung der in Dichlormethan löslichen Substanzen in Leder sowie des Gehalts an freien Fettsäuren in Leder; ✓ [Bitte entwickeln Sie überprüfbare Kriterien, die für die Abläufe in Ihrem Unternehmen passen].	

Beurteilung			
Benötigt praktische Hilfestellung	Benötigt mündliche Anweisungen	Benötigt Beobachtung	Völlig eigenständig
☒	☐	☐	☐

Figure 44: Assessment on quality assurance (newly designed sheet)

These assessments made here in practice can also be seen as a further confirmation of the estimations of the coverage of the spheres of activity of the Sector Qualifications Framework (SQF) by the German occupational profile of the industrial shoe producer (cp. chapter 7).

The design of the matrices, on the other hand, was criticised; the original design of the matrices suggested that the degree of independence of an apprentice had to be ticked in all sub-items, which is not intended. In fact, assessment crosses should only be placed in the bolded line of the criteria. This feedback led (among other things) to a redesign of the matrices (cp. chapter 5.4).

An added value of the matrices was seen particularly in the possibility of using them for communication after the apprentices' stays abroad.

Another example of apparent good practice is that the formative interviews after an assignment in a department were not only used to review the past, but also to agree on development goals, both professional and social, for the

coming months, as shown in Figure 45 (eating out more often with colleagues):

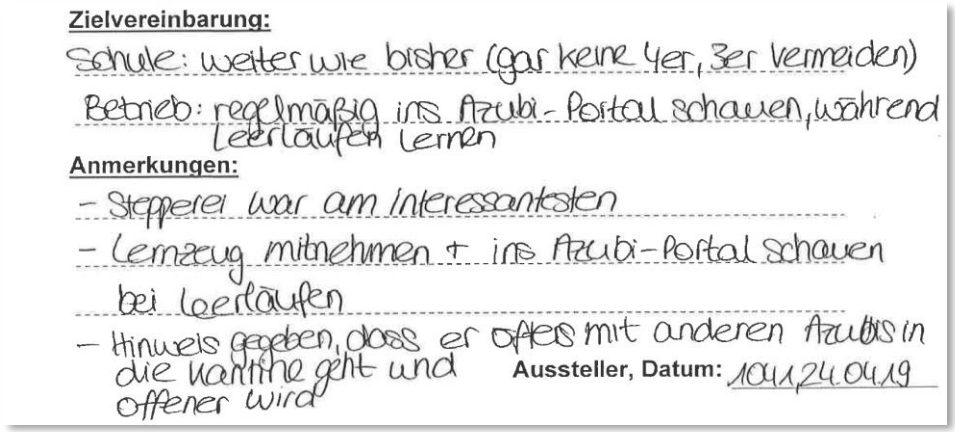

Zielvereinbarung:
Schule: weiter wie bisher (gar keine 4er, 3er vermeiden)
Betrieb: regelmäßig ins Azubi-Portal schauen, während Leerlaufen lernen
Anmerkungen:
- Stepperei war am interessantesten
- Lernzeug mitnehmen + ins Azubi-Portal schauen bei Leerlaufen
- Hinweis gegeben, dass er offen mit anderen Azubis in die Kantine geht und offener wird
Aussteller, Datum: 10.11.24.04.19

Figure 45: Development goals from one of the feedback interviews

6.1.4 SWOT

SWOT analysis of apprenticeship in Germany and the special features at Gabor

Strength	Weaknesses
• Vocational principle: qualifications recognised throughout Germany • The dual system as such, it ensures the commitment of companies and provides a good balance between specific and general learning outcomes • The good image of vocational education and training • Participation of many stakeholders • A strong CVET system • Lived internal flexibility of curricula • Trainers in all departments • collegial atmosphere • Possibility of deployment abroad	• Training is organised by the private sector: In times of economic risk, there is a danger that the number of apprentices will be reduced • Cooperation with vocational school can be expanded • Low permeability to academic training (HE) • Many school-leavers do not know that training in this sector is possible

Opportunities	Threads
• Improving cooperation with the school • Integration of new require-ments/technologies into existing job profiles • Digital media enable new learning environments	• Trend towards academic education • Unclear effects of digitization, risk of scissors opening: More demanding, but also more undemanding jobs • Economic situation: Lloyd in Suhlingen, a shoe producer of comparable size, has just closed down its German site

Table 20: SWOT Analysis Germany

6.2 Romania

6.2.1 Introduction

The Report on Experience and SWOT from piloting Work Based Learning in Romania serves as "apparent good practice" for other footwear companies.

WBL pilot of apprenticeship is based on a Locally Develop Curriculum (LDC), named „Footwear manufacturing technologies“ and developed by “Ion Holban” Technical College of Iasi (Educational Institution), SC Angela International SRL – Papucei (Economic operator), and “Gheorghe Asachi” Technical University of Iasi (Public institution - consultant) according to all Romanian Regulations.

WBL pilot programme in Romania was implemented at Papucei footwear company, lasted one year, starting from October 2018, and involved three apprentices from “Ion Holban” Technical College of Iasi.

The apprentices faced real work processes specific to the main spheres of activity of industrial footwear manufacturing:

- Core spheres (582h): Cutting, Pre-stitching, Stitching, Pre-lasting, Lasting, Assembly and Finishing;
- Peripheral spheres (72h): Technical Development, Production planning, design and Quality Assurance.

The apprentices' achievements were evaluated by the responsible tutors and their progress was documented and to further improve the WBL activity, the apprentices were asked to answer to a set of questions during an open interview to evaluate the atmosphere of the learning process.

The results of implementing WBL in Romania were shared and analysed during a workshop that gathered representatives from TUIASI, Papucei, “Ion Holban” Technical College and CNDIPT (Romanian National Center for the Development of Vocational and Technical Education). The experts shared their opinions regarding the implementation of WBL, the progress made by trainees, benefits and future collaborations. The results of the WBL pilot were evaluated through a SWOT analysis and are presented in the final chapter of this report.

6.2.2 Locally developed curriculum for WBL

The curriculum design for VET is a process regulated by national legislation and the related set of methodologies approved by the Ministry of National Education Order (OMEN).

The ICSAS project proposes a solution for footwear companies that are facing a gap in terms of recruiting qualified workforce, especially young graduates of VET schools by implementing a Work Based Learning (WBL) program based on Locally Developed Curriculum (LDC) those learning outcomes are designed for the footwear manufacturing. LDC is the curricular provision specific to each vocational and technical education establishment and it is delivered in partnership with the economic operators.

The designed curriculum, named „Footwear manufacturing technologies" involved "Ion Holban" Technical College of Iasi (Educational Institution), SC Angela International SRL – Papucei (Economic operator), and "Gheorghe Asachi" Technical University of Iasi (Public institution - consultant).

The hereby LDC curriculum for WBL, designed within the framework of the ICSAS project, complies with all Romanian national regulations, was checked and validated by the project Advisory Board (RO) and approved by the County School Inspectorate of Iasi.

This curriculum was studied during a school year and goes through a total of 654 hours (9 weeks x 5 days x 6 hours = 270 hours/year and 32 weeks x 2 days x 6 hours = 384 hours/year) at the economic operator during practical training sessions.

To proceed with the WBL piloting, an official LDC Agreement was signed between School and Papucei company.

6.2.3 Selection of apprentices

Apprentices engaged in the Work Based Learning have a background in Textile and Clothing and were selected from "Ion Holban" Technical College from Iasi in collaboration with Papucei and TUIASI. Apprentices were evaluated in three stages: theoretical knowledge in the field, practical skills and interviews. From an initial number of six apprentices, the top three were selected based on their total score, as presented in Figure 46.

Universitatea Tehnică Gheorghe Asachi Iaşi, Romania

COLEGIUL TEHNIC „ION HOLBAN" IAŞI

Papucei

SC Angela International, Romania
www.papucei.eu

Students selection results for WBL

INTEGRATING COMPANIES IN A SUSTAINABLE APPRENTICESHIP SYSTEM
- NR: 2017-1-DE02-KA202-004174 -

No.	Student name and surname	Theoretical knowledge	Practical skills	Interviews	Total points	Final Result
1.		18	30	20	68	Reserve
2.		14	30	Absent	_	Absent
3.		16	50	20	86	Accepted
4.		13	60	20	93	Accepted
5.		16	50	20	86	Accepted
6.		15	50	20	85	Reserve

Figure 46: Apprentices selection results for WBL piloting in Romania

6.2.4 WBL Pilot planning

The piloting phase had a duration of one year, scheduled during October 2018 - October 2019. The apprentices passed through all spheres of activity and started on 22nd October 2018. Considering learning-teaching activities of each sphere, Papucei and TUIASI decided on the following distribution (Table 21):

Learning Spheres	Learning content	Time distribution	Total hours
Core Spheres	Cutting	October - November 2018 5 weeks, 5 days/week, 6 h / day	150
	Pre-stitching	November – December 2018 3 weeks, 5 days/week, 6 h / day	90
	Stitching	December 2018 - February 2019 1 week, 5 days / week, 6 h / day + 7 weeks, 2 days / week, 6 h / day	115
	Pre-lasting and lasting	March - April 2019 7 weeks, 2 days/week, 6 h / day	84
	Assembly	June 2019 8 weeks, 2 days/week, 6 h / day	96
	Finishing	July 2019 4 weeks, 2 days/week, 6 h / day	48
Peripheral Spheres	Design Technical development Quality assurance Production planning	September - October 2019 6 weeks, 2 days / week, 6 h / day	72

Table 21: Spheres distribution for piloting WBL

The detailed schedule of the WBL is presented in the following Table 22.

Sphere	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	January-Februaty 2019	Martch-April 2019	May-June 2019	July 2019	September-October 2019
No of hours	5x6=30	5x6=30	5x6=30	5x6=30	5x6=30	5x6=30	5x6=30	5x6=30	5x6=30	6 hours/day* 2days/week* 7weeks=84	6 hours/day* 2days/week* 7weeks=84	6 hours/day* 2days/week* 8weeks=96	6 hours/day* 2days/week* 4weeks=48	6 hours/day* 2days/week* 6weeks=72
Period	22-26 Oct	29 Oct-2 Nov	5-9 Nov	12-16 Nov	19-23 Nov	26-30 Nov	3-7 Dec	10-14 Dec	17-21 Dec	Monday and Thursday	Monday and Thursday	Monday and Thursday	Monday and Thursday	Monday and Thursday
Cutting														
Pre-stitching														
Stitching														
Pre-lasting and Lasting														
Assembly														
Finishing														
Technical Development														
Production Planning														
Design														
Quality Assurance														

Table 22: WBL pilot schedule in Romania

6.2.5 Tutors training Workshop on WBL

The role of tutors is at the heart of apprenticeship programmes:

- Passing on practical skills alongside with theoretical know-how
- Tutoring = internal knowledge management (& transfer) system
- Coaching apprentices = social responsibility
- Dealing with emotional ups and downs of teens

Before the start of WBL pilot program in Romania, Tutors from Papucei footwear company were trained by representatives from TUIASI regarding the role of the tutors, the aim of the pilot activity, Train the Trainers manuals, Learning-Teaching Exercises, spheres of activity and WBT planning and coordination (Figure 47).

