

Handout for the selection and analysis of work tasks for vocational training

Guideline I



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ABOUT THE GUIDELINES

This handout was created in the context of the BMBF project "Progressing Work-Based Learning in Thailand (ProWoThai)" as the first in a series. The handouts were developed, tested and further developed in a participatory manner. Colleagues from academia and practice from Thailand, Malaysia and Germany were involved.

The aim of the handouts is to provide VET practitioners with guidelines for the development, organization and reflection of work-based learning (WBL). WBL can take place either (i) at the company workplace and in real work or (ii) in simulated work processes in the integrated specialist rooms of a vocational school, a training workshop or in a laboratory.

Work-based learning combines work activities with learning processes in different forms at all learning locations. The following features characterize work-based learning:

- 1) The promotion of holistic skills development for learners with the aim of independent, appropriate and responsible action in the context of work, family and society.
- 2) The use of real work tasks and processes typical of the profession or company as the object of learning in conjunction with an orientation towards learning outcomes.
- 3) The didactic and curricular transformation of real work tasks into forms of learning, such as the learning and work task, and their use for holistic work- and action-oriented as well as problem-based examinations and validations.

This handout focuses on the analysis of work tasks that are conducive to learning and typical for the profession and is to be understood as a working document for practitioners. The project participants wish all colleagues much courage and pleasure in using and testing the guidelines and invite them to develop them further.

Further information can be found at: www.prowothai.de



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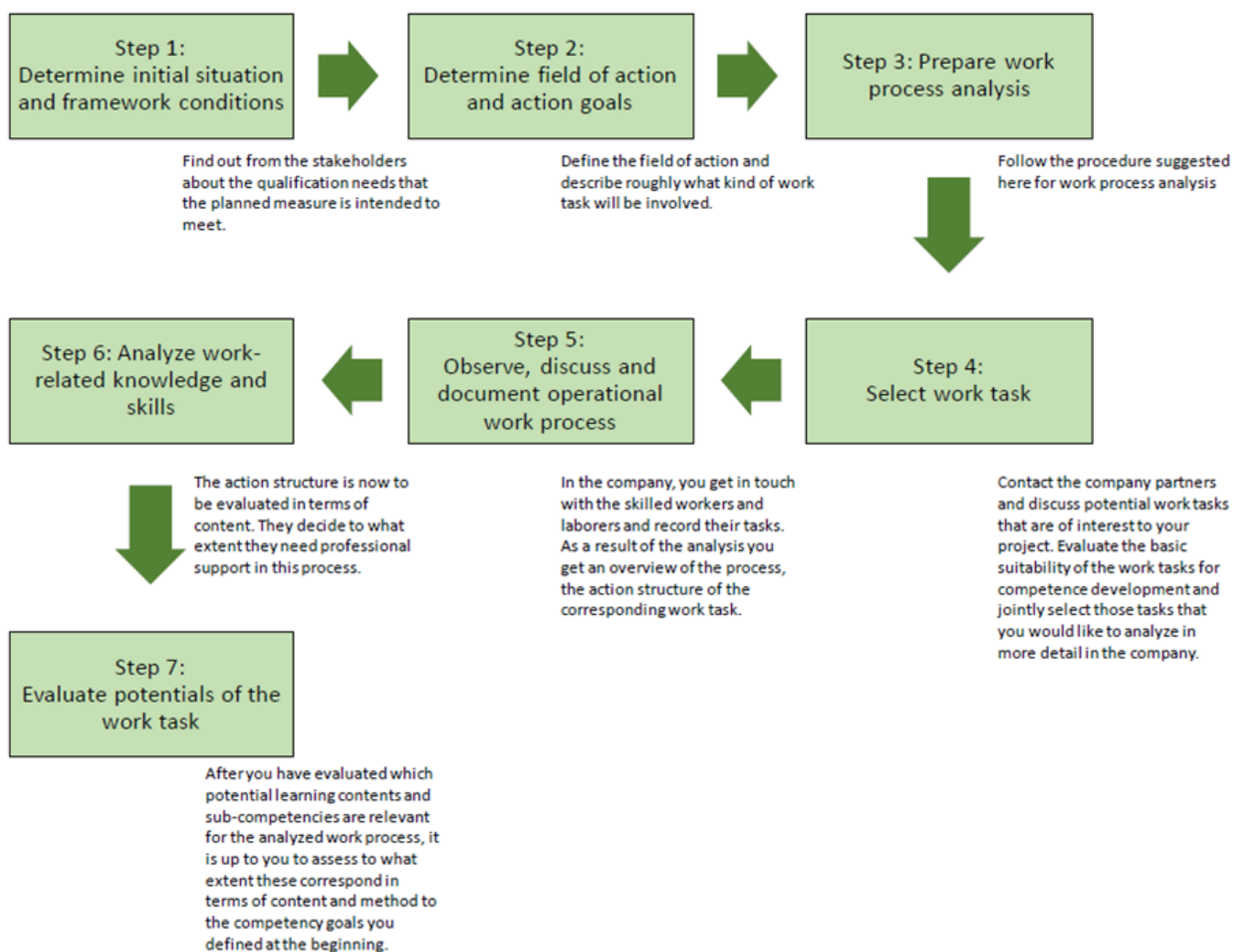


