Acquisition of “Vocational Competence” through Projects and Work Tasks

Traditional School ⟷ Professional Activity

Knowledge ⟷ Competence

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Acquisition of Vocational Competence

Structure

1. Objectives of the Project and Work Tasks (PWT)

The objective of the project and work tasks can be defined as "acquisition of vocational competence through methodical and content suitable project and work tasks that integrate self organised teaching methods and enable the completion of an individualised performance / competency evaluation of team and individual performance."

This objective includes several aspects that complement and promote each other. The aim of "vocational competence" as a teaching goal is undisputed. There is, however, a controversial dispute over the methodical and didactic way that this expertise should be achieved in the classroom, since the teaching process and organisation of lessons generally don't match actual profession situations (see Chapter 2.) Competence is learned, neither by memorising competency definitions nor by accumulating knowledge, but by connecting action and practice with realistic reflection and evaluation. It follows that the organisational framework, together with the teaching content and methodical design of the learning situation, must allow for the experience of vocational competence. This commonplace demand is entirely supported by modern, neurologically-based learning research, but is not so easy to implement, since it contradicts the traditional organisation of school as a "teaching organisation." We have therefore devoted a separate chapter, "Vocational Learning Organisation" to this central aspect of school-based learning.

The experience of vocational competence in teaching should be the task of the vocational school, as long as they take their vocational education claims seriously. A school, however, is not a company, and lessons can rarely replicate operational processes, as the main goal is the learning process, not a work or business processes. It is therefore necessary to bring these two layers, learning processes and work processes together.

It is our opinion that projects and work tasks are the "missing link." They are the starting point in enabling the experience of professional courses of action and competencies. They create a competency-generating learning situation.

The Project Concept

The term "project" is often used both in business as in educational contexts, however, each with different meanings, so it is necessary to make a clarification between the two.

The educational project concept, according to Frey, is characterised in that the students pick a project initiative, jointly plan a complex project, agree on goals, develop actions to be taken, put these actions into practice in a limited time frame, then achieve and reflect on them. Often, presentable products arise from this work. In a school setting these are called "projects," however, they are usually work tasks with more complex characteristics and group work that extend over longer periods of time.

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Although aimed at a target or result, the accuracy of the goal setting and the establishment of the required resources are not the main focus.

In this aspect, this is how one differentiates a business project from other school work.

For the sake of simplicity, we quote the ISO-Norm10006 (https://en.wikipedia.org/wiki/ISO_10006) and will define a project as:

"(..) Fulfils a unique process (3.4.1), consisting of a set of coordinated and controlled processes (3.1) with a start and end date and is carried out to achieve a goal that has specific requirements taken into account, (3.1.2) with restrictions in terms of time, costs and resources."

This definition clearly defines the main components and concepts of a business project:

1. Coordinated and guided operations
2. Clear start and end date
3. Goal with defined specific requirements
4. Limitation of time, costs and resources

The difference between an educational project and a business project is that at the core of an educational project is personal development while at the core of a business project is a cost-effective and customer-oriented perspective that is at the foreground of the project. The results based focus in business projects, for example, projects with fixed resources, calculated in a defined time frame that is accepted by the customer (and therefore profitable) and delivers results, must be taken into account when acquiring vocational competence.

Based on these considerations, a task format for vocational training has been created, connecting the educational with both the business project concepts and the project and work tasks (PWT). Here, the term "project and work task" is a modification of a term more commonly used in vocational didactic literature, which is "learning and work task." Learning is an obvious goal in school related tasks. In this sense, the term is redundant. From our perspective, since it is during competence-based vocational education that one gains project expertise, we want to express this clearly with the term "project and work tasks." Project competence, within the meaning of vocational competence, develops in learning situations in the context of a professional, thoughtful, and effective learning process, which is geared towards skills acquisition. The description of such learning situations should represent, in our view, the base of competency standards.