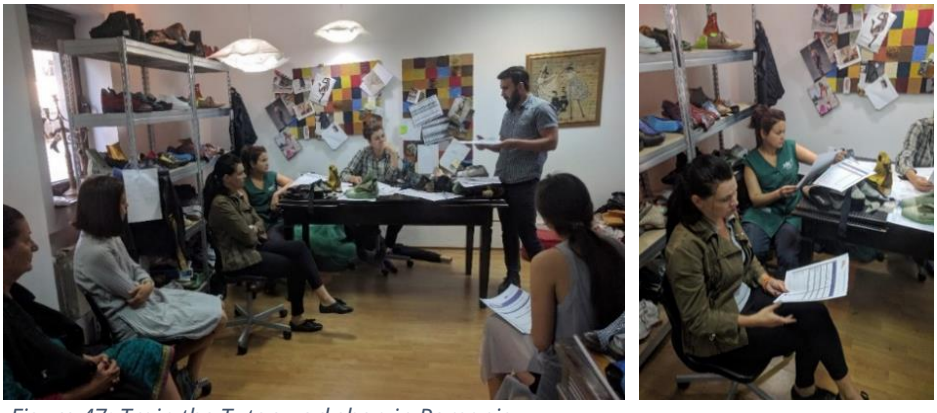


Figure 47: Train the Tutor workshop in Romania

6.2.6 WBL pilot implementation

According to the agreed WBL pilot program and guided by tutors from Papucei and TUIASI the apprentices followed all the Core Spheres and the Peripheral spheres specific to footwear industrial manufacturing.

Core spheres – 582 h

Cutting, Pre-stitching, Stitching, Pre-lasting, Lasting, Assembly and Finishing



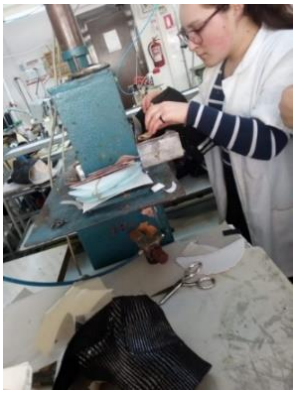
Cutting



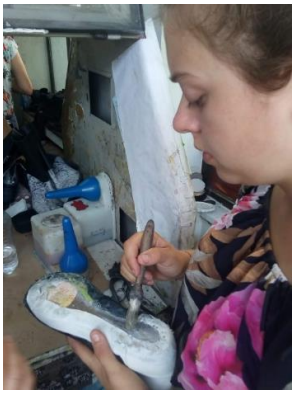
Pre-stitching



Stitching



Pre-lasting and Lasting



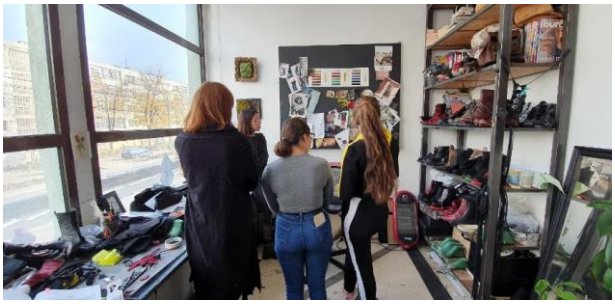
Lasting


Finishing

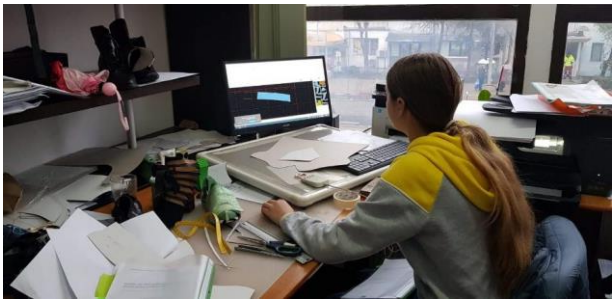
Figure 48: Apprentices' during Core spheres WBL at Papucei

Peripheral spheres – 72 h

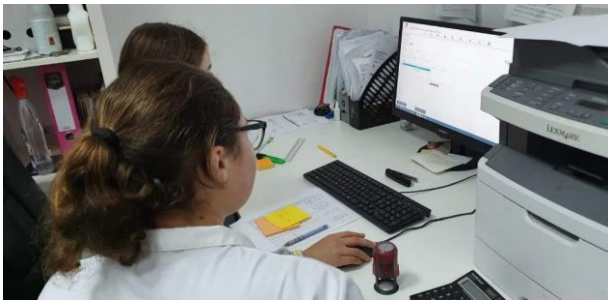
Design, Technical Development, Production Planning and Quality Assurance



Design



Technical Development



Production Planning

Quality Assurance

Figure 49: Apprentices' during Peripheral spheres WBL at Papucei

Regular Work meetings at TUIASI

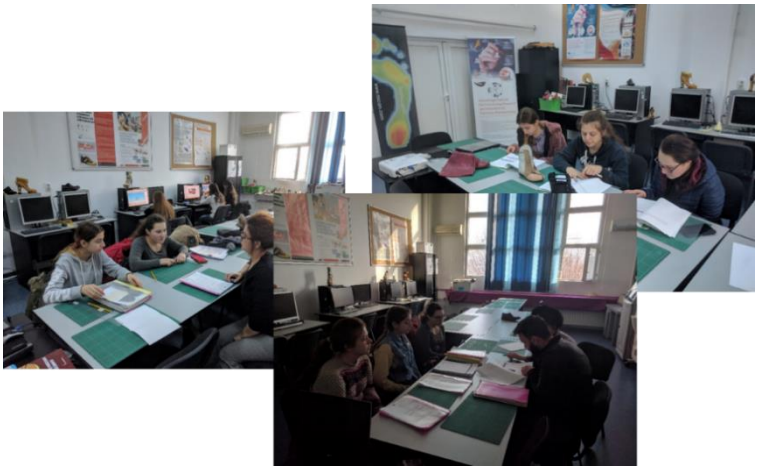


Figure 50: Apprentices' during meetings at TUIASI

Apprentices notebooks

Additionally, the apprentice` documented all their work in individual note-books containing drawings, samples explanations and observations.

Figure 51: Apprentices notebooks and footwear prototypes

6.2.7 Formative Quality Assurance

6.2.7.1 Learning Outcomes feedback

For each sphere of activity, at the end of the training in that sphere, the apprentices' achievements were evaluated by the responsible tutors from

TUIASI and PAPUCEI by using the Matrices found in the Manuals developed by ICSAS to support tutors involved in WBL process.

For all learning spheres, the apprentices need instruction or supervision to perform the respective work tasks. None of the apprentices managed to receive the highest possible rating "Can perform all work tasks (almost) independently". This is justified by the age of the apprentices (~16 years old), their learning pace in an actual work environment being slower compared with the one of an adult, and their limited theoretical knowledge in the field of Footwear industrial manufacturing. Therefore, it is recommended to adapt the number of allocated hours for WBL according to the age of the students and their theoretical knowledge. An example of filled matrices is presented in Figure 52.

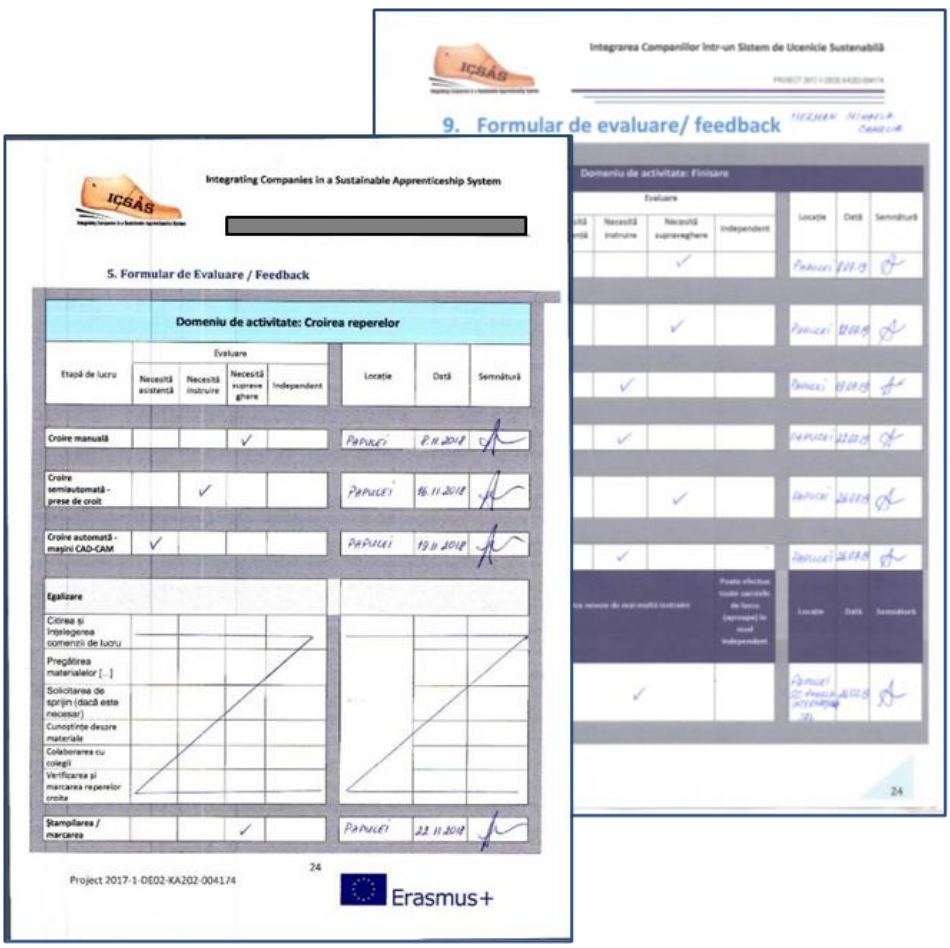


Figure 52: Example of filled matrices from Cutting and Finishing

The main findings of the Romanian apprentices learning outcomes assessment are presented in the following table:

Learning Sphere	Findings
Cutting	All apprentices need instructions and supervision for performing the requested tasks for manual cutting and die-cutting and that they need assistance for automatic cutting.
Pre-stitching	Apprentices can read and understand work orders independently need additional instructions and supervision for making the adjustments on the skiving and splitting machines and that they need to be supervised during performing the majority of the pre-stitching operations.
Stitching	Apprentices need additional instructions and supervision for performing the majority of the stitching operations.
Pre-lasting and lasting	Apprentices can read and understand work orders independently, can perform the majority of operations independently or under supervision but need more practice to achieve the required quality. Regarding Lasting, due to the high complexity in operating the lasting machines the apprentices need further training in operating those machines.
Assembly	Apprentices can perform the majority of operations under supervision.
Finishing	Apprentices can perform the majority of operations but need supervision and additional practice to achieve the required quality.
Design Technical development Quality assurance Production planning	Allocated time was only sufficient to understand the main principles, therefore, apprentices need additional training in peripheral departments.

Table 23: Learning outcomes feedback main findings

6.2.7.2 Interviews with the apprentices

To further improve the WBL activity, after their stay at each learning station, the apprentices were asked to answer a set of questions during an open interview to evaluate the atmosphere of the learning process.

The following questions were used during the interviews:

- Which LS (Learning Station) have you just completed?
- How long did you stay there?
- Was the time frame adequate or rather too long or too short? If it was not adequate, why?
- Do you feel proficient at this LS now? If not, why?
- Did you feel well prepared for this LS? If not, what was missing?
- Do you think that the entire learning potential of the LS was used? If not, why?
- Did the tutor support you in an adequate way? If not, why?
- Do you think that communication with colleagues was cooperative? If not, why?
- Were you part of a team or were you working on your own?
- Would you recommend your learning experience at this LS to other learners? Why?
- What could be improved?
- What was the most difficult task at this learning station?
- Were you able to put your theoretical knowledge from vocational school into practice at this LS? Did this LS help you to reinforce your understanding of theoretical knowledge?