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FOREWORD

The basis for the development of learning and work tasks as well as work and learning tasks is selection and analysis of operational work tasks. This practical guide 1 provides step-by-step instructions for selecting, analyzing and describing real company work tasks. Finally, the necessary technical and interdisciplinary goals are worked out and form a basis for the didactic and methodical design of task-related forms of learning in vocational education (see Handout 2).



1. DETERMINE INITIAL SITUATION AND GENERAL CONDITIONS



Describe your *initial situation*, based on the existing *framework conditions that* you currently find for your project. As a first approach, you can write out the terms that apply to you from the collection below, in order to then clarify the respective specifics, such as the reason for your project, the target group, curricular requirements, the need for development and the relevance.

Fictitious example:

We are an inter-company training center for the construction industry and serve various trades with course offerings in the area of basic and specialized vocational training. In addition to a number of medium-sized companies, our customers mainly include small family-run craft businesses. Another important customer for us is the employment office, which has unemployed people retrained by us in skilled trades. For about a year now, we have been receiving an increasing number of inquiries as to whether we could offer a training course in the installation of photovoltaic systems. Many orders could not be accepted because the employees did not have the appropriate skills.

Target groups	Formats	Learning sites
Trainees Professionals Skilled workers Workers Unskilled workers Semi-skilled workers Master craftsmen Technicians Engineers Group Leaders Department Managers Business economists Craftsmen Teenagers Unemployed Retrainees Students	Dual training Theory/school based training Continuing education Advanced training Adaptation training University studies Dual university studies Seminar Training course Workshop Exercise Instruction Project Handicraft lessons	Inter-company vocational training center Vocational Training Center Educational Service Provider Employment office Training company Vocational School University of Applied Sciences Education provider University of Cooperative Education Further training center Continuing Education School External learning venues
Occasion	Branch	
Customer demand Technological progress Digital transformation Sustainable action Interdisciplinary competences Self-employment Personnel change Change of department New boss Dissatisfaction Competitive pressure Establishment of in-company	Agriculture Construction Chemistry Mining Service Craft Trade Energy industry Environmental Technology Finance School, education and science Free time	Internet Consumption Social work Media Metal and electrical Health Sports Transport and logistics Advertising and marketing Tourism and gastronomy Economy and administration

2. SET THE OBJECTIVE



In view of the above starting situation, describe which **professional competencies are involved in** your case. For this purpose, it may be necessary to take a closer look at the professional field of action together with your partners, customers, superiors with regard to the associated activities. Then explain how the competence objective can be justified with applicable curricula.

Fictitious example:

After successful participation in the advanced training course "Installing PV systems", the trained roofers are able to install photovoltaic modules on house roofs by:

- Advise the customer
- Observe manufacturer documentation
- Cooperate with colleagues
- Create workflow plans
- Create cost estimates
- Carry out material orders
- set up the construction site
- observe the accident prevention regulations
- Mounting solar modules professionally
- Lay electrical lines and cooperate with other trades
- ensure the functionality of the roofing
- Create invoices



An **occupational field of action** is a collection and description of typical occupational work processes that are similar to one another. For example, all the activities of a motor vehicle mechatronics technician that are part of maintenance and inspection can be assigned to the "Service" field of action.

3. PREPARE WORK PROCESS ANALYSIS



Contact relevant companies (if you are not working in a company context anyway). If your project meets with interest, you should clarify the following questions with the company .