2. Compare "Traditional learning, Work and Business Process"

The following lineup shows the main areas / categories in which a comparison should take place:

a) Traditional Learning Organisation ← → **Operational Organisation**

- Compartmental divides
- Hourly blocked intervals
- Class Organisation
- Teacher-Student
- Small / Short A-orders
- Less Responsibility
- Learning Attitudes and Consumerism

- Order Related Operational Plan
- Work Sequence / Workday
- Department / Work team
- Boss / Supervisor-Employee
- More Extensive A-orders
- Potentially More Responsibility
- Active task completion

"Compartmental Zapping" and Short Activities ← → **Related Longer Processes (Projects)**

b) Work Order / Task ←→ **Customer / Project Task**

- Small steps
- Single / Partner work
- Short, clocked time sections
- More or less Feedback
- Knowledge / skill-oriented
- Less responsibility

- Complex / Extensive
- Independent work in a team
- Continuous, extended time periods
- Results-based feedback
- Skill and competence oriented
- Profit Responsibility as a Rule

"Reference" Short Activities ← → **Responsible "Immersion" in a Process**

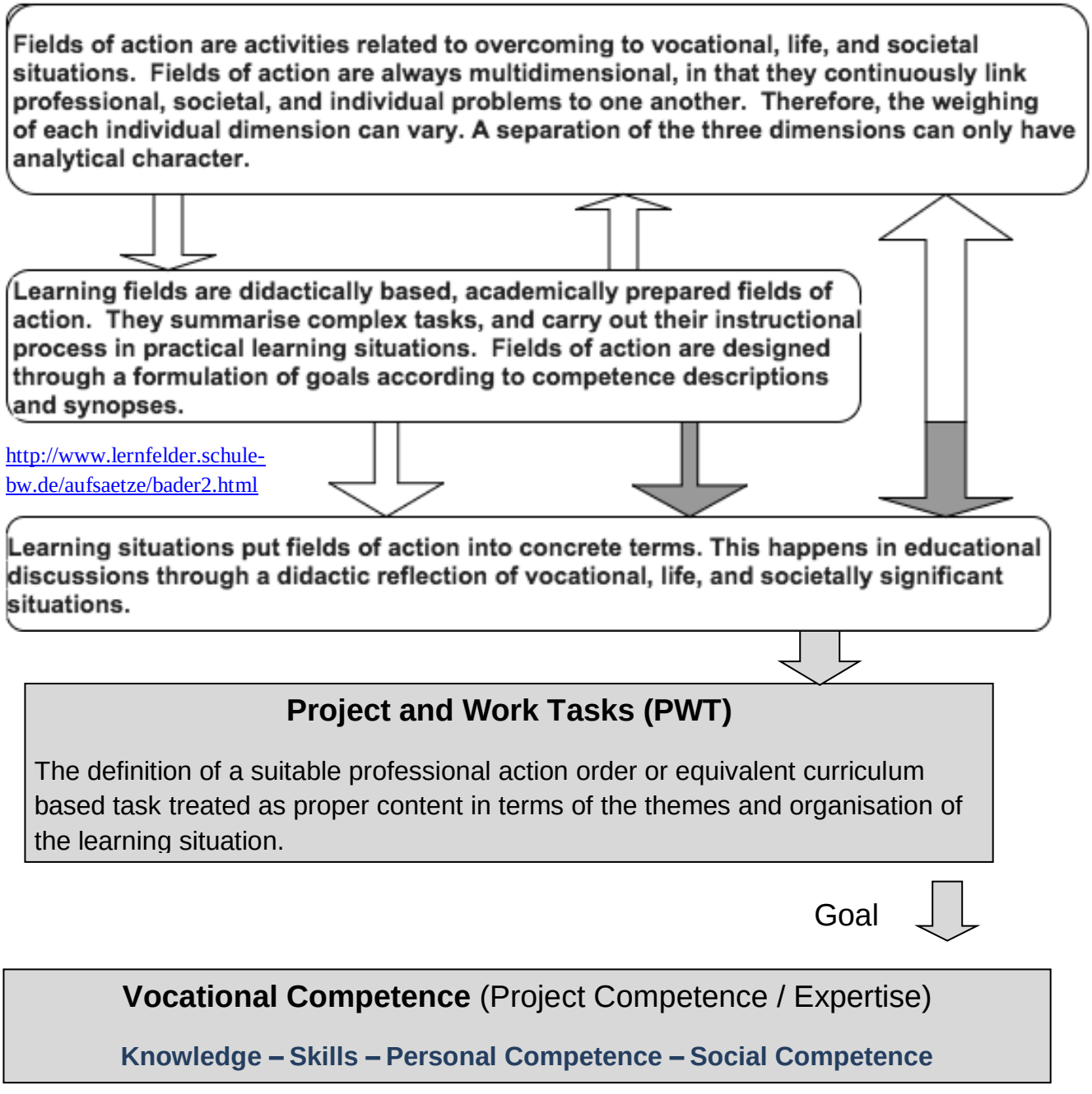
This comparison shows that the acquisition of vocational competence can not be achieved with only traditional learning methodology and organisation. The direction must be complex and goal driven tasks aimed at real **project expertise.** This is exactly what must be achieved in the concept of "project and work tasks."

