



Developing Innovative and Attractive CVET programmes in industrial shoe production

Learning Station Analysis (LSA) Manual

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1 Introduction

This manual is intended to provide advice on how to carry out Learning Station Analyses (LSA) in the industrial shoe production in different European countries. It was produced in the project “Developing Innovative and Attractive CVET programmes in industrial shoe production” (DIA-CVET). The aim of this project is to raise qualified personnel in industrial footwear production to the competence level of professional technicians by means of suitable and attractive further training measures. For this purpose, appropriate further training programmes are to be developed that make this competence development possible or can ensure it. Besides the identification of essential spheres of activity for personnel on professional technician level, the so-called LSA were identified as crucial instruments for the development and implementation of further training programmes.

Learning station analyses are an important tool for identifying the preconditions for learning in the work process. Because CVET measures are not formalised and defined by curricula to the same extent as initial vocational training, it is necessary to determine learning contents, learning modalities and learning environments as well as their design to promote conducive learning by means of suitable instruments and procedures, such as the LSA. For the purpose to deliver these information, LSA are based on actual (real world) work processes by analysing their essential tasks at a given level of competence and assessing their learning content.

This manual does not provide a ready-made cooking recipe for the implementation of LSA, as the institutional formations of initial as well as of continuing vocational education and training (CVET) differ greatly in the various European countries. For example, the level of vocational competence that graduates of initial vocational education and training (IVET) possess must be taken into account in order ensure that CVET measures can be adequately linked to them.

It also plays a role whether certified CVET programmes for professional technicians (EQF level 6 or 7) exist for certain areas of production, on which further training programmes for the industrial footwear sector can be oriented. This includes particularly the possibility of recognising prior learning outcomes. Furthermore, industrial shoe production can and will differ more or less significantly between different countries in terms of the production organisation, so that this fact has to be taken into account by making the learning station analyses sensitive to job profiles, the division of labour and specific forms of the work processes.

It follows from the above that this manual only provides guidelines, cornerstones and essentials for the implementation of LSA. Adaptations to regional or national particularities are to be made by those conducting learning station analyses in their countries.

At this point, it is also advisable to prevent a narrow concept of learning based exclusively on experience. Insofar as the use of LSA does not lead to the development of IVET but ultimately CVET programmes that are allocated at a high EQF level, more theoretical knowledge components will also have to be included in the programmes. Therefore, learning will not take place exclusively in the work process (or at The workplace), but will be supplemented by units of theoretical (classroom) teaching and learning. These knowledge units, however, are always complementary or theoretically in-depth to work-integrated learning and thus also follow the structure and content of the work processes.

To conclude these introductory remarks, a brief reference to the context in which the LSA came into being and its development is permitted: This manual is an adapted and shortened version of a handbook developed jointly by the Institute of Technology and Education (ITB) of the University of Bremen with trainers from Airbus Industries during the projects 'Move Pro Europe' and 'AERONET' in the aviation sector. The instrument has already been successfully tested in the Leonardo project 'APPRENTSOD' and the Erasmus+ project 'DualTRAIN' in other countries and sectors. A first adaptation to the industrial shoe production has already taken place through the Erasmus+ project ICSAS, but in this case, as in the others, the method was used exclusively for IVET. The instrument will be applied in the present case of industrial shoe production in selected workplaces at a high level of competence, i.e. a specialist technician (EQF 6 or 7) and with a view to developing vocational training programmes.

2 LSA – Objectives and Procedure

The Learning Station Analysis primarily aims at revealing the learning potential of exemplarily described jobs with increased occupational/professional requirements and, on the other hand, together with the analyses of other jobs and corresponding activities, to provide information which further training measures can be implemented to achieve the competence profile of a professional technician for industrial shoe production. Thus, the labelling of the LSA instrument already illustrates what the analyses are aiming at.