- *Are the tasks you are looking for offered by the company?*
- *What related tasks are involved in the operation?*
- *Does the company provide training in this area of responsibility?*
- *Are there already teaching materials available for this? If yes, which ones?*
- *Who is an expert (contact) in the company for this task?*
- *Which of your own colleagues or employees is suitable to support you in identifying a competence-promoting work task?*
- *Can an appointment be made to analyze the tasks on site?*



4. SELECT OPERATIONAL TASKS FOR ANALYSIS



Together with the company contact person, select one or more exemplary company work tasks that are suitable for vocational training. To determine whether the tasks are conducive to learning, ask a qualified employee to complete the following questionnaire. Evaluate it afterwards. The result decides on the selection of the work task to be analyzed.

Work Task:						
To what extent do you agree with the statements about the work task above?		not at all	rather less	partly partly	honor more	totally
Holistic						
01	It must be planned independently and on one's own responsibility in advance.					
02	Data and information must be obtained.					
03	Before accepting an order, the customer or supervisor must be consulted.					
04	Calculations must be made.					
05	In the task you have to make many decisions yourself.					
06	The quality is to be checked at the end (final inspection, functional test, etc.).					
07	The handover to the customer is done by the executor himself.					
08	The task involves many different steps.					
09	In this task, you yourself bear a relatively large amount of responsibility.					
Effectiveness of the problem						
10	There are often unforeseen problems and you have to react flexibly.					
11	Sometimes you don't know what to do and have to find a way to help yourself.					
12	It comes down to your own proposals for solutions, ideas and decisions.					
Collectivity						
13	You have to be able to rely on your colleagues for the job.					
14	One often needs support from others in this task.					
15	For this task, you often need to communicate with others.					

Reflexivity					
16	The task is dangerous, you need to work very carefully.				
17	Very careful work must be done.				
18	With this task, you often wonder if you have done everything right.				
19	You have to know what you can do better next time.				
20	Special regulations apply to this work.				
21	You have to be constantly careful not to make mistakes.				
Room for maneuver					
22	There are many different possible solutions for the task.				
23	For the task you need creativity.				
24	The task is relatively open, the ideas come during the work.				
25	Only the result is important, the procedure can be decided by yourself.				
Individual development					
26	The task is challenging.				
27	The task is complex, but not overwhelming.				
28	When problems arise, they can usually be resolved.				
29	The task is not boring.				
Professionalization					
30	In this task, you can learn new things.				
31	The task can help you advance professionally.				
32	In the task you can gain valuable experience.				
33	For this task, you need to know the business well.				
34	In this task you can learn new techniques of work.				

Evaluation: For each "not at all" = 0 points, "rather less" = 1 point, "partly partly" = 2 points, "rather more" = 3 points, "completely" = 4 points.

Points	Suitability
120-136	very well suited
103-119	well suited
86-102	suitable
69-85	Still suitable
0-68	Not suitable

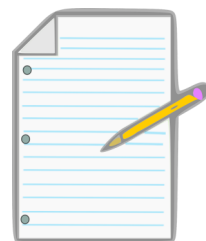
5. OBSERVE; DISCUSS AND DOCUMENT OPERATIONAL TASKS



You will prepare to conduct an operational work process analysis. Proceed in the following four steps:

1. Conduct a preliminary meeting with the workers. Find out what information the representative has received in advance or still needs to obtain in order to fully understand his work task. Describe what the initial situation of the task is and what its objective is. Document your findings in sheet 1.
2. Record all preparations that are carried out in advance of the actual execution. Record which planning decisions have to be made. Ask whether there are alternative solutions. Note which entries have to be made in computer systems. Draw up a work plan in table form together with the specialist. Inquire about the applicable regulations, laws and standards. Document your results in sheet 2.
3. During the observation, make a note of the individual work steps that you observe. If something is unclear to you, ask questions if possible. Identify the equipment, tools and materials used in the execution of the work. Record communicative situations, whether verbal, telephone or written. Pay attention to unforeseen problems. Document your findings in sheet 3.
4. Observe how quality is ensured, e.g., by obtaining customer feedback, functional testing, measurements, or other reviews, acceptances, and inspections. Conduct a final interview with the workers. Compare the work plan with your observations. In particular, note any deviations from the plan. Discuss what could be improved. Document your findings in sheet 4.

Work process analysis sheet 1: Preliminary discussion of the work process analysis



Ask experienced employees who are familiar with the task in question to take the survey. Explain your plan and the purpose of the survey to the employees. Make it clear to employees that this is not an inspection of their work. Obtain permission from employees to use the results of the survey. Ask if the results should be treated anonymously. Ask whether you may record the interview.