The project approach is most suited to these requirements. Operation oriented projects are complex. They have different approaches and implementation strategies, require time management, include quality standards, and must be customisable. As a rule, they must include project documentation which also in the school sense support the reflection process.

These brief remarks on traditional school learning processes, operational procedures and work tasks have significantly made the need for genuine expertise produced through learning situations and project orientation a central core idea. However, the professional didactic concept of the "learning field environment" leads to similar conclusions. This of course is not a contradiction, because the learning field environment idea contains interdisciplinary professional fields of action that are scholarly implemented.

3. Project and Work Tasks in a Learning Field Environment

With the learning field environment concept, the traditional divide between subject areas should be set aside in a vocational school. The learning areas in turn are based on real operational action situations and combine several fields of action together. So, for instance, the business field of "Understanding and Documenting Stocks and Value Streams" comprises all areas of activity and all operative areas or segments of this field. In the learning environment, and in a learning situation, the trainee should work and learn in a problem solving manner, according to the model of complete action (researching, planning, decision-making, executing, checking and evaluating.) The following graphic illustrates this relationship; the shaded areas represent extensions on our part.



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The learning field environment concept points towards methodological and didactic direction, which results in dealing with demands for necessary professional skills. The learning environment concept arose even before the now more commonly used concept of competence. It was developed in the 1970's in cooperation with professional associations and is aimed at the acquisition of vocational competence through appropriate illustration of professional fields through activity in school learning areas. Perhaps today, one would call this "fields of competence."

What up until this point has been has been more difficult to implement in the learning field environment concept, due to school and administrative inflexibility, is the definition of appropriate learning situations. This sounds simple, but it is not. The suitable, competence generating learning situation is a major hurdle for traditionally trained teachers and here they will require assistance and methodological and didactic approach aids. That is exactly the concept that is presented here.

A learning field environment needs one or more work-based learning situations with problem-oriented tasks brought forward. When these tasks lead to concrete products as well as a methodological design of the learning situation, one can speak of comprehensible acquisition of competence. One can also say this: learning situations plus concrete formulation, according to predefined criteria, of learning and working processes become a competency-generating learning environment.

How this output format looks will be described below. Only the operational commitment to the task format and preparation for the procedure solves the problem of creating a competency-generating learning situation in order to create a classroom reality.

4. Procedure for the Construction of Projects and Work Tasks

Given the prior statements, there are 5 key elements that must be considered in the design of projects and tasks.

i) A task with product / time orientation (definition of project tasks)

This requirement is the core element of the operational project concept. The operational project concept includes a profit expectation in the form of defined products with given resources, especially time. Simply having a task to complete is not sufficient, the task must lead to clear products in a strictly planned time frame. This is because in operational reality, no calculation would otherwise be possible. The project and work task as project order fulfil, in addition to the acquisition of project competence as a goal, the responsible principle for results and integrate credibility into the learning process.

ii) Description of the methodological approach (teaching / working methods, learning organisation, team building)

This aspect is the cornerstone for the connection of school-based learning defined through a project commissioned work or business process. It is also the approach that makes project and work tasks transferable. In all of the examples listed, this aspect can be tracked and reproduced. It describes exactly how the learning and working processes are organised, how the work teams are formed, what will be evaluated, who has what roles, and so forth. By using this description, another teacher can take on the same task and know not only what he has to do, but also how to do it. This makes the learning methodology no longer separate from the content. This goes without saying that having the methodical approach and self organising method in the foreground also supports the competence goal of “personal responsibility” and “responsible teamwork.”

iii) Work planning and Evaluation of the Work Process (Quality / Productivity Control, Encouragement of personal responsibility)