"Learning stations" are created where significant work is done for the company and the company's work and business processes. LSA therefore are conducted at workplaces where the core tasks can be assigned to an occupational activity field – albeit at a competence level that is to be located above skilled machine work. These activity fields describe the required occupational activities on the basis of meaning-conveying work contexts and characteristic tasks that are typical for the professional activity and that comprise a complete work action. With this definition, fields of activity can be delimited and specified as follows:

No singular activities or tasks are analysed, but rather tasks in the sense of a complete occupational or professional action that follow a process structure defined in the task and goal. A general process structure of an activity field includes the determination of the concrete task (e.g. the optimisation of processes), its planning (including the retrieval of information) and implementation as well as the control and evaluation of the work result up to the documentation. The concept of learning station analyses takes the following criteria into account:

- Learning station analyses must include the overarching coherence of the work process and refer to an independent activity profile.
- A learning station analysis always describes a work context and a complete occupational or professional working activity that emphasises the connection between planning, executing and evaluating or reflecting.
- The documentation of the LSA has to include the contents and forms as well as the required knowledge and skills of the occupational or professional activities.
- The analysis takes into account the meaning, function and significance of the concrete work process in the context of the overall operational business process.
- The potential for shaping the work process that a specialist technician can use in his or her working and learning process is given special attention.

The procedural flow of an LSA is structured in four phases:

- Preparation of the analysis,
- Conducting the analysis,
- Evaluation and documentation of the analysis
- Utilising the results for CVET programmes.

3 LSA – Overall Approach

3.1 Preparing the LSA

Although identified spheres of activity should be referred to for each LSA, it may happen that no corresponding occupation can be identified for certain occupational profiles, in which case the following practical approach is recommended: On the basis of the above-mentioned conditions, which delimit spheres of activity from tasks, it is important to check whether a work process selected for analysis meets these requirements, because only under this condition can learning stations contribute to competence development. However, it must also be taken into account that the competences aligned to occupational profiles often cannot be fully developed in the learning stations, so that certain contents (e.g. theoretical knowledge) must be acquired in the form of classroom learning.

Investigation team

The preparation of an LSA includes in particular the selection of the persons who will carry out the study. For reasons of an efficient, targeted implementation of an LSA, a group of two persons is recommended, which should include a company expert (e.g. a production manager or a skilled worker) and a researcher or vocational teacher. The following functions are to be conducted during the investigation:

- Guiding the conversation (interview),
- Writing a protocol (key words),
- Taking photos and making sketches,
- Organising working materials (e.g. drawings).

Selection of learning stations

If a sphere of activity, e.g. maintenance management, is assessed as relevant for a specialist technician in industrial shoe production, it is necessary to identify company workplaces as (possible) learning stations in a company or department, where qualified skilled workers cope with requirements that are indicative of the sphere of activity. Company representatives in the study team are in charge of selecting the workplaces, as they have detailed insights into the business and work processes and can safeguard the organisational prerequisites of the study "on site".

On 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 narrow the view on the most relevant processes in different fields. When – due to work organisation – several spheres of activity are involved in a work process, it may require repeated analyses from a different angle each time.

A factor of influence on the selection of work places in departments and companies that should not be neglected is the willingness of the skilled workers who work there to participate in an analysis of their work. Here it is particularly important to make it clear that analyses are not carried

out in preparation for rationalisation measures, personnel restructuring or assessments of individual performance.

3.2 Guide to analysis

It is important for both already established investigation teams and for those groups of people who are selected for an analysis to deal with the LSA guidelines for the investigation in detail beforehand. The following questions are crucial to the implementation of an LSA and guide all its phases:

- In which business and work processes is the activity field embedded?
- 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 models 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?

On the basis of these fundamental questions, categories of analysis are developed, which in turn can be explored in more detail through a catalogue of guiding questions.

Analysis category: Business process

The analysis of skilled work cannot refer to the workplace without considering the context. Without considering 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 essential. These materials 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. Environmental conditions such as lighting conditions, noise exposure, ambient temperatures but also aspects of ergonomics at the workplace (e.g. sitting positions, work benches) or accessibility of the workpiece are of interest here.

Analysis category: Subject and methods of qualified specialist work

When describing the subject of skilled work, the work context and the work process are taken into account. For a specialist technician for industrial maintenance the subject of work and the applied methods differ from a skilled maintenance worker on the shop floor. While the latter in the event of a malfunction must determine the cause of the defect in the machine or production line and therefore needs detailed knowledge about the undisturbed functional process in order to be able to determine the reason for the malfunction by comparing it with the disturbed state. The skilled maintenance worker will need knowledge about prescribed maintenance and repair strategies. The specialist technician for maintenance work, on the other hand, must know the company's maintenance plan and be able to improve it, he must therefore know different maintenance methods and strategies and implement them according to requirements. He must analyse

complete production processes and be able to use this knowledge for developing maintenance strategies for the operational infrastructure.