Main findings:

- All learning spheres were recommended as being dynamic and interesting;
- Tutors provided adequate support and explained in detail all the operations;
- Allocated time was considered sufficient to learn main operations;
- More time to be allocated for exercising activities with a higher degree of complexity;
- Additional training and practice regarding machinery setup;
- The practice helped them to improve their understanding of theoretical knowledge;
- Experienced colleagues were always open to provide support and assistance.

Figure 53: Example of Interview with apprentices

6.2.8 SWOT analysis of WBL in Romania

The implementation of WBL in Romania was analysed during a workshop that gathered 12 representatives from TUIASI, Papucei, "Ion Holban" High school and CNDIPT (Romanian National Centre for the Development of Vocational and Technical Education) that shared their opinions regarding the implementation of WBL, the progress made by trainees, benefits and future collaboration. The results of the SWOT analysis made during the workshop is presented in the following table:

Strengths	Weaknesses
• LDC objectives were achieved (LDC – locally developed curriculum, a component of National Curriculum, includes allocated hours for the development of school-specific curriculum in partnership with	• Estimated and allocated hours for some of the departments: too many or too few hours; for example: were too many hours for the cutting and stitching departments while for the lasting department more hours

private companies) – the LDC was developed in implemented successfully, the trainees followed and passed all WBL spheres of activity and can be employed in a footwear company; • The project facilitated the collaboration between Technical school - Industry – University; • Training Manuals and Learning-Teaching manuals have great value, both for the company and the school; • Portfolios elaborated by the trainees have didactic use; • Social impact: comparison between school ateliers and factory; integration in work teams, contact with workers from the company; • Apprentices learn how to follow a schedule, respect hierarchy, to be punctual, to communicate with colleagues, to follow work tasks.	would be required; The main explanation for this is represented by differences in the degree of difficulty between departments and the age of the trainees (very young, ~16 years old). The maximum number of hours imposed by the national legislation has to be respected but hours can be reallocated between departments; • Peripheral spheres: just a general introduction on these departments should be made, with few hours and the remaining hours should be allocated to the other departments. For example, to be proficient in Footwear Design or Technical development, a lot more hours are needed.
Opportunities	**Threads**
• The WBL programme can be successfully implemented in other footwear companies and technical schools from other regions from Romania; • Papucei and "Ion Holban" Technical college will continue to develop and strengthen their collaboration in the next years; • Ion Holban" Technical College will use the project results to promote their educational offer to attract students from secondary school.	• Changes in Romanian legislation are unpredictable; • The DUAL Romanian education system is not fully functional; • The motivation of the young Romanian generation is generally low and their interest is hard to capture and maintain.

Table 24: Learning outcomes main findings

6.3 Portugal

6.3.1 Introduction

This report aims to present the status of the development of the Pilot Actions at the company Carité, namely:

- Pilot Action 1 - Pilot action on core spheres (cutting, pre-stitching and stitching, lasting, assembly and finishing
- Pilot Action 2 - Pilot action on peripheral spheres (design and technical development)

The purpose of these pilot actions is to provide the company with a work based learning experience and the opportunity to get at first hand a practical impression of how this learning system works.

That is why apprentices of the company participating in the pilot experience have been involved for a long enough period to be a meaningful and profound experience.

The tutors were also prepared and assisted, providing support material to the role.

The entire pilot action was overseen by CTCP and CFPIC partners, always in close communication with Carité representatives.

The points included in this report are:

- Characterisation of Pilot Actions at Carité - duration, learning stations used, number of apprentices
- Training of tutors - workshops
- Pilot Action Plan - scheduling the distribution of hours through learning stations
- Evidence of the activities (photos)
- Evaluation

6.3.2 Pilot Action 1 – Pilot Action on Core Spheres

6.3.2.1 Characterization of the Pilot Action 1 at Carité

- Total Duration: 1000 hours
  - Theory = 250 hours
  - Practice in work context = 750 hours
- Beginning: 10/2018 End: 05/2019
- Learning Stations (LS) refer to Portuguese Qualification "Shoe Manufacturing Operator" on NQF/EQF level 2
- Nº apprentices - the Pilot Action 1 was started with 8 apprentices, who all participated in the Cutting Learning Station. After this LS, a selection had to be made, taking into account the impossibility of the company to continue to dispense them, since a period of intense work began. It was then defined that only 2 apprentices would continue with the remaining Learning Stations.
- Learning Stations involved in the Pilot Action 1: Cutting, Pre-Stitching and Stitching, Lasting, Assembly and Finishing.

6.3.2.2 Training the Tutors – Workshops

During the month of October, and prior to the start of the Pilot Action at Carité, two workshops were organized to train tutors:

Workshop 1
"Communication and Leadership"

Date: 16/10/2018
Place: Carité
Trainer: Ana Rodrigues
Trainees: Tutors

Workshop 2
"Tutoring methodology in ICSAS project"

Date: 25/10/2018
Place: Carité
Trainer: CTCP + CFPIC
Trainees: Tutors

6.3.2.3 Plan of Pilot Action 1 at Carité

It is presented the Pilot Action 1 Plan at Carité, with the distribution of the total number of hours by the Learning Stations involved and in each one, the distribution of the number of hours of theory and practice in the work context.

Learning station: Cutting			
Theory: CFPIC = 50hrs Practice: CFPIC + Carité = 150hrs Total = 200 hrs			
Unit		Duration (hrs)	Place
8431	Processes and techniques of footwear Cutting	50	Carité
	Practice in work context: • Application of shoe cutting techniques in different parts and materials • Cutting of different models of footwear • Splitting and crimping footwear pieces • Stamping and marking of footwear pieces	150	Carité + Monitoring CTCP CFPIC

Learning station: Pre-Stitching and Stitching			
Theory: CFPIC = 100hrs Practice: CFPIC + Carité = 300hrs Total = 400 hrs			
Unit		Duration (hrs)	Place
8436	Skiving, punching and reinforcing footwear pieces	50	Carité
8440	Processes and techniques of footwear Stitching	50	Carité
	Practice in work context: • Sewing, materials and equipment's • Folding and pointing operations • Preparation of sewing of different models of footwear • Application of techniques in different pieces of footwear • Sewing of different models of footwear	300	Carité + Monitoring CTCP CFPIC

Learning station: Lasting, Assembly and Finish			
Theory: CFPIC = 100hrs Practice: CFPIC + Carité = 300hrs Total = 400 hrs			
Unit		Duration (hrs)	Place
8444	Footwear Lasting and Assembly	50	Carité
8448	Footwear Finishing	50	Carité
	Practice in work context: • Application and moulding of shoe-fitting reinforcements • Preparation of the surfaces of the soles and uppers • Fixing of soles to uppers • Assembly of different models of footwear • Quality control and packaging of footwear	300	Carité + Monitoring CTCP CFPIC

Table 25: Pilot Action Plan 1 at Carité

Organization of Theory / Practice in a Work Context

The following is an example of the Weekly development scheme for Pilot Action 1 in Carité - on the first two days of the week (Monday and Tuesday) the theoretical training is held (CFPIC) and on the remaining days of the week the trainees are in the sections to be developed practice in the work context under the supervision of the respective tutors.

In the example presented, for the month of December/2018, the learning stations in question were Cutting and Pre-Stitching.

Dezembro 2018

Seg	Ter	Qua	
26 **8:30 - 12:00** Processos e técnicas de corte de cl **Sala:** SFME **Turma:** na **14:00 - 17:30** Processos e técnicas de corte de **Sala:** SFME **Turma:** na	27 **8:30 - 12:00** Operações de facear, vazar e de aj **Sala:** SFME **Turma:** na **14:00 - 17:30** Operações de facear, vazar e de **Sala:** SFME **Turma:** na	28	
3 **8:30 - 12:00** Processos e técnicas de corte de cl **Sala:** SFME **Turma:** na **14:00 - 17:30** Processos e técnicas de corte de **Sala:** SFME **Turma:** na	4 **8:30 - 12:00** Operações de facear, vazar e de aj **Sala:** SFME **Turma:** na **14:00 - 17:30** Operações de facear, vazar e de **Sala:** SFME **Turma:** na	5	
10 **8:30 - 12:00** Processos e técnicas de corte de cl **Sala:** SFME **Turma:** na **14:00 - 17:30** Processos e técnicas de corte de **Sala:** SFME **Turma:** na	11 **8:30 - 12:00** Operações de facear, vazar e de aj **Sala:** SFME **Turma:** na **14:00 - 17:30** Operações de facear, vazar e de **Sala:** SFME **Turma:** na	12	
17 **8:30 - 12:00** Processos e técnicas de corte de cl **Sala:** SFME **Turma:** na **14:00 - 17:30** Processos e técnicas de corte de **Sala:** SFME **Turma:** na	18 **8:30 - 12:00** Operações de facear, vazar e de aj **Sala:** SFME **Turma:** na **14:00 - 17:30** Operações de facear, vazar e de **Sala:** SFME **Turma:** na	19	
24	25	26	
31	1	2	

Figure 54: Organisation of training at Carité

6.3.2.4 Impressions of Pilot Action 1

Cutting

Stitching

Lasting and Assembly

Finishing

6.3.2.5 Videos

Two videos were produced demonstrating the activities throughout this pilot action. These videos can be viewed on the project website.

6.3.2.6 Supporting material: Manuals for Trainers/Tutors

The following manuals (cp. chapter 4) were presented and made available to tutors to support the preparation and implementation of the pilot action:

- Cutting
- Pre-Stitching
- Stitching
- Pre-Lasting
- Lasting
- Assembly
- Finishing

6.3.2.7 Assessment/Feedback

As foreseen in the methodology, the following formal evaluation instruments were used:

A. Theoretical training - Evaluation grid - completed by the respective trainers (CFPIC)

Figure 55:Theoretical training - Evaluation grid

B. Workplace training - Assessment grid at each learning station - completed by the tutors.

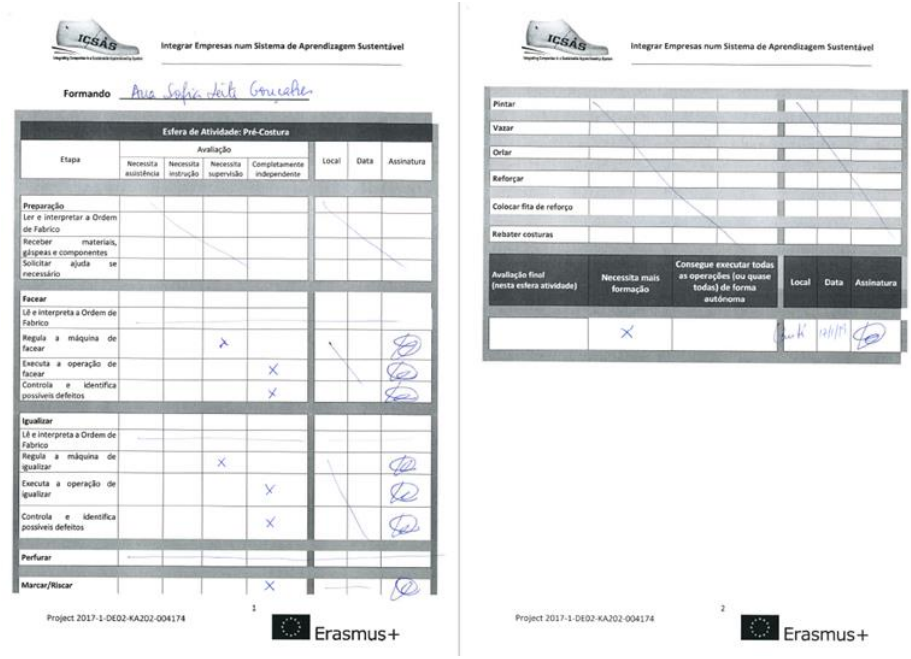


Figure 56: Workplace training - Assessment grid

C. Interview with each trainee at the end of each learning season.

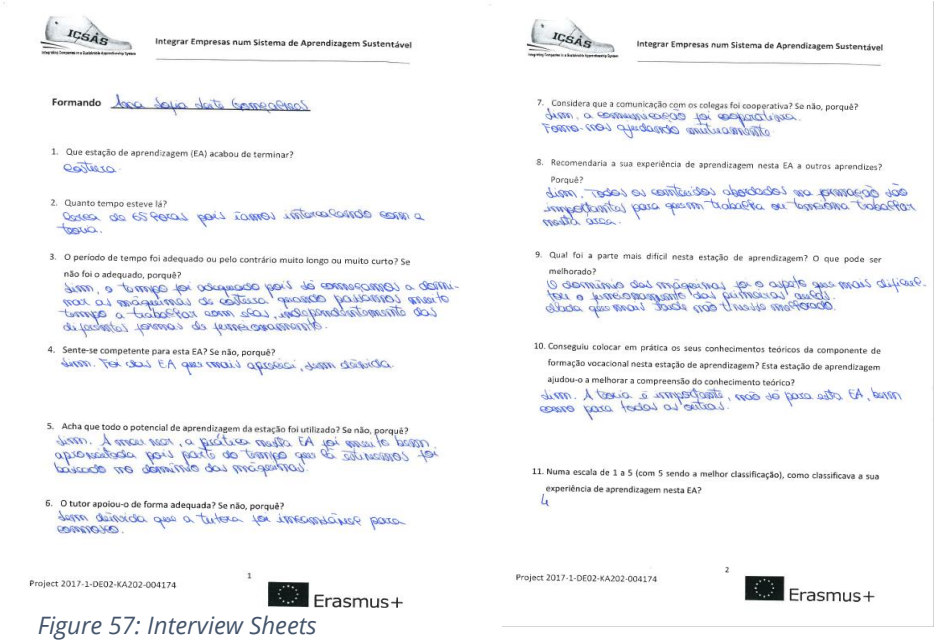


Figure 57: Interview Sheets

6.3.3 Pilot Action 2 – Pilot Action on Peripheral Spheres

6.3.3.1 Characterization of the Pilot Action 2 at Carité

- Total Duration: 40 hours
- Beginning: 10/2019 End: 11/2019
- Theory/Practice in work context
- Nº apprentices - the Pilot Action 2 started and finished with 6 young collaborators of Carité, most of them with functions related to technical development
- Learning Stations involved in the Pilot Action 2: Design and Technical Development

6.3.3.2 Objectives and Program of Pilot Action 2 at Carité

Specific objectives:

- Sketching shoe models (drawing on paper, drawing on the last, examples for women's shoes and men's shoes)
- Manually develop shoe models by planning, developing, scaling and extracting moulds
- Track prototype execution
- Final evaluation

Program:

- Applied drawing basics - shoe expression and representation techniques
- Approach to the anatomy of the foot
- The last:
  - Types of lasts
  - Last measurements
  - Technical reference points in the last
- Last planning
- Footwear model pull-over (construction type - cemented)
- Mould Extraction

- Technical items to be observed in a shoe in terms of quality
- Technical specifications on shoe model moulds
- Ways to get consumption of a shoe
- Prototyping
- Prototype monitoring in production

6.3.3.3 Impressions of Pilot Action 2






6.3.3.4 Video

One video was produced demonstrating the activities throughout this pilot action. This video can be viewed on the project website.

6.3.3.5 Supporting material: Manuals for Trainers/Tutors

The following manuals were presented and made available to trainer to support the preparation and implementation of the pilot action:

- Design
- Technical Development

6.3.3.6 Assessment/Feedback

As foreseen in the methodology, the following formal evaluation instruments were used:

- Workplace training - Assessment grid at each learning station - completed by the tutors;
- Interview with each trainee at the end of each learning season.

6.3.4 Conclusions

We leave here some conclusions of the implementation of these pilot actions that we consider relevant:

- The success of the piloting confirms the adequacy of the training curriculum designed specifically with piloting purposes.
- The WBL - Work Based Learning component of the curriculum is an asset for the motivation of the youngsters involved.
- The previous preparation of the tutors was determinate for the success of the piloting.
- The manuals for the trainers, as well as the assessment grids were important tools in the support of the tutors during piloting.

7 Comparative analysis on NQFs and a SQF

This chapter includes a comparative analysis on National Qualification Frameworks (NQF) and a Sector Qualification Framework (SQF) for industrial shoe production and is based on exhaustive national reports by the partners that can be consulted on the project webpage icsas-project.eu.

7.1 Introduction

Aim of IO 6 of ICSAS project is to develop, validate and publish a Sector Qualification Framework (SQF, levels 2-4) for initial qualifications of industrial shoe production and to integrate all qualifications on these levels of our sector from Portugal (PT), Spain (ES), Romania (RO) and Germany (DE) into this SQF.

Our first step was to explore an overview of what happened in the development of National Qualification Frameworks (NQF) in these four countries, how these NQFs are linked to the European QF (EQF) and what qualifications of our sector are of relevance for this aim. Thus four separate national reports were produced; here the comparative analysis from these is presented. This analysis is available not only in English, but also in our four languages.

The comparative analysis is subdivided into five chapters; the first one beyond this introduction of this analysis describes briefly the history and the implementation of a qualification framework (QF) in partner countries and their linkage to EQF.

All non-sector related Qualification Frameworks refer to broad and open descriptors like “A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study” (EQF, level 4, skills, EU 2008, updated EU 2017). A SQF offers the option to specify this broad “field of work”; our joint transnational decision on this were the nine relevant spheres of activity within the sector of industrial shoe production, already mentioned in IO1 reports. These spheres of activity are described in more detail in chapter 7.3.

Chapter 7.4 sketches briefly the relevant qualifications from industrial shoe production in Germany, Portugal, Romania and Spain on Initial Vocational and Training (IVET) levels (<=4).

Finally, chapter 7.5 consists of our Sector Qualification Framework, levels 2-4, for industrial shoe production. The framework is presented in tables to facilitate the transnational comparison and to offer a comprehensive visualisation thereof.

This comparative analysis is a collaborative report; parts taken from the national reports are not marked as citations.

7.2 Main issues of the Qualification Frameworks in partner countries

On 23rd April 2008, Recommendation 2008/C111/01/EC of the European Parliament and of the Council on the creation of the European Qualifications Framework for Lifelong Learning was approved (EU 2008). The objective of this recommendation was to create a common frame of reference that would serve as a conversion mechanism for the different national systems and qualification levels for general and university education and for vocational education and training. The recommendation aimed to improve the transparency, comparability and portability of qualifications.

From this date, European countries such as Germany, Spain, Romania and Portugal started developing their own national qualification frameworks to promote greater mobility for citizens in their learning, training and work environment, fulfil the commitment derived from the EU 2030 Agenda and its objectives, and guarantee an inclusive, equitable and quality education, as well as promoting lifelong learning.

7.2.1 Germany

Differing from Anglo-Saxon countries, Germany has no tradition with qualification frameworks. Discussions on this started in the late 2000 years; initiated by the development of the European Qualification Framework (EQF) that was published in 2008.

First step was to develop and approve the DQR, which took place from 2006-2009 (AK DQR 2011, p.2-4). Delegates from all relevant institutions (national and federal ministries, social partners, chambers, universities, General Education, Vocational Education and Training, Higher Education, Adult Education, and others) developed the following structure differing from EQF, which divides between 3 abilities (knowledge, skills and competences):

DQR	Professional competence		Personal competence	
	Knowledge	*Skills*	*Social competence*	*Autonomy*

Table 26: Differences in descriptors between EQF and DQR

Second step was the referencing of all qualifications of four pilot sectors (metal/electro, health, information technologies (IT), and trade) to DQR until 2012 (Sperle 2012, p. 8). At the end of this period, a political decision took place, again: all VET qualifications that last 2 years are on level 3; all VET qualifications that last 3 or 3.5 years are on level 4. Main challenging discussion during this period was whether "Abitur" (university entrance certificate) should be below/on the same level/or above 3 years VET qualifications. 5 years later, in 2017, "Abitur" was levelled on level 4.

Third step, formal referencing of DQR to EQF took place in 2012; a qualification on level X of DQR is on the same level X of EQF (DQR 2013, p.11).

The scope of the ICSAS project is Initial Vocational Education and Training (IVET). These qualifications were referenced in Germany to levels 3 and 4. In a narrow sense, the German context of the word "qualification" encompasses qualifications offering access to qualified work and/or increasing opportunities on labour market. Other certificates or measures that offer access to educational tracks or increase chances to get an apprenticeship were originally not foreseen in the DQR, but the "entry training" was included in 2014 (DQR 2014, chapter 3).

7.2.2 Spain

The Spanish Government entrusted the preparation of the Spanish Qualification Framework for Lifelong Learning (MECU) to the Ministry of Education in 2009, following the Recommendation 2008/C111/01/EC (EU 2008) and the Spanish Sustainable Economy Law. This process, coordinated by the General Directorate of Vocational Training, gathered the Ministries of Employment, Industry, and Economy, as well as other social actors (institutional entities, training evaluation agencies, etc.) and took place from 2009-2019. Although it should be mentioned that the MECU has not come into force yet since its draft Royal Decree still has not been published on the Official Spanish Gazette (BOE).

The Spanish Framework for Lifelong Learning (MECU 2017) is linked to the EQF and together with the Spanish Qualifications Framework for Higher Education (MECES), completes the eight reference levels of the European framework.

Each level is associated with learning outcomes descriptors, classified in knowledge, skills and autonomy and responsibility, in accordance with the EQF, but adapted to the national context.

Since the scope of the ICSAS project is Initial Vocational Education and Training (IVET), in Spain this includes levels 2-4.

- Level 2 includes the official certificate of completion of the second year of compulsory secondary education and the certificate of vocational training programs for students with special educational needs or specific groups.
- Level 3 has two sublevels, depending on the academic or professional values, or both, as well as the breadth of the qualification:
    - Level 3 A includes the Secondary Education certificate and/or the certificate of Basic Professional Technician;
    - Level 3 B includes level 1 Professional Certifications.
- Level 4 has three sublevels, depending on the academic or professional values, or both, as well as the breadth of the qualification:
    - Level 4 A includes the qualifications of Upper Secondary Education, Professional Training Technician, Professional Music Teaching Technician, Professional Dance Teaching Technician, Plastic Arts and Design Technician and Sports Technician;
    - Level 4 B includes level 2 Professional Certifications;
    - Level 4 C includes the Vocational Training Specialisation courses.

7.2.3 Romania

Romania, with support from the European Union, started since 1994-95 an extensive reform of the national vocational education and training system (VET) by developing a National Qualifications Framework. In 2011, Romania decided to merge existing and multiple qualification bodies into one: the National Qualifications Authority, who had the mission to elaborate the Romanian NQF following the EQF. In 2016, the dual form of initial VET at EQF levels 3, 4 and 5 was introduced, and in 2018 the dual system was endorsed to the education law. The implementation of dual VET started in 2017/18 and is currently available only at EQF level 3.