The ongoing evaluation of the work process is a very difficult matter for students. In the current school situation, students have gotten used to short term “learning events” that are often both initiated and checked by a teacher. To plan, navigate, and continuously evaluate a longer process by themselves is unfamiliar. However, the ability to optimise action and personal responsibility in the work process is an integral part of any project management. The school learning process can initiate this procedure by providing students with appropriate pre-planned project planning formulas which advise on completing meaningful reviews in manageable portions. Each student tracks their progress with a daily learning report, while small teams use a work planning and evaluation form. Of course, this required part of the learning process must be included in the evaluation in order to reinforce that this is a necessary part of the monitoring process.

iv) Product Presentation / Delivery (present and deliver work products)

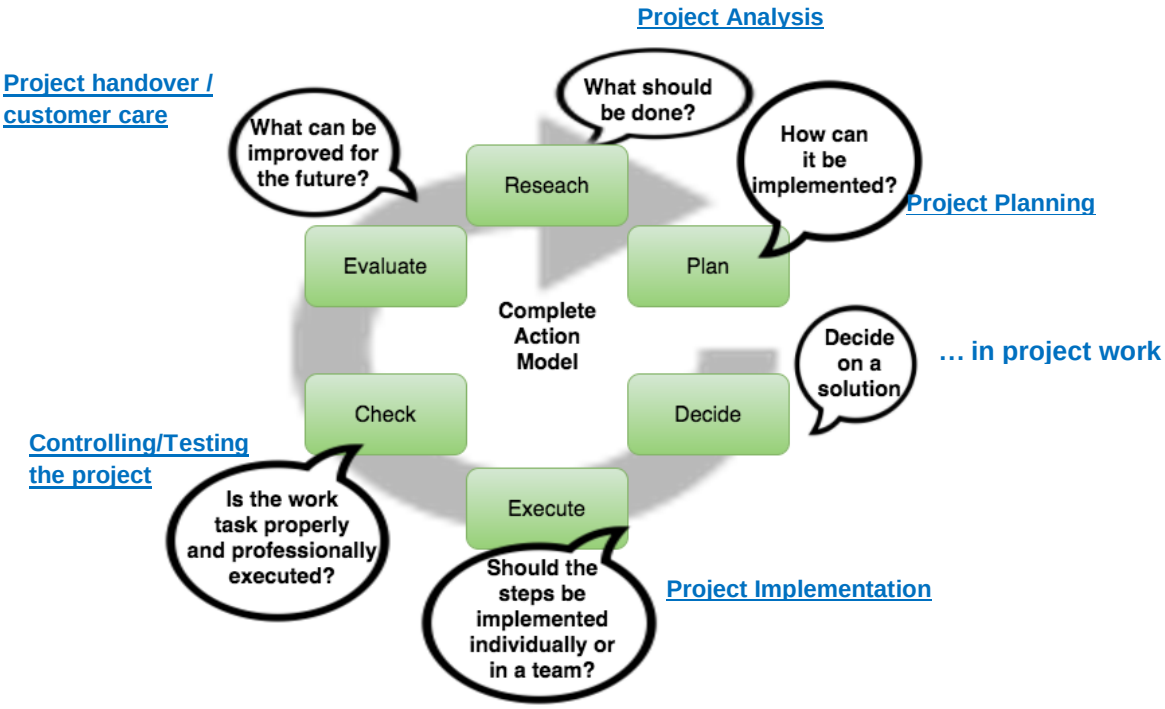
Depending on the requested work product, this can be a presentation, a demonstration of a product / poster / film / montage / installation and so forth. In the

"smallest" case, documents can just be handed over. It is important that the delivered products are an expression of the entire work and learning process and thus demonstrate its effectiveness or ineffectiveness. In other words, the essential parts of the learning and working process must culminate in "tangible" results.

v) Evaluation and Feedback (Quality control of the learning and work process)

In the learning process, the teacher/supervisor is usually the "Customer Replacement." He or she also has the task of receiving the product and results. Since the work process at school also represents the learning process, this evaluation must be connected with comprehensive feedback that also evaluates learning opportunities and learning progress. The key element here is that the task evaluation criteria is formulated in the same way as the quality criteria. This makes work success accessible to the student at an early stage through evaluation of his or her learning process and thus personal responsibility and transparence can be obtained. However not only are the assessment criteria preset, but also the manner in which they can be determined. It is then desirable that the students also be involved in this process. In the next chapter we will present some evaluation examples for project and work tasks.