Although at first glance maintenance is the subject of the work, both the subject and the method of skilled work differ significantly between skilled maintenance work on shop floor level and skilled specialist technician's work on industrial maintenance management.

Analysis category: Tools and equipment for qualified specialist work

Concerning the description of the tools and equipment used in the workplace, the context of the work process is crucial. In addition to the tools used, production facilities and also plans are of interest here, the use of which only (or almost only) takes place at the specific workplace.

Analysis category: Organisation of qualified specialist work

The shape of work organisation is a key feature of analysing work and workplaces that cannot be neglected. The focus here is on aspects of work structure and workflow organisation (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 interaction and co-operation and communication requirements relating to the work process. Also working-time models (e.g. shift work, break times, part-time jobs) may affect the nature of qualified work considerably.

Analysis category: Requirements for qualified specialist work and its subject matter

What needs to be identified here are the different demands placed on the work process and the subject of work by various interest groups. The company, for example, sets specific quality standards which are necessary to stay competitive and must be adhered to, and demands compliance with time and cost specifications. Requirements on the part of legislators and regulators, e.g. in the form of technical standards, accident prevention and health and safety regulations, must also be taken into account. Last but not least, the same applies to the skilled workers' own requirements for themselves and their work. It is only when these different and sometimes contradictory requirements are juxtaposed that the shapeability and necessity of shaping technology and work becomes clear.

Analysis category	Guiding questions
Business and work process	<ul style="list-style-type: none"> – 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	<ul style="list-style-type: none"> – Where is the analysed workplace located? – What are the prevailing lighting conditions? – What climatic conditions affect the professionals (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	<ul style="list-style-type: none"> – 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	<ul style="list-style-type: none"> – Which tools and equipment are used to perform the task? – How is the tool/equipment handled?
Organisation of skilled work	<ul style="list-style-type: none"> – How is work organised (e.g. individual work or group work, division of labour)? – In which way do hierarchies affect the skilled work? – Which co-operations and boundaries with other occupations or departments exist? – Which qualifications of the skilled workers are interacting at the respective learning station?
Requirements for skilled work	<ul style="list-style-type: none"> – 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 demand?
Interfaces	<ul style="list-style-type: none"> – 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 and practical work interlinked, what are the 'vocational basics' and/or 'core competencies'?
Training experiences	<ul style="list-style-type: none"> – Is the analysed workplace actually being used in training programmes? If not, why? – Are there persons at or near the learning station who are in CVET programmes? – Which CVET programmes did the skilled workers attend? – What level of autonomy is expected from a skilled worker at his learning station?

Table 1: Catalogue of guiding questions for the Learning Station Analysis

Analysis category: Interfaces

The fundamental orientation towards business and work processes has the effect that the learning station analyses often do not fully capture work processes, which is why it is important to place the selective investigations in a larger context. Especially interfaces and overlaps with other fields of activity deserve special attention: As mentioned at the beginning, actual work processes often

cannot be assigned to just one field of activity - and the other way round, in a concrete LSA, investigation results on one field of activity that were obtained at other workplaces can also be critically reflected.

Analysis category: Experience with training and further education

An essential element of the analyses is the consideration of the experiences or the history of training measures at the respective learning station under investigation. It is important to find out and document the training sessions offered and carried out. Even if no training measures were offered, this is an important fact. In addition to capturing the content focus of the training offers, it is also important to document the necessary qualification requirements for participation. The type of training offered (e.g. workshops, instruction courses) should also be included as an important component in the analysis of the training experiences. Finally, a comparison of the level of autonomy desirable for the learning station with the level actually achievable through the training measures should be made.

The outlined classification scheme with guiding questions for the LSA is merged in table 1 and designed as a master template to guide the analysis. It has proven useful for each team member to have this guide with them as a "memory aid" during the investigation, because the guiding questions developed offer suggestions for the investigation. They are by no means to be understood as a checklist strictly in the sense of "question by question", but can generally be used in every investigation and are intended as hints to be able to work out investigation results in a focused way.