The Ministry of Education is the national authority for formal pre-university education (including IVET). They are responsible for the IVET policies developed by the National Centre for Technical and Vocational Education and Training Development (CNDIPT). Sectoral committees are responsible for defining and validating occupational standards and qualifications.

Romanian qualification descriptors are identical to EQF level descriptors, being defined in terms of three categories of learning outcomes: knowledge (theoretical and/or factual); skills, divided into cognitive skills (use of logical, intuitive and creative thinking) and practical skills (manual dexterity and use of methods, materials, tools and instruments); and responsibility and autonomy.

There are two main types of VET programmes in Romania:

- Three-year school-based programmes that provide graduates with a professional qualification at EQF level 3.
- Four-year technological programmes that offer graduated the EQF level 4 “technician qualification”.

7.2.4 Portugal

In 2007, the European Qualification Framework (EQF) was established to enhance the basic training of the workforce. At the same time, in Portugal, the National Qualifications Agency (ANQEP) was created, aiming at coordinating the development of the NQF, jointly with other competent bodies in the area of vocational education and training (in particular, the Portuguese Ministry of Education).

The PTQF comprises 8 qualification levels, each one defined by a set of indicators that specify the learning outcomes corresponding to the qualifications at that level in terms of knowledge, skills/competences and attitudes. Both PTQF qualification levels and respective descriptors are adopted from the EQF.

The National Catalogue of Qualifications includes school-based VET programs, dependent on the Ministry of Education and Science, and work-based VET programs, financed by the IEFP (Employment and Vocational Training Institute).

There are two types of VET programmes in Portugal depending on whether they are in the educational system or in the employment system:

- Vocational Education System (educational system)
    - Education and Training Courses – CEF:
        - For young people who have completed the 2nd cycle of basic education or who are attending the last year of that cycle. These courses provide a level 2 qualification according to the PTQF.
        - For young people part of the 3rd cycle of basic education. These courses provide a level 2 qualification according to the PTQF.
        - For young people part of higher secondary education. These courses provide a level 4 qualification according to the PTQF.
    - Professional Training Courses:
        - For students who have completed the 3rd cycle of basic education and did not concluded their secondary education.

These courses provide a level 4 qualification according to the PTQF.

- Learning System (employment system)

It is intended to support the qualification and certification of young people who, for various reasons, prematurely abandoned the education system. It is a double certification system, where there is strong interaction between theoretical and practical training components. Practical training is mainly in companies/in sectoral training centres (work-based learning system).

7.3 Spheres of activity in industrial shoe production

Depending on design and make, a shoe consists of several dozen components and its manufacture requires up to 150 work steps. In that sense, shoe production is a relatively complex process, which is mainly characterized by various joining methods. Experienced skilled workers are needed in all departments of a shoe factory, especially at key operations such as cutting, stitching and lasting.

7.3.1 Cutting

The task of the cutting department staff is to cut the shoe parts from upper, lining, interlining and reinforcement materials (leather, synthetic leather, natural or synthetic textiles) in the required geometries.

The following cutting techniques are used:

- Hand cutting with knife and pattern stencils: Mainly used for sample and small series production.
- Clicking machines and cutting dies (swing arm cutting presses for cutting upper and lining leather, travelling head and beam cutting presses for natural and synthetic textile materials): typically used for serial production.
- Dieless cutting on automated CAM cutting tables (oscillating blade / punching / roughing tool, water jet or laser): mainly used for prototyping and small series production, but also for serial production. The cutting geometries are provided by the CAD system.
- Material, colour, number of pairs and special requirements can be found in the accompanying specifications that come with each work batch.

Prior to cutting, the leather hides and skins must be checked in terms of differences in thickness and colour, quality zones and eventual defects. Crucial in leather cutting – whether manual, machine cutting or computer-aided – is the compliance with the cutting rules (quality rule, pairing rule, stretch direction) because they influence the quality of the final product. Skill and experience in creating a cutting layout on a hide or skin are also imperative to minimise waste, because the upper leather represents by far the largest single cost item in shoe production.

Further operations in the cutting room are splitting of the cut parts (to reduce them to the required even thickness) and stamping of the parts (article number etc.). The quality control of the cuts is carried out directly in the department.

7.3.2 Pre-Stitching and Stitching

Upper manufacturing is time and labour intensive and can only be automated to a limited extent, at least in leather street shoe production. Upper manufacturing (the term used for sewing operations in the footwear industry is “stitching”) represents the biggest item in terms of value creation in footwear production. Experienced stitching operators are particularly sought-after.

In upper manufacturing, a distinction is made between preparatory work ("pre-stitching“) and the actual upper assembly (“stitching”).

The stitching work to be done on a shoe depends on the model. Essentially, upper manufacturing consists of assembling all lining parts, assembling all outer upper parts, and then stitching together lining and outer upper with some subsequent final operations.

The necessary pre-stitching operations depend on the type of shoe, the specific model and the material. Typical pre-stitching operations are:

- Skiving (bevelling respectively thickness reduction of the edges of shoe parts)
- Splitting (to achieve homogenous thickness)
- Marking (e.g. to provide guidance for stitching or punching)
- Edge inking (open edges of non through-dyed leathers)
- Cementing (applying adhesive to parts and joining them together)
- Folding (to fold down previously skived edges with adhesive)
- Perforating, punching, embossing
- Reinforcing (with adhesive or ironing-on)
- Crimping (pre-moulding for better shape, e.g. for boot legs)

Pre-stitching operations are done partly manual, partly on machines. They can be decisive for the quality of the final product.

Upper assembly is done on stitching machines. There are various types: Flat-bed, post-bed or cylinder-arm machines, as well as single-needle, two- and three-needle machines to perform the numerous stitch types for closing and decorative seams.

7.3.3 Lasting

"Lasting" means attaching the lasting margin (i.e. the lower edge of an upper) by means of tacks and/or adhesives to the insole, which can be considered as the constructive backbone of footwear, although it is not at all visible on the final product. Lasting is one of the crucial operations in footwear production. Depending on the construction method, the lasting proceedings can differ.

Prior to lasting, toe puffs and heel counters must be inserted into the finished uppers in between upper and lining material in order to reinforce toe and heel. Toe puffs are usually ironed in. Leather fibre-board heel counters are dipped into latex adhesive, dried and then inserted by hand; another type of heel counters are thermoplastic heel counters. Some shoe types require crimping of the vamp, and most shoe types require back part moulding (hot and cold, depending on the type of heel counter). In parallel, lasts and insoles are prepared. The insoles are stapled to the last.

Thicker upper leathers should be treated with tempered water vapour or softener in order to prevent the grain from cracking (during the toe lasting process, the material must endure an elongation of up to 30%). Next to the toe lasting machine, a toe activating device is positioned, which heat-activates the toe puff (some devices work with tempered water vapour to soften the leather and toe puff, and with a mould shaped like the front part of the last to increase mouldability and to pre-mould the toe area).

Lasting starts with pulling the upper in the correct position over the last. Most companies use the two-machine-lasting system, i.e. toe lasting is performed on the first machine and then side-and heel lasting on the second machine. The machine pincers pull the upper material close to the last and the lasting edge is attached under the insole.

During the lasting process, the upper is exposed to high tensile forces in order to shape it to the last.

Some factories use a pounding machine or just manual hammering to improve the lasting result (i.e. flatten the lasting edge and get rid of eventual creases).

The subsequent steps are throughput of the lasted uppers through heat- and cool-setting tunnel transport systems which improve the shape retention of the materials as well as the fit of the final product.

7.3.4 Assembly

In the assembly room, upper and bottom parts are joined. By the time the batch of lasted uppers enters the assembly room, the bottom parts in the correct sizes and numbers have been prepared and put on the rack shelves together with the uppers.

First, the staples fixing the insole to the last bottom need to be removed. The next step is roughing the lasting edge as a surface preparation for the adhesive bond. The objective of roughing is to smoothen potential creases, to remove the grain layer of the leather because it contains oils or other greases or surface treatments which will weaken the bonding strength, and to increase the bonding surface. Roughing can be performed on machines (roughing machines or combined roughing/cementing machines); however, manual roughing remains widespread. It is imperative to precisely respect the roughing contours and to remove just the grain layer in order to preserve the structural strength of the material. Roughing dust must be thoroughly blown off.

Then a filler is inserted into the cavity on the last bottom in order to compensate for the height difference between last bottom and lasting edge.

The next step is cementing, i.e. to apply adhesive onto the roughened shoe bottom (with a cementing or a combined roughing/cementing machine) as well as onto the sole. Although robotised adhesive application solutions for sole cementing exist, manual application with a brush is still common. Depending on the type of soling material, the appropriate adhesive needs to be chosen. Each adhesive type requires a specific surface treatment; the objective of pre-treatments is to clean the bonding surface and to create ideal conditions for the adhesive to adhere to the material.

After the mandatory drying times, the soles can be pressed. Therefore, the adhesive (sole and upper) is re-activated, the soles are positioned manually

onto the last bottoms and the whole is then inserted into a sole press (hydraulic or pneumatic depending on their application suitability).

Alternatively, soles can be sewn-on, vulcanised or direct-injected depending on the construction method.

The subsequent operations are delasting and attaching the heel – if the shoe model provides for a heel. The soles of stitch-down or welt-sewn footwear require finishing operations such as scouring and/or polishing of the edges.

7.3.5 Finishing

In the finishing room, the shoes are prepared for sale and boxed.

Finishing operations include various work steps.

Depending on the type of upper material (leather finish and colours) the shoes must be cleaned and – if necessary – repaired. For this purpose, a wide range of tools and auxiliaries are available, which must be selected very carefully, especially for sensitive upper materials such as aniline leather or suede. Wrinkles are ironed out or smoothed-out with a blow-drier.

Spray-finishes, waxes and creams are applied, insocks or seat sock pieces are inserted, and decorative elements fixed.

A task of particular importance is the final quality control prior to shipment (please see also sphere 6; “Quality Assurance”.).

Finally, the shoes are boxed in individual boxes and 10 or 12 or more pair boxes put in shipping cartons (preparation for shipping is often done in the dispatch warehouse).

7.3.6 Quality Assurance

Quality assurance of footwear relates mainly to three aspects: Visual appearance, fit and functional characteristics (e.g. durability, performance, absence of harmful substances).

Sensibly, these controls should not only be performed on the finished footwear, but at all manufacturing stages. All operators should systematically self-check their work, and all work batches should undergo a quality check before leaving each production department to avoid problems in subsequent processes. A visual quality control before boxing the shoes is standard.

When a customer performs pre-shipment inspections of shoes that were produced by a supplier, the visual control is carried out according to a sampling plan which defines how many shoes must be inspected and in order to be able to decide whether a production batch can be accepted or not.

Fit and wear testing is done by a panel of reliable and product sensible testers who will fill in a test questionnaire. This is commonly organised by the product development team. Bigger companies have dedicated fit and wear testing departments.

The control of technical aspects consists in subjecting the shoes to a series of physical and mechanical tests to ensure their quality and safety. The absence of harmful substances is checked through chemical testing. There are legal standards for the performance of footwear testing, defining the requirements in terms of sampling, conditioning of the samples and test execution in order to facilitate comparison of the results. If the test results are intended to be communicated to customers or other stakeholders, it is recommended to commission an independent laboratory to perform the testing. For certain types of shoes, such as safety shoes, this is even mandatory.