All aspects of "complete action" are implicitly included within the described learning situation and associated learning processes. Project and work tasks consequently offer an excellent holistic activity orientation and wholeheartedly reflect modern professional methodology and didactics. One can even say that they are met only with "real" life!



From: http://www.foraus.de/medien/laa_handl_orientierung/Vollst-Handlung_600.jpg
(foraus.de is BIBB's Internet platform to support vocational training personnel)
("Project" amended by the author)

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The 5 systematically oriented elements for the design of projects and tasks detailed above almost completely describe a learning situation that is aimed at fostering vocational competence. Project and work tasks in conjunction with a curriculum, and while referring to the learning situations we are describing, can be more meaningful than previous syllabi. The PWT can also inject new life into competency standards, and not only into the formal "outcome," but also throughout the process in which the outcome is reached. It doesn't always happen that formal standards of competence during everyday teaching have such meaningful catchphrases!

Summary: Overall instructional context procedure

Learning Environment for a (partial) Learning Area/ Module

1. **Getting Started:**
   Learning map (Advance Organizer)/Mind map/… . (Outline/ Review)

2. **Basic Knowledge / Skills:**
   Self organised and action oriented U-methods for basic knowledge and skills acquisition

3. **Competence generating referential learning situations:**

Project and work tasks with essential design criteria

1) A task with product and time orientation (project orientation)

2) Teaching Organisation/Team Building (Organisational learning/A-Process)

3) Planning and evaluation of the work process (reflecting on the process)

4) Determination of the product presentation / handover (type / form of delivery)

5) Determination of the feedback / evaluation process (student involvement)

4. **Methods for Feedback/Evaluation/Reflection** (5 Point PWT) **:**
   - Presentation, documentation, technical discussion, demonstration etc.
   - Assessment of individual performance in a team
   - Test (Multiple-Choice), class work, etc.
   - Reflection talk, analysis and discussion (individually/in teams/in the classroom)
   - Evaluation sheets etc.

The PWT must not necessarily be done in chronological order. For example, numbers 2 and 4 can occur several times during the process.

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Exemplary Approaches for the Construction of Project and Work Tasks

Step 1
Identification of professional fields of action through an analysis of business processes
Example: training as a graphic / web designer

Step 2
Deriving from learning situations from professional vocational situations
Example: Creating a corporate website for a medium-sized company with 100 employees and 20 million annual turnover. The company researches and sells cleaning supplies.

Step 3
Defining the subjects involved
Example: ITS, AS, Graphic Design

Step 4
Formulation of a complex starting point with a written work contact, suitable due to its competency based learning scope of action. The tasks should include the 5 key design criteria.

Criteria	Example: graphic designer / web designer
Product and time specified tasks, milestones where applicable	Company website with certain specifications (i.e. registration form, database connection, an employee directory access, internal area etc.) Products: website, documentation and presentation of website Timeframe: 16 teaching blocks + 4 blocks for the presentation and evaluation
Notes on the procedure, methodology and organisation	Regular and expert groups for the purpose of broad specialist foundation; Core groups: Company website 8x, set naming conventions ➔3 People x 8 core groups Expert groups: Duration: 8 blocks Expert themes: Webserver/ database connection – Logo design /site layout — PHP/HTML-implementation Distribution: (3 x 4 Students /Themes) x 2 =24 S, members from the core groups each present a topic, expert groups are mirrored (2x equal groups)
Guided work planning and quality control / evaluation	Teams must submit their current double-block plans After 4 blocks, each member of the team hands over a signed document, in which he or she declares which part of the work package he or she is responsible for. Activity report / Protocol for consecutive half day (short listing)

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Product delivery or presentation	Second to last day, 4th Block: Delivery of documents and presentation (electronic) Demonstration of site and explanation
Feedback and Evaluation Criteria	- Team documentation - Presentations / Technical discussions - Sites and explanations - Additional points for special performance or deductions for underachievement ➔Weighed individual grades from sub-notes, additional technical discussion if necessary

Important note: Make sure enough time is regulated in the planing process for reflection and feedback of the work process and the results. Individual experiences and acquired knowledge can now be harnessed and generalised in other contexts.