3.3 Executing the analysis and documentation

The professionals employed at the selected workplaces whose work is to be analysed are informed about what the learning station analysis is about. It should be made clear to them that they are doing their everyday work: It is not about a "staging performance" of singular craftsmanship or demonstration of ideal practice, but about the professional's coping with everyday demands. If there is no "highlight" as a work assignment on the analysis day, but rather unspectacular "routine work", this is not detrimental to the analysis, but reflects normality.

The workplaces are visited and analysed according to the guiding questions which were conceived to get answers making the «invisible» visible. It is advisable to ask for consent to record the interviews, as original recorded interviews make it easier to cope with the wealth of information during the analysis and fewer mistakes, errors or misunderstandings occur that need to be corrected later.

The time required for the analysis depends strongly on the complexity of the tasks at the specific workplace. Experience shows that the time required is usually a few hours.

The documentation of an LSA must be proofread and approved by staff of the respective department before further use.

4 Evaluation

The LSA pursues two goals: Firstly to compare the organisation of work at the learning stations with activity fields, on the other hand, the identification and assessment of the learning potential of these stations. The information provided by the skilled workers interviewed at their workplaces should provide the necessary clarity on this learning potential. However, the LSA team should first think carefully about what can be expected when using the term "learning potential" in the context of continuing vocational education and training. "Potential" is certainly not a colloquial term like "to learn". Potential expresses that something specific (e.g. a situation in everyday life or at work) offers possibilities or even good possibilities for something, in this case the (good) possibility to learn. Unlike in colloquial language and in everyday life, in vocational pedagogy and in skills research "to learn" does not simply mean to influence a person in a positive and, above all, effective way, but actually means to increase the level of professional competence (e.g. by broadening competences) in the – here very narrow – sense that someone proactively learns to master something in the course of a learning process that he or she was previously unable to do.

In the DIA-CVET project, 13 spheres of activity have been identified for the professional profile of a specialist technician in industrial shoe production. Learning stations, whose learning potentials are revealed by the LSA, are linked to each individual sphere. The learning potentials refer in particular, but not exclusively, to the possibilities and opportunities to learn in the process of work. Since not every workplace guarantees this to the desired extent, the results of the LSA can be used to gain indications of how workplaces can be developed much more in the direction of learning stations, i.e. in the improvement of learning opportunities.

For each learning station, core competences can be identified, which in the synopsis of all learning stations represent core competences of an occupational profile specialist technician. When evaluating the LSA, hierarchical dependencies between individual core competences as well as overlaps must be taken into account. For the occupational profile of the specialist technician, overlaps between the learning station "maintenance management" and "quality management" are not only conceivable but probable.

The evaluation of the LSA must therefore be carried out under two central questions:

- What does one learn in a learning station and what of it is necessary for which other learning station?
- What competences must one already have in order to be able to learn something in any learning station?

In principle, these two questions must be answered in the analysis of each learning station. The two most important results of the analysis of a learning station are therefore, firstly, the indication of a prerequisite for learning and, secondly, a learning outcome, which in turn can be a prerequisite for another learning station.

A series of LSAs carried out comprehensively in a company will result in a coherent sequence of the necessary learning steps as determined by the operational processes. The evaluation should therefore take place from the point of view of the internal linking of all work processes, so that it can be checked whether the actual processuality of the work organisation enables an orientation towards the spheres of activity, because according to the LSA, this is where the requirements are located that individual learning must follow as a competence development process. With a view to the result of this evaluation step, it must then be checked whether the requirements characteristic

for individual spheres of activity – and thus for the analysed learning stations – can also be acquired in the process.

5 Template

The template below is based on the table with the categories of analysis (Tab. 1). It is semi-open, i.e. it can be adapted according to profession or context. In some cases, sub-categories are already provided – of course always with the possibility to add free answers.

Learning station		
Date		
Location		
Allocation	Occupational profile
Process environment	Products
	Type of product/service	
	(Internal) supplier	
	Order-/material acceptance	
	Direct customer of product/service	
	End customer of product/service	
	Process 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	
	Team work	
	Cycle time	
	Shifts	
	Similar work stations	
Specifics		
Special conditions		

Interfaces	To other activity fields?			
	To other learning stations?			
	To others? (please specify)			
Experience with training and further education				
knowledge / skills				
Specificities				
Highest level of autonomy achievable	Supporting maintenance / production management	With instruction and guidance	Under supervision	Independently
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>