Definition of INSPECTION (according to ISO 2859-1): “Activity such as measuring, examining, testing or gauging one or more characteristics of a product or service, and comparing the results with specified requirements in order to establish whether conformity is achieved for each characteristic.”

7.3.7 Footwear Design

Shoe designers do not only design individual models, but also concepts for entire collections. The main focus is always to meet the tastes and needs of future buyers, both in terms of fashion as well as of quality and fit.

Designers must be creative, able to draw, have a sense of emerging trends and an eye for harmonious lines and colours. The success of the entire company depends on the success of the models with the customers and thus the success and the employment situation for the entire company.

A shoe designer should be familiar with the shoe making process in order to design models in such a way that the effort in production remains proportionate to the achievable selling price and that the manufacturing can be done with the existing equipment and skills.

Many designers still draw on paper or on deep-drawn copies of the last surface. Younger designers are increasingly moving from initial manual design sketches to design on 3D CAD systems. 3D CAD systems save time and money by permitting to evaluate designs already at an early stage on the screen (which can be shared with co-workers no matter where on the globe) instead of going through the traditional time-consuming prototyping process. In addition, 3D CAD systems generate geometry data for computer-aided machines (CAM and CIM machines).

7.3.8 Technical Development

When the designer has completed his work, the results are sketches on paper or on deep-drawn last copies, at least in most small and medium-sized enterprises of footwear industry. Only few designers of SMEs in the field of leather street shoes work with digital tools. In the universe of sports shoes, things are often different, especially since global agreements and speed play an even greater role here and CAD systems are very helpful for gaining valuable time.

No matter whether the designer produces sketches on paper or on deep-drawn last copies, the result is an upper design in the first place. Typically, the designer specifies the upper materials to use. In addition, the designer also creates the shoe bottoms, i.e. outsoles and heels, to match the respective lasts (usually also on paper). Bottom parts can also be selected from respective suppliers.

Designers therefore often purely focus on the creative part. Once a design idea exists, this is when the technical developers come into play. They take care of the digitization and the technical development of the designs.

Their work focuses on the following questions: How can the idea sketch of a shoe be broken down into producible individual parts with the correct dimensions and the necessary additions and reductions for production? How do you get from a 3D design on a deep-drawn last copy to stencils or punching knives for upper parts, which are to be cut from 2D materials and then reassembled into 3D objects? Which types of seams, of lining and reinforcement materials and, more generally, which operations in production are necessary to convert the idea into a product that the company can actually manufacture with the existing machinery and the know-how of the production staff?

7.3.9 Production Planning

Footwear production planning is about distributing and coordinating all activities related to footwear manufacturing.

Production planning activities include the following functions:

- Product data management: Classification of products in terms of size, style, variants, design, target market, materials, components, technical specifications etc.
- Order management: Inventory, manufacturing and delivery planning according to deadlines and available resources
- Manufacturing planning and monitoring: Planning and coordinating all the manufacturing phases and tracking work in progress and consumption
- Materials and components planning and inventory management: Ordering materials and components according to work orders and managing bills and keeping inventory
- Delivery and finished products stock management: Plan, organise and monitor logistics and supply chain activities
- Workforce management: Organising workforce accordingly to availability and keeping daily records of work hours and productivity
- Financial Management: Accountancy system that provides accurate and on time information regarding cash flows, fund flows, recurring expenses, costing and efficiency of manufacturing systems, budgeting and fund allocations

Depending on the company (size, organisation of departments, distribution of activities etc.) part of the activities related to production planning can be included in other departments. For increased efficiency, companies use software systems for production planning. The main software categories are ERP (Enterprise Resource Planning), PDM (Product Data Management) and PLM (Product Lifecycle Management) systems.

7.4 Qualifications from the footwear sector in partner countries

In recent years, several articles have been published arguing that general qualifications frameworks are somehow nothing but “a paradigmatic case of travelling educational reforms“ (*see* Bohlinger 2019). Therefore, given the belief that sectoral qualification frameworks may add value to general qualification frameworks in terms of transparency of qualifications in sectors, the ICSAS project has created a qualification framework for the footwear sector.

For this, after conducting a research, the qualifications for industrial shoemaking in EQF levels 2-4 were extracted from the national catalogue of qualifications of each partner country. These qualifications will be discussed in more detail in the following subparagraphs. It should be recalled that this project is based on the WBL (Work-Based-Learning) during IVET (Initial Vocational Education and Training), which is why the EQF level 2-4 qualifications have been chosen.

7.4.1 Germany

German qualifications on level 2-4 (European Qualification Framework (EQF)/Deutscher Qualifikationsrahmen (DQR)) with relevance for industrial shoe production are presented in Table 27.

Name of qualification (DE)	Name of qualification (EN)	DQR level	EQF level	Length	Permeability	Amount of learners
Einstiegs-qualifizierung „Herstellung von Schuhen“* (IHK 2019)	Entry training “production of shoes” *	2	2	9 months	Might be (in fact: this option almost never occurs) recognised when starting an apprentice-ship as an “industrial shoemaker” via a reduction of length by 6 months	Not published
Fachkraft Lederver-arbeitung (BiBB 2011)	Assistant for leather processing	3	3	2 years	Fully recognised as the first 2 years when starting an apprenticeship as an “Industrial shoemaker”	6 new contracts in 2017 (according to BiBB)
Industrieller Schuhfertiger (BiBB 2017)	Industrial shoemaker	4	4	3 years	–	36 new contracts in 2017 (according to BiBB)

Table 27: German qualifications from shoe sector on level 2-4
*: Not a qualification with relevance for labour market

Main features of **Entry training “production of shoes”**:

- Very short curriculum (1 page!)
- It refers only to spheres of activity “cutting” and “stitching”.

- "Basic cognitive and practical skills" or "largely under supervision" (from QF level 2) describe learning outcomes (LO) quite realistic.
- It includes the *option* to shorten a qualification as an "industrial shoemaker" by 6 months.

Main features of **Assistant for leather processing**:

- It equals the first 2 years of the curriculum of the industrial shoemaker; curricula for learning venue school even states: "Common classes for both vocations are possible." (and real, due to small amounts of apprentices.)
- Fully *creditable* against "industrial shoemaker"; holders of "Assistant for leather works" need only 1 additional year of VET to become an industrial shoemaker.
- It refers to spheres of activity "cutting", "stitching" and "finish" (only leather, not soles/shoes).
- "A broad spectrum of cognitive and practical skills" or "work autonomously" (from QF level 3) describe learning outcomes (LO) for these 3 core spheres quite realistic.
- It offers additionally insights into peripheral spheres "technical development" (station: "technical pattern making (uppers)", "design" (station: "upper coordination") and production planning.

Main features of **Industrial shoemaker**:

- It covers all 5 core spheres (cutting, stitching, lasting, assembly, finishing).
- "A spectrum of cognitive and practical skills" or "set own learning and work objectives" (from QF level 4) describe learning outcomes (LO) for these 5 core spheres quite realistic.
- It covers "production planning" and "quality assurance" in parts; only the planning of the production of a shoe (not a whole production line) resp. quality assurance of established materials and processes.
- It offers additionally insights into the other 2 peripheral spheres.

7.4.2 Spain

Spanish qualifications on level 2-4 (European Qualification Framework (EQF)/Marco de Cualificaciones Español (MECU)) with relevance for industrial shoe production are presented in Table 28.

Name of qualification (ES)	Name of qualification (EN)	MECU level	EQF level	Length	Amount of learners
Fabricación de calzado a medida y ortopédico (TCPC0212)	Custom-made and orthopaedic footwear manufacturing	2	2	690 hours	Not published
Patronaje de calzado y marroquinería (TCPC0112)	Shoes and leather goods pattern making	3	3	780 hours	
Técnico en calzado y accesorios de moda (2017/8045)	Footwear and fashion accessories technician	4	4	2000 hours	

Table 28: Spanish qualifications from shoe sector on level 2-4

Main features of **Custom-made and orthopaedic footwear manufacturing**:

- It is a professional certification consisting of four units of competence: selecting raw materials, manufactured products, tools, and custom and orthopaedic shoemaking machines; adapting base lasts to manufacture custom-made and orthopaedic footwear; manufacturing custom-made and orthopaedic footwear; and, adapting or manufacturing tap shoes.
- This professional certification included in the Catalogue of Qualifications is linked to the Modular Catalogue for Vocational Training by modules and learning units, which students must pass.
- It covers all ICSAS core spheres of activity (cutting, stitching, lasting, assembly, finishing) and 3 ICSAS secondary spheres of activity (production planning, technical development, design).
- The posts in the industrial shoe manufacturing related to this qualification are footwear hand finisher, footwear hand cutter, footwear hand/machine stitcher and footwear hand laster.

Main features of **Shoes and leather goods pattern making**:

- RD991/2013 of the 13th December updated RD2574/1996, where it was included this professional certification.

- It consists of five units of competence: analysing raw materials, products and clothing, footwear and leather goods processes; analysing and interpreting the design, collaborating in the definition of the product in textile and leather; carrying out the adjustment and cutting for footwear and auxiliary models; perform the cutting of patterns for leather goods and saddler; and, carrying out the industrialisation of footwear and leather goods patterns.
- This professional certification included in the Catalogue of Qualifications is linked to the Modular Catalogue for Vocational Training by modules and learning units, which students must pass.
- It only covers 3 secondary spheres of activity (design, technical development and quality assurance).
- The posts in the industrial shoe manufacturing related to this qualification are footwear pattern maker, footwear model maker, footwear grader, footwear adjuster, footwear CAD/CAM technical designer.

Main features of **Footwear and fashion accessories technician**:

- There are 2 curricula for this qualification: the national curricula developed by the Ministry of Education and the regional curricula, which is the adaptation of the national curricula that regions where the qualification is going to be implemented have made.
- There are admission requirements. Candidates must be in possession of the title of Secondary Education Graduate/higher academic level, a title of Basic Vocation Training or a title of Technician, or have passed the university admission test for people over 25. If the candidate does not have any of these titles and is over 17, he/she can take the entrance test to intermediate level vocational training.
- It covers all ICSAS core spheres of activity (cutting, stitching, lasting, assembly, finishing) and 3 ICSAS secondary spheres of activity (production planning, technical development, quality assurance).
- It includes the *option* to validate a certain module that students have passed within this VET qualification with a similar module in the professional certification focusing in that topic (ex. pattern making).
- The posts in the industrial shoe manufacturing related to this qualification are footwear hand/machine cutter, footwear hand/machine cutter, industrial sewing machine operator and shoemaker.

7.4.3 Romania

Romanian qualifications on level 3 and 4 (European Qualification Framework (EQF)/ Romanian Qualification Framework (ROQR)) with relevance for industrial shoe production are presented in Table 29.