5. Teacher and Student Roles in Project and Work Tasks

A. The teacher's role in project and work tasks

➔ Before :

Suitable scenarios/
formulating exact tasks

➔ During :

Steer - Advise - Give Feedback
Foster student independence
Team building / care

➔ After :

Feedback / Evaluation ➔ Find out grades

The Challenge ➔ Relatively open teaching process

The transition of the learning process into project principles means that the teacher must target his or her preparation. He or she must exactly describe and plan "the scenario." From the teacher's point of view, the PWT is a project specification book for students. This means that, instead of having small steps of conventional teaching one doesn't plan every hour but one must rather work within a longer pre-constructed timeframe. The reward of the self controlled learning process with a longer time frame is that the teacher, coach and project leader become one person.
It's not a secret that the need for of this kind of learning process, and the ability to endorse this type of open learning process, results in very diverse and also sometimes imperfect results. But that's simply normal life as well as the normal competence acquisition process for each one of us. Teachers who are used to the classic illusion of control in teaching (Quote: "That's exactly what we have already dealt with!") can find this to be a difficult process at the beginning. However, the risk is worth it in every respect.

Even for students, the learning process with project and work tasks is a substantial change from their traditional "learning consumer role."

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B. The student's role in project and work tasks

➔ Before :

Understand the tasks: "What does the teacher/person who gives the work task want?" Division of teams / Team roles /tasks

➔ During :

Open work structure / communication with classmates; certain freedom in choice of activities; less "rules," etc.

learning teamwork through experience!

➔ After :

Work Product ➔ Evaluation /Feedback

The Challenge ❾ Autonomy / Personal responsibility over a longer time period; must be able to plan work and make decisions!

In a sense, the goal of "acquisition of vocational competence" means that these rolling changes become just a matter of course for both teachers and students. Schools are finally beginning to organise learning so that it replicates real life. Project and work tasks are implicitly designed to create a self responsible learning process for students.

6. Internal Differentiation and “Vocational Learning Organisation”

“Implicit Internal Differentiation"

Working in project teams allows the students a high degree of self-control over their learning and working process. Within the path, making sure one has the whole concept and mission of the project in mind is important.

Thus, the students can collaboratively participate and decide for themselves on the tempo, difficulty, personal type of access, and their personal interest in the project. In addition, this makes it possible for teachers to refine their support and mutually aid the students. **Thus, the potential of the group is used.**

This "implicit internal differentiation" is, for example, contained in the nature of the work process and can be reached with little additional effort.

“Vocational Learning Organisation”

Vocational competence is a result of "experiential" skills development in appropriate learning environments.

➔Vocational action processes are interrelated, project, team and customer-oriented. Learning this process competence calls for as much of a cohesive learning environment as possible.

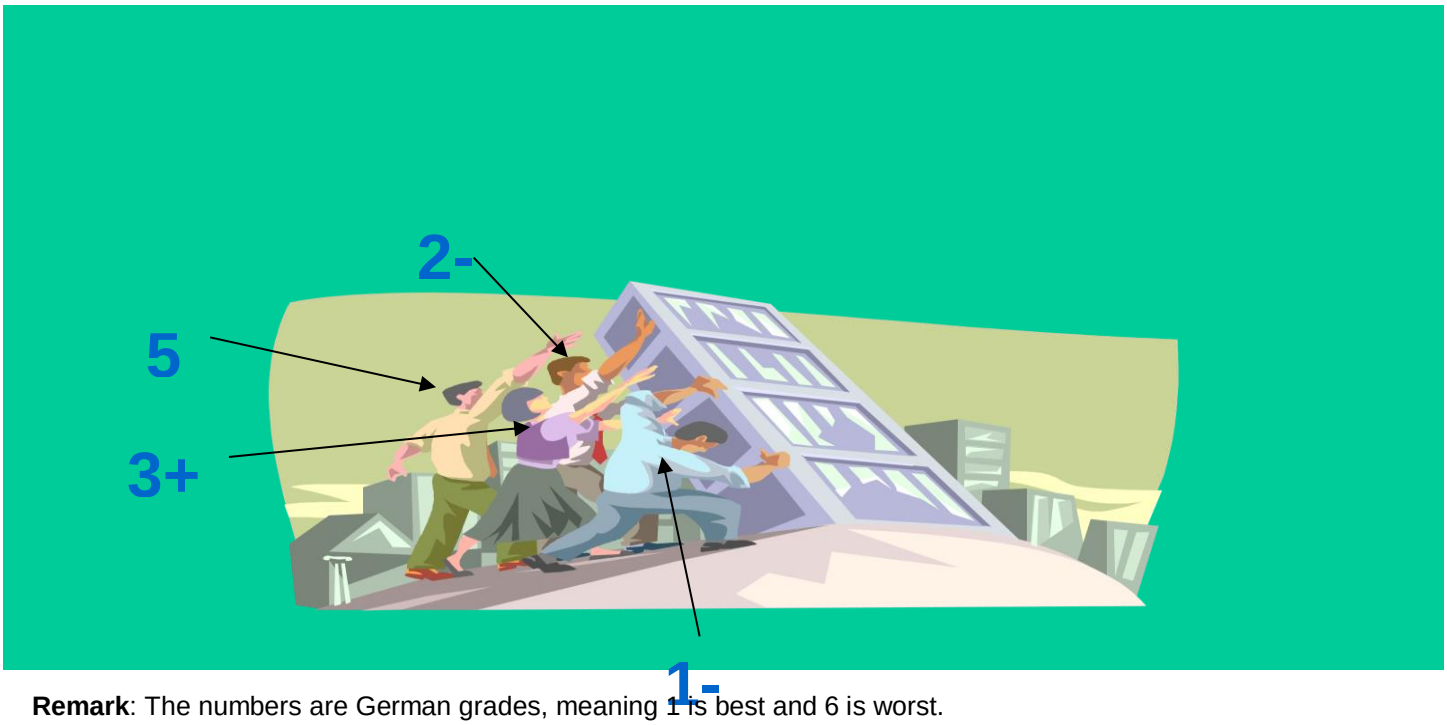
➔**Merging hours / blocks and subjects into larger units of time and content.**