General information

Company (and department, if applicable) incl. contact
 Employees and contact
 What is your job title?
 What training have you undergone?
 How did you acquire this task (in education/training, at work?)
 Observer
 Date and place

Information about the work task

What should be done? What is to be done?
 Initial situation/situation description/scenario/working context
 What problem is this task intended to solve/what is the purpose of the task?
 What is the particular relevance of the task, especially, if applicable, for upstream and downstream tasks in the process chain?
 Goal: What condition should be achieved?
 Target indicators: How can I tell that the task has been completed?
 Quality criteria: Which requirements have to be met?
 Relevance: What is the task important for?
 Time limit: When must the task be completed?
 Location specification: Where should the work take place?
 Process specification: Which procedures, resources and aids are to be used to perform the task?
 If necessary, teamwork and division of labor: Who should do what? Who is to be involved?
 What do you have to pay special attention to when performing the work task?
 In your opinion, what prior knowledge is necessary to perform the work task? What do you need to know and be able to do?
 Where do you see difficulties in performing the work task?
 How often does this work task occur in your daily work routine? Does it occur frequently or is it a rather infrequently performed work task?

Analysis of relevant documents

Analyze the documents relevant to the work order. A document analysis of relevant texts and publications can be helpful to get an overview of the formalities regarding contents, specifications, criteria and procedure of certain work. Relevant documents usually have to be researched in various sources (websites, archives, databases, etc.). In the following, we distinguish between laws and legal ordinances, company documents, and teaching and learning materials.

- What specifications do you find regarding the task in the binding curricula (education plans, framework curricula, training framework plan)?
- What specifications do you find regarding the task in company documents (training plan, quality management, work instructions, process descriptions, product and service descriptions)?
- What specifications do you find with regard to the task in any relevant teaching and learning materials you may have viewed?
- Which legal and sublegal regulations must be observed during the task?

Work process analysis sheet 2: Work Planning Analysis



Observe how the employee starts preparing the work and note the steps and contents of the individual activities on the observation sheet. This may involve making a work plan, performing calculations and computations, selecting tools, materials and supplies, organizing equipment, obtaining documents, coordinating appointments, etc.

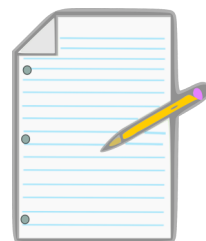
Make it clear to the employees that this is not an inspection of their work, but that the tour of operations is intended to identify operational work tasks that promote competence.

For the documentation form, in addition to the sheets, think about your smartphone or a camera to be able to capture certain work processes photographically/videographically.

If it is not clear to you what the employee is doing or why he is doing something, have him explain it to you. If you have to interrupt the employee in his or her work to ask questions, do so only as long as this does not endanger, hinder or disturb anyone in the company.

No.	Planning step (e.g. organization, procurement, communication, calculation, inquiries, consultation, agreement, documentation, create work plan, etc.)	Methods, tools, aids, programs (e.g. telephone, Excel, email, etc.)	Required information, data, specifications, documents	Cooperation and communication with other people	Specifications, regulations, rules, results to be observed
1.					
2.					
3.					
...					

Work process analysis sheet 3: Implementation Analysis



The employee takes up the processing of the actual work task. Watch him and note his individual work steps. Document your observations in sheet 3. Enter which procedures, tools, aids, information and forms of communication he uses in the process.

No.	Work step	Tools, aids, programs, machines	Required information, data, specifications, documents	Cooperation and communication with other people	Specifications, regulations, rules, laws, standards to be observed
1.					
2.					
3.					
...					

Work process analysis sheet 4: Closing Analysis



In the last step, you examine how the work process is completed by the employee and, as before, note the individual steps and activities of the employee. Here, the focus is on activities such as handing over the product to the internal or external customer, quality inspection (measuring, testing, checking), carrying out functional tests, commissioning, final documentation (e.g. inspection records), obtaining customer feedback, issuing invoices, receiving complaints if necessary, rectifying and eliminating faults, etc.

No.	Work step	Tools, aids, programs, machines	Required information, data, specifications, documents	Cooperation and communication with other people	Specifications, regulations, rules, laws, standards to be observed
1.					
2.					
3.					
...					