Name of qualification (RO)	Name of qualification (EN)	ROQR level	EQF level	Length	Amount of learners
Cizmar / Confectiner articole din piele si inlocuitori 753602	Shoemaker/Industrial shoemaker	3	3	3 years	165 (2019-2020 academic year)
Croitor stantator piese incaltaminte 815603	Cutting operator				
Pregatitor piese incaltaminte 815604	Pre-stitching operator				
Cusator piese din piele si inlocuitori 815605	Stitching operator				
Tragator fete pe calapod 815606	Lasting operator				
Talpuitor industrial 815607	Soling operator				
Finisaor incaltaminte 815608	Finishing operator				
Tehnicial in textile-pielarie	Technician in textile and leather industry	4	4	4 years	Not available
Tehnician incaltaminte	Technician in footwear industry				
Tehnician designer pentru industria textile si de pielarie	Designer technician in textile and footwear industry				

Table 29: Romanian qualifications from shoe sector on level 3 and 4

Main features in **level 3 and 4 qualifications**:

- All qualifications are regulated at the national level, by official documents named SPTs (Standard for Professional Training). Knowledge, skills and attitudes are described according to EQF recommendation.
- The curricula for both level 3 and 4 are focused on the core spheres of the shoemaking process, like cutting, stitching, lasting, assembling and finishing; the other activities, like design and development, production planning or quality control, are not properly included.
- Knowledge, skills, and attitudes are described according to EQF recommendation. However, the national curricula give a general description, without making a direct link with the work environment (ex. Learning Stations, core spheres of activities ...).
- The number of learners for each qualification is regulated by official documents approved by the Ministry of Education; regarding the number of learners enrolled in footwear study programs, each year a less and less at national level.
- Supportive legislation and methodologies for dual training are provided by the Ministry of Education, but the companies from the footwear industry cannot support it due to their size (SMEs) and limited financial resources.

7.4.4 Portugal

Portuguese qualifications on level 2 and 4 (European Qualification Framework (EQF)/ Portuguese Qualification Framework (PTQF)) with relevance for industrial shoe production are presented in Table 30.

Name of qualification (PT)	Name of qualification (EN)	PTQF level	EQF level	Length	Amount of learners
Operador/a de Fabrico de Calçado	Footwear Manufacturing Operator	2	2	3 years	Not available
Técnico/a de Fabrico Manual de Calçado	Footwear Manual Production Technician	4	4		
Técnico/a de Modelação de Calçado	Footwear Pattern Maker				
Técnico/a de Gestão da produção de Calçado e Marroquinaria	Footwear & Leather Goods Production Manager				

Table 30: Portuguese qualifications from shoe sector on level 2 and 4

Main features of **Footwear Manufacturing Operator**:

- Recognized and certified by ANQEP (National Agency for the Qualification and Professional Education Training) after approval of the sectoral counselling group for fashion industries, involving all technical experts and social partners;
- Published in the Employment and Labour Gazette nº 29 on 8th August 2013;
- These professionals perform cutting, stitching preparation, stitching, assembly and finishing of footwear using different materials, equipment and techniques according to the established procedures on quality, maintenance and safety and health at work. These professionals cut the different pieces of the footwear model, do all pre-stitching operations, namely skiving, splitting, crimping, punching, folding, apply reinforces, metallic accessories, perform all stitching operations with column and flat stitching machines, perform all the assembling operations, included in cemented footwear construction and eventually other type of constructions, perform all finishing operations, and control the quality of the work done.

Main features of **Footwear Manual Production Technician**:

- Recognized and certified by ANQEP (National Agency for the Qualification and Professional Education Training) after approval of the sectoral counselling group for fashion industries, involving all technical experts and social partners;
- Published in the Employment and Labour Gazette nº 30 on 15th August 2009;
- 1st Update published in Employment and Labour Gazette nº 48 on 29th December 2012, entered into force on 29th March 2013;
- This profile was developed having in mind the craftsmanship character of Footwear sector in Portugal;
- This profile has associated a training path for the apprenticeship training model which represents the closest possible training model to the dual training (combines training in a centre and in the company for young people 15+);
- Manually run all modelling, cutting, closing, assembling and finishing footwear, as well as mechanical sewing operations thereof in accordance with the quality standards, environment, health and safety. In addition, a professional is able to run his/her own business, handling the product promotion in various channels namely on-line and to lead a micro company with management competences.

Main features of **Footwear Pattern Maker**:

- Recognized and certified by ANQEP (National Agency for the Qualification and Professional Education Training) after approval of the sectoral counselling group for fashion industries, involving all technical experts and social partners;
- Published in the Employment and Labour Gazette nº 29 on 8th August 2013, entering in force in the same day;
- Update published in Employment and Labour Gazette nº 17 on 8th May 2014, entered into force on 8th May 2014;
- To plan and develop moulds for different footwear models, defining technical specifications regarding the manufacturing process, in order to assure the quality, productivity and security. The footwear pattern maker operates at an industrialization level, working as an interface between design and production, transforming designer's specifications into technical requirements, footwear concepts into manufacturing

lines, making the patterns for uppers, linings and bottom components, producing technical drawings for various range of tools (cutting dies, mould, etc.), accompanying prototyping and evaluating footwear prototypes, grading and producing sizing samples, performing required tests for samples and confirming the customer's qualitative and pricing constrains.

Main features of **Footwear & Leather Goods Production Manager**:

- Recognized and certified by ANQEP (National Agency for the Qualification and Professional Education Training) after approval of the sectoral counselling group for fashion industries, involving all technical experts and social partners;
- Published for the first time in the Dispatch nº 13456/2008 14th May that approved the original version of the National Catalogue of Qualifications. The 1st update was published in the Employment and Labour Gazette nº 47 on 22th December 2009 and entered in force on 22nd March 2010. After that it had several updates. The last versions entered in force in 22nd October 2017;
- To plan, distribute, coordinate, monitor and control the activities of the different stages of footwear manufacturing, according to the production objectives, deadlines and the available resources, taking into account the use of new generation equipment and materials, with a view to quality and productivity and the accomplishment of environment, energy rationalization, health and safety established standards.

7.5 SQF industrial shoemaker level 2-4

With respect to these descriptions, we decided to subdivide the "broad range" (EQF level 4, skills) or "basic cognitive and practical skills" (EQF level 2, skills) for our sector into three main categories:

- autonomous performance
- initiation
- partly; e. g. planning of a single product (not production line)
- not tackled

The qualifications have been grouped below according to their level in the EQF. Each qualification is broken down into the spheres of activity selected by the ICSAS project, and those covered by a qualification are marked in colour. The colour with which they are marked, as explained before, shows the broad range or basic cognitive and practical skills in each qualification.

7.5.1 Level 2 according to EQF

Country	Qualification	Spheres of activity in footwear sector								
DE	Entry training	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
PT	Footwear manufacturing operator	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production Planning	Quality assurance
ES	Custom-made and orthopaedic footwear manufacturing	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance

Table 31: Qualifications in the participating countries on level 2

7.5.2 Level 3 according to EQF

Country	Qualification	Spheres of activity in footwear sector								
DE	Leather processing	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Shoemaker/Industrial shoemaker	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Cutting operator	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Stitching operator	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Lasting operator	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Soling operator	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Finishing operator	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
ES	Shoes and leather goods pattern making	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance

Table 32: Qualifications in the participating countries on level 3

7.5.3 Level 4 according to EQF

Country	Qualification	Spheres of activity in footwear sector								
DE	Industrial Shoemaker	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
PT	Footwear pattern maker	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
PT	Footwear Manual Production Technician	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
PT	Footwear & Leather Goods Production Manager	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Technician in textile and leather industry - footwear included	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Technician in footwear industry	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
RO	Designer technician in textile and footwear industry	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance
ES	Footwear and fashion accessories technician	Cutting	Stitching	Lasting	Assembly	Finishing	Design	Technical development	Production planning	Quality assurance

Table 33: Qualifications in the participating countries on level 4

8 Impact and Sustainability

8.1 Memorandum of Understanding

Memorandum of Understanding for the recognition of the results of the EU-funded "Integrating Companies in a Sustainable Apprenticeship System (ICSAS)" project.

Taking into account that:

- Promoting work-based learning (WBL) is very high on the agenda of European Union (EU) policies: "Promote work-based learning in all its forms, with special attention to apprenticeships, by involving social partners, companies, chambers and [Vocational Education and Training] (VET) providers as well as stimulating innovation and entrepreneurship." (Riga conclusion 2015, p.8)
- WBL is a fundamental aspect of VET which is directly linked to the mission to help learners acquire knowledge, skills and competences which are essential in working life (EC - Practices and Policy Pointers, 2013)
- Well-designed apprenticeship schemes have the potential that both, employers as well as learners, benefit.
- WBL can reinforce the link between the world of work and the world of education and training, also (EU 2018).
- Youth (<25 years) unemployment rate in Spain is very (42,9%), in Portugal (26,4%) and Romania (20,3%) quite high.
- The European Qualifications Framework (EQF), improves the transparency, comparability and portability of citizens' qualifications, including apprentices (EU 2017).

The parties agree as follows:

1. Objectives

The purpose of this Memorandum of Understanding (MoU) is to endorse the results of the EU-funded ICSAS project. Main Objective is the development of the existing Vocational Education and Training (VET) systems of Romania and

Portugal towards Work Based-Learning and improve the tutors' performance based on mutual learning from the German apprenticeship system. As mobility of workers within Europe increases, furthermore a Sector Qualification Framework (SQF) is necessary for more transparency.

2. Work based learning and industrial shoe production

In pursuing these objectives, the parties will commit to:

- Recognizing that educational reforms cannot be imported or implemented "top-down"; stakeholders and practitioners from the sectors must be taken on board and their experiences and beliefs must be taken serious, also. The approach of mutual learning referring to apparent good practice from other European countries in this project has led to valuable results and fruitful relations within the stakeholders of all partner countries;
- Recognizing Work Based Learning as a necessary part of an apprenticeship and therefore support the integration of an extensive in-company training periods in the national apprenticeship curriculum;
- Promoting Learning Station Analysis as an adequate way to exploit learning potentials of real work-processes as a base for the development of an in-company training curriculum for apprentices;
- Welcoming the developed "train the tutor" manuals, focusing on sector-specific and general (didactic) skills as a valuable tool for supporting apprentices and take it into account for own training activities;
- Acknowledging that the tutors in companies are key factors to the success of the in-company training in an apprenticeship. Therefor they should be constantly promoted and developed through training;
- Seeking to promote the developed Sector Qualification Framework, linked to the European Qualification Framework (EQF), as it offers an opportunity to develop transparency and mutual trust within the stakeholders of the industrial shoe sector.

8.2 ICSAS Position Paper on Work Based Learning (WBL)

ICSAS Position Paper on Work Based Learning (WBL) in Vocational Education and Training (VET) for the implementation of the results of the EU-funded "Integrating Companies in a Sustainable Apprenticeship System (ICSAS)" project.

The purpose of this paper is to contribute to policy-making in the European industrial shoe production sector and beyond with respect to curricula-driven work-based learning (WBL) within Vocational Education and Training (VET). The European industrial shoe production sector is mainly focussed on high quality products. Key factors are innovative design, quality, quick reaction to fashion trends as well as a wide range of styles and colours. Some companies also focus on small but demanding markets, such as safety shoes or shoes for healthcare e.g. orthopaedic shoes.

However, the competitiveness of the sector is highly depending on knowledge, skills and competences (KSC) of the staff gained through Vocational Education and Training. These competences are needed to design, produce, operate and maintain cutting-edge products and manufacturing systems.

In the last decade, however, industrial shoe producers have seen a shortage of skilled workers and innovative mind-sets, hampering the competitiveness of EU shoe production industry and the employability of workers. WBL within VET helps to maintain the quality standards of products and provides new opportunities for industry and its staff.

With that in mind, this position paper aims to help decision-makers all over the EU to recognise the importance of curricula-driven WBL within VET in the European industrial shoe production sector and to provide them with a series of recommendations to support the development of competences and skills in this area. The ICSAS project mainly aimed at developing the existing Vocational Education and Training (VET) systems of Romania and Portugal towards work-based learning and to improve the tutor's performance in Spain and Germany based on mutual learning from the German apprenticeship system. Furthermore, project partners developed a Sector Qualification Framework (SQF) and referenced the national qualifications of Germany, Portugal, Romania, and Spain.