➔The goal should be to organize as large, contiguous units of time as possible. One can also try to begin on a smaller level by combining or building theme pools (topics / areas of expertise) with colleagues.

7. Assessment of Individual Achievements in a Team

7.1. The Problem

(Graphics: From: unknown graphic; Additional notes by the authors



Remark: The numbers are German grades, meaning 1 is best and 6 is worst.

A "work product" can be created as a team, however, not every person within the team carries the same weight toward the result. For the sake of fair evaluation (we must / should / want to evaluate each student's individual results) it is important that nobody hides "behind" a team effort and also that someone who produces good work in a team full of people not pulling their weight does not "go down" with the team.

Because of this dilemma, we often prefer to evaluate students by their definable individual performance (such as with exams or tests). This, however, stands partly in opposition to the goal of "acquisition of vocational competence" in vocational education. Once can summarise this as follows:

"Vocational competence means the ability work together with both a supervisor and colleagues to perform responsibly, document, carry out a task, and hand over a product or service while caring for and being committed to the customer's complete satisfaction."

➔1. We need to make project oriented teamwork a working method in the classroom experience.

➔2. We need to promote a sense of responsibility for productive team results.

➔3. We need to give students individual feedback about their team effort.

How can we individually evaluate team performance while also being transparent and fair?

➔The solution wasn't / isn't …students evaluate themselves and their fellow students directly in the form of scores, points, etc. because …..

➔… The worst students evaluate the least critically and students also simply lack evaluation experience and criteria.

Moreover, legally speaking, the teacher can't hand over his or her responsibility to grade to the students.

7.2. The Solution

a) Introduction and Principle

The PWT generally has the following evaluation elements available:

- Team products such as documentaries, presentations, demonstrations
- "Direct" individually assessable elements such as tests, technical discussions, individual parts of presentations, etc.

These elements are then used to obtain an individualised overall grade, divided into the following components:

1. **IT** =: Individually weighted **t**eam performance ➔**The main objective of the process!**
   (from team products such as documentaries, presentations, demonstrations, etc., however, these are individually graded)
   +

2. **PB/PD** =: Personal **b**onus points / **d**eductions
   (A bonus or deduction determined from individual engagement / commitment in a team)
   +

3. **IM** =: Individual evaluation of "direct" individually **m**easured performance
   (based on tests, technical discussions, and an individual's part in the presentation, etc.)

= IF =: Individual **f**inal grade

Student teams determine the **IC** (individual commitment) and calculate an individual's performance in the team (**IT**) as well as an individual's team bonus or deduction (**PB/PD**).

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IC (Individual commitment portion) may also be referred to as proportion of team work.