6. WORK RELATED KNOWLEDGE AND SKILLS FROM THE PROCESS



Certain knowledge, skills and abilities are required to carry out each work step. These can be technical or interdisciplinary (e.g. personal, methodical, social, ...) and are the basis for the didactic and methodical design of learning and work tasks on the basis of the work process analysis carried out here.

Set out the four completed question and observation sheets and think about which

- theoretical knowledge is imparted,
- practical skills are practiced,
- methodical and rational work techniques,
- social and communication skills developed and
- personal attitudes and values

must be adopted in order to describe a corresponding action competence for the essential work steps. Document the results on the following evaluation sheet. Not all fields always have to be filled in:

<i>In the information phase</i>		
Action competence	Theoretical knowledge and skills as well as practical skills	Interdisciplinary knowledge, skills and abilities (social, methodological, personal)
...		
...		
...		

Fictitious example: Install a photovoltaic system on the roof of a house:

<i>In the information phase</i>		
<i>Action competence</i>	<i>Theoretical knowledge and skills as well as practical skills</i>	<i>Interdisciplinary knowledge, skills and abilities (social, methodological, personal)</i>
<i>Consultation of the customer on request for a photovoltaic system</i>	<i>Assessment of the structural and local situation, documentation of the consultation, ...</i>	<i>Sales-promoting conversational skills, Appropriate customer demeanor, Taking an entrepreneurial point of view, ...</i>
<i>In the planning phase</i>		
<i>Action competence</i>	<i>Theoretical knowledge and skills as well as practical skills</i>	<i>Interdisciplinary knowledge, skills and abilities (social, methodological, personal)</i>
<i>Planning the installation of a photovoltaic system</i>	<i>Calculation of wind and snow loads, knowledge of the operation of photovoltaic systems and types of their installation, ordering components from manufacturers and wholesalers, ...</i>	<i>Create work flow plan, select liaisons, coordinate scheduling and staffing with peers and supervisors, Independently and self-initiated job preparation, cost-conscious planning, ...</i>
<i>In the execution phase</i>		
<i>Action competence</i>	<i>Theoretical knowledge and skills as well as practical skills</i>	<i>Interdisciplinary knowledge, skills and abilities (social, methodological, personal)</i>
<i>Assembly of a photovoltaic system</i>	<i>Knowledge of rainproofing, waterproofing, windproofing and structural requirements for roofs, mounting integrated and elevated systems on various roof coverings and roof shapes, ...</i>	<i>Use of work-sharing procedures, effective use of tools and materials, cooperation with other trades (e.g. electrical engineers), assumption of responsibility for work safety for oneself and others, ...</i>
<i>In the closing phase</i>		
<i>Action competence</i>	<i>Theoretical knowledge and skills as well as practical skills</i>	<i>Interdisciplinary knowledge, skills and abilities (social, methodological, personal)</i>
<i>Testing and handover of the photovoltaic system</i>	<i>Knowledge of quality criteria for proper installation work on PV systems, ensuring that the roof and PV system are functioning properly, ...</i>	<i>Prepare inspection report, prepare invoice, solicit and receive customer feedback, Quality conscious and conscientious leaving the job site, ...</i>

7. ASSESS POTENTIALS FOR COMPETENCE DEVELOPMENT



Finally, you are to assess the extent to which the selection and analysis of a company work task was successful in order to use it for training and further education purposes. Reflect on your work process analysis and the quality of your results using the following guiding questions

1. Describe what your original goal was in using this handout.
2. Use some key criteria to determine the extent to which you have achieved this goal.
3. Did your objective change during the process? If yes: how and why did you have to adjust the objective?
4. Could the adjusted goals be better achieved? What conclusions do you draw from this?
5. Did the work process analysis go according to plan? If no: which deviations from the plan have taken place and for what reasons?
6. Do you have the impression that you were not able to observe or discuss important aspects of the work task at all? If yes: what were the limitations?
7. To what extent do you have the impression that you were able to record and document the observed or discussed work steps completely, clearly and comprehensibly?
8. To what extent were you able to identify documents (laws, regulations, curricula) relevant to the work task and include them in the analysis?
9. To what extent did you succeed in describing the professional action competencies relevant to the tasks during the evaluation?
10. To what extent did you succeed in identifying the relevant, concrete theoretical knowledge and skills as well as the practical skills for the individual competencies?
11. With a view to the evaluation sheet on the task's conduciveness to learning and competence as well as to the results of the evaluation of the work process analysis: Where do you see the advantages and disadvantages of the tasks with regard to the potentials for competence development?

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