In this position paper, we would like to highlight the project recommendations for further developing curricula-driven WBL as an apprenticeship scheme in Portugal and Romania and all other EU countries.

- Due to rapidly changing technological developments as well as altering trends in fashion, WBL becomes more and more crucial for today's learners in industrial shoe production industry. The competitiveness of manufacturing companies depends on the skills possessed by its workforce. In order to cope with the market, VET providers and companies should focus on combining learning in education or training institutions with substantial work-based learning in companies and other workplaces. We call on VET regulatory bodies across Europe to integrate substantial curricula-driven WBL as part of all VET programmes.
- It is necessary for VET-systems of any country that all stakeholders work together in order to define comprehensive learning outcomes in accordance with national legislation. Therefore a modernization of a VET-curricula should be executed jointly by responsible regional or national authorities, employers, vocational education and training institutions, chambers of industry, commerce and crafts, professional and sectorial organisations, trade unions and youth and parent organisations to ensure a fair balance between work, job specific skills, knowledge and key competences of the apprentices.
- In order to attract more young people for an apprenticeship in industrial shoe production in Portugal, the sector needs to become more competitive. Therefore, all national recognised qualifications in this field should be updated and elevated above level 2 of the SQF.
- Educational reforms cannot be imported from one EU member state to another or implemented "top-down". Thus we recommend that stakeholders from any country reflect on approaches from various different VET-systems – and adopt respective develop their system with respect to national traditions and beliefs.
- In-company trainers are essential for WBL. They should cooperate closely with vocational education and training institutions and teachers to provide guidance for apprentices and to ensure mutual and regular feedback. Therefor they need to be supported in gaining sector-specific and general (didactical) skills. For instance, this could be done by promoting the use of the ICSAS train the trainer manuals as well as the feedback matrices, which were developed and launched by this EU project.

- Trainers need to be supported by industry and authorities to update their skills, knowledge and competences in order to train apprentices according to the latest teaching and training methods and labour market needs. We recommend that countries develop and provide adult education courses for trainers and mentors and offer those via Continuous VET (CVET) providers.
- The developed SQF is a guiding document for transparency and mobility within industrial shoe production. It includes a comparison of qualifications in industrial shoe production sector in Germany, Portugal, Romania and Spain based on a common understanding of what defines competences and taking into account the diversity and traditions of vocational education, training systems and policy priorities in the partner countries. It offers an overview on competences and skills of qualified staff in all partner countries. We recommend that any new or updated profile in the sector from partner countries as well as qualifications from other EU countries should be levelled in this SQF.

8.3 Impact Romania

In Romania, we have identified serious gaps between the skills acquired by trainees in VET study programs and the skills required by the footwear companies. For several years, the number of professional study and training programs addressing NQF/EQF levels 3 and 4 for the footwear sector has been reduced year after year. As a result, at the local and regional level, the footwear companies face a very difficult situation in terms of making the switch between generations of employees and recruiting graduates of VET schools.

In this context, the model proposed by the ICSAS project for Romania is associated with the Local Development Curriculum (LDC) for work-based learning (WBL). This implementation model has received very positive feedback from the relevant stakeholders, including experts in education, representatives from the footwear industry, teachers, and tutors. LDC is a component of the national curriculum, is regulated by the Ministry of Education in terms of the general framework and applying methodologies, but being specific by its content to each VET school according to the training requirements of the economic operators. This way, the ICSAS project demonstrates a sustainable model for adapting the professional training of youngsters enrolled in study programs belonging to the textile and leather field through a complete training program containing all stages of the footwear manufacturing.

Moreover, the ICSAS model implemented in Romania provides supportive resources for the development of the tools necessary for the application of dual training system. Started in 2018, the dual education system in Romania has already faced difficulties in implementation, especially related to the fact that companies in the footwear sector are mostly small and medium-sized companies and cannot bear materially the formation of dual learning classes according to the methodologies in force. Instead, the ICSAS apprenticeship-like scheme could be implemented by VET schools in partnership with the footwear companies. The teaching resources (curricula, sectoral framework, training manuals, tools for exercises and assessment, etc.) and agreement models are easy to be adapted from one particular situation to another.

At regional level (Nord-East region of Romania), there are 60 VET providers addressing NQF/EQF levels 3 and 4 for textile, clothing, leather and footwear

sectors, with around 5000 pupils each year. But only a small percent (1%) is enrolled in a footwear training program even the needs of the footwear companies are huge. Therefore, the ICSAS project has a great impact from this perspective. To spread out beyond the local and regional dimension, and to generate an impact at the national level, the national authority responsible for the development of vocational and technical education was contacted. CNDIPT is responsible for developing new qualifications or updating the existing ones to be introduced in the National Register of Qualifications. Also, CNDIPT elaborates national Standards for Professional Training (rom. Standard de Pregatire Profesionala - SPP) and participates in the sectoral committees for designing the national curricula for technical and professional education in Romania. Coordinating at the national level the VET providers for textile, clothing, leather and footwear sector, the representatives of CNDPIT appreciated the ICSAS model and committed to act in the following two directions: 1) to take the ICSAS curricula as an example in the process of updating the national standard for the professional training for footwear qualifications and 2) to recommend the ICSAS model based on locally developed curriculum towards the VET providers from Romania.

The good results obtaining during ICSAS project lifetime promise a relevant impact in the Romanian VET system being sustained by the following premises:

- The commitment of the target group (young trainees) in the piloting stage, their motivation and willingness to complete the training program;
- The project outcomes have been designed and validated based on a fruitful collaboration of teachers/tutors from university and VET school with representatives from footwear company.
- The responsibility assumed by tutors in all activities related to the training program followed by the trainees at the footwear company.
- The engagement of relevant stakeholders, including footwear companies, producers' associations, regional and national authority bodies for VET.

8.4 Impact Portugal

Footwear worldwide established in 2019 a new record production of 24,3 billion pairs, equivalent to 3,5 pairs of shoes per inhabitant on Earth.

Portugal occupies in 2019 the 20th place in the ranking of the 20 largest footwear producers in the world, with 76 million pairs produced. Portugal is the 15th largest footwear exporter in the world in value - USD 2.002 million - corresponding to 76 million pairs, but it is the 10th largest leather footwear exporter, which has the highest added value and the highest average selling price. Portugal therefore exports almost 100% of its footwear production and Europe remains its biggest destination.

Portuguese footwear has come to be successful in the most varied world instances, exporting to more than 150 different countries, to all continents. In terms of average export price, it ranks 2nd in the world, with only Italy above it.

The footwear industry in Portugal with its 1.500 companies and 40.000 employees highly contributes to the volume of exportations and balance of the Portuguese trade balance.

The ICSAS project with new practices tested in work based learning and a proposal for a new job profile and curriculum for the footwear industrial production technician in Portugal, came to impact the companies practices and the future Footwear Qualification Framework in Portugal.

This impact results not only from the high-quality project outcomes and the tested practices on WBL but also and above all from the example the project gives to the sector, through the action of the partners involved, specially CARITÉ which, with its unconditional involvement, brought to the project the entrepreneurial vision and the field experience, able to influence all the footwear chain. In the last Multiplier Event, the participation of the CEO of CARITÉ impacted near all sector, possible to be realised from the visualization of the online seminar video available in:

www.youtube.com/watch?v=6JmD1ydUMl4&t=4541s .

The short-term impact ICSAS project was responsible to involved 8 employees in CARITÉ to a WBL experience will be mainstream this way to whole footwear chain in a medium-long term.

The footwear industry in Portugal is extremely polarized: it's focused on the North of Portugal, mainly in the councils S. João da Madeira / Santa Maria da Feira / Oliveira de Azeméis and Felgueiras / Guimarães / Vizela, with very small clusters in other areas such as the Benedita, Vila Nova de Gaia. 85% of footwear produced in Portugal come from the first two hubs, which also absorb an equal percentage of the sector's employment. The ICSAS project impacted mainly in the North of Portugal where new practices in WBL are expected to be implemented.

The sector has a business network made up of SMEs. Impacts in small/medium companies are most expected, mainly at the level of WBL learning practices implementation.

The last few years have been marked by a growth in production at a higher rate than employment, as a result of an increase in productivity due to the adoption of new technologies and the reinforcement of the bet on products with higher added value. Also, here footwear companies can benefit from the ICSAS project outcomes, as new technologies and higher added value products demand new qualification and new practices in WBL made available by ICSAS.

Despite the successive interventions for the development of skills and the positive evolution that has been noted in the last decade, the sector continues to hold the lowest qualifications, due also to the high age of its population. In the last decade, the sector globally reduced its share of unskilled workers to 10%, replacing them progressively with semi-qualified (24%) and qualified workers, with 57% of their employment now qualified as a result of the professional training promoted for the employed people in general, with an emphasis on middle managers and senior executives who currently represent around 9% of the sector's employment.

However, there is still a need to qualify 34% of its assets and modernize many of the qualified ones to face new challenges. The new demands regarding innovation due to the pursuit of strategies related to i4.0 are constant, and it is important that the sector be prepared for the shift of paradigm.

In this context ICSAS project results fulfil of the pillars of the Strategic Plan for the Footwear Industry for 2020 - qualification and rejuvenation. The qualification of the current employees and the attraction of youngster to the sector is a challenge to be embraced more than ever. ICSAS has been a fertile field to raise ideas, make networks and create new standards seeking high quality competences to face the challenges. ICSAS created means to support the reinforcement of skills in product creation, technical development, production, management, quality, logistics to support the qualification of people, seeking the generational transition that many companies are already going through.

The new job profile developed by ICSAS Portuguese project team (CTCP, CFPIC, CARITÉ) with the support of Advisory Board (APICCAPS and IEFP) is now the object of a public tender to incorporate it in the Portuguese Footwear Qualification Framework. This job profile, once accepted, will induct new training opportunities incorporating WBL practices, which will impact in the attraction of young people to what the industry is today, modern and creative, whose qualifications must reflect this.

ICSAS with new WBL practices and new job profiles and training opportunities supports the intention of footwear sector to make a qualitative leap in the international affirmation process, based on the sophistication and creativity and in maintaining a national production base as a guarantee of flexibility, speed of response and product quality, as well as demanding standards of sustainability and social responsibility.

9 Résumé

The methodological and practical approaches presented in this book show how curriculum-based work-based learning (WBL) can be implemented sustainably in countries with traditional school-based vocational education and training systems.

According to the experience gained in the 3 years of the ICSAS project and similar previous projects, the content and organisational steps described here are a necessary, but not a sufficient condition for the successful implementation of dual approaches.

But emotional aspects are at least as important as these technical aspects. Any, even partial, changes in educational systems break with traditions, established responsibilities and, occasionally, also with the convictions of the respective actors.

It is therefore recommended that colleagues who wish to use this transfer handbook for similar activities in other countries or sectors should pay attention not only to the institutional but also to the individual competences of the partners involved. Without real conviction of the relevant actors and open support of the networks, comparable projects can certainly be carried out, but a sustainable result could not be expected.

The project partners would also like to take this opportunity to express their appreciation of all those colleagues who do not appear by name as co-authors. Without the commitment of countless trainers/mentors in the departments, the trainers at the International Shoe Competence Center (ISC) in Pirmasens, the administrative departments, the unpaid work of the project advisory board, the cameramen of the experience videos and last but not least, the layout designer of the products and the ICSAS website, the ICSAS project could not have been carried out so successfully.

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