The determination of the individual commitment component "IC" is the main task of the developed method! The basic idea is to then consequently modify the grade for the individual team member in relation to the commitment component IC.

To determine the commitment component IC, 3 basic ideas are combined:

1. Each student evaluates the other members of the team in relation to herself and not in absolute terms.

2. The student with the best evaluation becomes the reference point for the group. This means basically every one of the other group members could have been committed as her or him. The best one gest a commitment factor of 1 the others get factors in realtion to the best one.
   This has still nothing to do with the final marks for the team products graded by the teacher. Separately.

3. In the end the teacher revies the commitment factors suggested by the student evaluations and based on his additional experience he determines in communication with the group the final commitment as a factor or in percent.

That’s in short how it is done . To get a deeper understanding of the idea and to get some practical experience, a training course assisted by the authors is highly recommended.

The method also includes other variants and refinements. For the sake of the length, just some basic versions and explanations have been made at this point. In practice, both the concept of the project and work tasks, as well as the method of determining an individual's performance within a team will be deepened in training seminars and experienced through practical exercises.

Also the authors would like to emphasize that the method is free for personal use but still copyright protected. That means reference to the authors is a condition for using the method and professional organisations should contact the authors (hauer@oszimt.de).

In the real classroom the process is implemented by distributing to the student teams the forms on the next pages and applying them.

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Please access your fellow teammates behavior and work ethics in relation to your own under it's title section.

I am:	A	25,0

Which statement is correct? (Please only 1 "x")

	B	C	D ....
13	**Did much less than me!**	**Did much less than me!**	**Did much less than me!**
18	**Did slightly less than me!**	**Did slightly less than me!**	**Did slightly less than me!**
25	**Did exactly the same as me!**	**Did exactly the same as me!**	**Did exactly the same as me!**
32	**Did more than me!**	**Did more than me!**	**Did more than me!**
37	**Did much more than me!**	**Did much more than me!**	**Did much more than me!**

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Which statement is correct? (Please only 1 “x”)

	A	C	D ....
13	**Did much less than me!**	13 **Did much less than me!**	13 **Did much less than me!**
18	**Did slightly less than me!**	18 **Did slightly less than me!**	18 **Did slightly less than me!**
25	**Did exactly the same as me!**	25 **Did exactly the same as me!**	25 **Did exactly the same as me!**
32	**Did more than me!**	32 **Did more than me!**	32 **Did more than me!**
37	**Did much more than me!**	37 **Did much more than me!**	37 **Did much more than me!**

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I am:		C	25,0	

Which statement is correct? (Please only 1 "x")

	A	B	D ....
13	Did much less than me!	Did much less than me!	Did much less than me!
18	Did slightly less than me!	Did slightly less than me!	Did slightly less than me!
25	Did exactly the same as me!	Did exactly the same as me!	Did exactly the same as me!
32	Did more than me!	Did more than me!	Did more than me!
37	Did much more than me!	Did much more than me!	Did much more than me!

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I am:	D	25,0	

Which statement is correct? (Please only 1 "x")

	A	B....	C ....
13	Did much less than me!	Did much less than me!	Did much less than me!
18	Did slightly less than me!	Did slightly less than me!	Did slightly less than me!
25	Did exactly the same as me!	Did exactly the same as me!	Did exactly the same as me!
32	Did more than me!	Did more than me!	Did more than me!
37	Did much more than me!	Did much more than me!	Did much more than me!

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The teacher, and partially the fellow student, is then able to calculate a student's individual engagement by using the following sum formula sheet. Each student gets a row where the numbers on the left side of the questionnaire are filled in (ie. 13, 18, 27, 32, 37)

Evaluation result for team: _____

	1. Name	2. Name	3. Name	4. Name
Last name (Please enter alphabetically)**:**	***A***	***B***	***C***	***D***
A	**---**			
B		**---**		
C			**---**	
D				**---**
Additional grading				
Total				
Maximum value "total"				
Total / Max = Commitment factor				
Commitment IC % (factor *100):				
Teacher's definition of Commitment IC %				
Group product grade 1 % (done by teacher)				
Group product grade 2 % (done by teacher)				
Group products grade total %				
(Products Grade * Commitment) / 100				
Bonus definition (teacher)				
Final grade %				

Please fill in the "checked worth" in the table to further calculate the results!