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Terms used in this handbook, which have gender-specific meanings are used neutrally, are inclusive, and apply equally to all.

Bojana Vignjević Korotaj

Iva Buchberger

DID YOU KNOW YOUR HANDS CAN THINK?

Teaching for Critical Thinking
in Vocational Education and Training:
A Handbook for Vocational Teachers

Rijeka, 2025.

Content

Foreword	1
Introduction	5
Critical thinking competency and teaching for critical thinking	8
Model of teaching for critical thinking in vocational education and training	12
Learning outcomes focused on the development of critical thinking	16
Critical approach to lesson content	29
Active teaching methods and organisational forms of teaching	35
Active assessment methods	41
Critical action	55
Democratic classroom atmosphere	61
Beginning	71
References	72

To our fathers, Milan and Nevio, and their hardworking hands

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Foreword

Let me tell you something you already know. The world ain't all sunshine and rainbows. It's a very mean and nasty place and I don't care how tough you are it will beat you to your knees and keep you there permanently if you let it. You, me, or nobody is gonna hit as hard as life. But it ain't about how hard you hit. It's about how hard you can get hit and keep moving forward. How much you can take and keep moving forward. That's how winning is done!

Rocky Balboa

Dear vocational teachers,

The handbook *Did You Know That Your Hands Can Think: Teaching for Critical Thinking in Vocational Education and Training: A Handbook for Vocational Teachers* is intended for those of you who teach vocational subjects in vocational schools. The handbook is the result of a project entitled "Innovating Vocational Education and Training through Teaching for Critical Thinking", which was funded by the University of Rijeka as part of the Young Researchers Grant Programme in 2022. The motivation to work on this topic arose partly from our research interests as authors of the handbook and partly from the clear recommendations of national and international education policy on the need to develop critical thinking skills in vocational school students. To illustrate, it suffices to explain the goals of VET from the national education context, which include developing individuals who are curious, who want to learn and know how to direct their learning, who recognize problems and design

new solutions, who are open to new ideas and ways of thinking, and who think critically while respecting other thoughts and ideas (MSE, 2018). Since the literature lacks specific recommendations and guidelines for vocational teachers to support them in designing and delivering lessons that foster the development of critical thinking in students, the purpose of this handbook is precisely that – to provide vocational teachers with support in the form of guidelines for designing and delivering lessons aimed at developing students' critical thinking competency. The guidelines for vocational teachers published in this handbook were developed in two stages:

1. The existing generic model of teaching for critical thinking (Buchberger, 2020; 2022; 2023) was contextualized through an in-depth analysis of the relevant literature for vocational education;

2. The created model of teaching for critical thinking for VET was discussed with VET teachers in focus groups and improved according to their suggestions and comments.

The handbook first explains the critical thinking competency and teaching for critical thinking in order to clarify why and how critical thinking is pedagogically defined as a complex competency and what it means to teach for critical thinking. Following that, the model of teaching for critical thinking in vocational education and training is explained, breaking down all dimensions of teaching for critical thinking (learning outcomes focused on the development of critical thinking, a critical approach to lesson content, active teaching methods and organisational forms of teaching, active assessment methods, critical action and democratic classroom atmosphere). Each chapter begins with quotes from vocational teachers who participated in the focus groups for the purposes of the previously mentioned project or from interviews conducted as part of the doctoral dis-

sertation by Vignjević Korotaj (2020) entitled *The Formation and Development of Vocational Teachers' Professional Identity in the Republic of Croatia*. In the chapters dealing with the dimensions of teaching for critical thinking, you will find a brief theoretical introduction to each dimension, followed by examples of its use in the classroom. The examples have been created with reference to current curricula/syllables[1] to make them as useful as possible for teachers. These examples are also partly based on the experiences and suggestions of vocational teachers who participated in our previous research. After the examples you will find some questions for reflection and space for notes.

Vocational education is specific in many ways, and you as vocational teachers are one of the unique aspects of this system. Some of you started working in vocational schools immediately after graduating from university, while others have many years of professional experience in your field. Some of you made a conscious decision to become a teacher, while for others teaching happened as a result of various circumstances. In addition, your daily work in vocational schools is challenging – you encounter students with very different experiences, previous knowledge and motivation, you have to deal with the various demands of students, parents and colleagues and teach multiple vocational subjects, often without textbooks or handbooks to make your work easier. On the other hand, there are various demands placed on you – you need to keep abreast of developments in two fields (your discipline and teaching) often acting as a bridge between employers, the school and the individual needs of your students. You prepare your students for their future careers or further ed-

1 At the time of writing this handbook, some subjects/modules had old curricula and some had newly developed curricula. In both cases, the recommendations and guidelines for the development of critical thinking competence remain the same. In addition, it should be emphasized that the newly developed curricula for the subjects/modules represent a step forward in the implementation of critical thinking teaching in VET.

ucation, while also caring for their well-being, both physical and mental. In addition to your daily tasks, you are involved in educational projects, follow educational policy and some of you are even involved in its development. All of this makes your work incredibly complex, and we believe that improving the quality of the teaching process can seem challenging and stressful at times. Of course, teaching is also very fulfilling – especially given the significant role teachers play in fostering the development of various student competencies, including critical thinking. We hope that this handbook will provide you with the support you need to encourage the development of critical thinking in your students, while also motivating you to find new ways to improve your own teaching.

The authors

Introduction

Vocational education has many specific characteristics, the most frequently emphasized of which is its focus on the acquisition of skills necessary for the labour market. Recently, this has increasingly included the acquisition and development of general skills (such as problem solving, teamwork, flexibility, etc.) in addition to specific vocational skills. Another specificity within the vocational education and training system is that teaching in vocational schools typically combines general education subjects, vocational-theoretical subjects, and practical instruction, resulting in various profiles of teachers in vocational schools. In the context of acquiring practical skills, work-based learning, realized in various forms (e.g., apprenticeships, simulations in an educational context, workplace learning periods), is particularly important in vocational education and training. Linehan (2008) highlights several characteristics of work-based learning, which include, among other things: task orientation in the workplace, solving real-world practical problems, innovating practice, promoting autonomy and self-regulation in students, and focusing on improving both personal and organizational performance. Therefore, it can be concluded that it is assumed that during their education and training, students will develop a high level of expertise, professional responsibility, and autonomy. At the same time, vocational education and training systems, nationally, in Europe, and globally, face various challenges at all levels (macro, meso, micro). This is partly because this system is closely connected with the rapid changes occurring in the economic context. Consequently, some of the identified challenges vocational schools face include: lack of student interest in certain deficit trade and industrial professions, difficulties in collaboration between vocational schools and employers, insufficient equipment in some schools, inadequate opportunities for the professional development of

vocational teachers in terms of further developing their teaching and vocational competencies, as well as an increasing number of students with various difficulties (Määttä, Koski-Heikkinen, Uusiautti, 2014; Sirk, Liivik, and Loogma, 2016; Vignjević Korotaj, 2023). It is clear that most of these challenges require systemic solutions that need to be addressed at the macro level. However, it is also necessary to consider what can be done at the meso (institutional) and micro (personal) levels to improve the quality of work in vocational schools and to develop the necessary competencies in students for their future professional engagement in an uncertain labour market.

The importance of developing critical thinking skills is emphasized in educational policies at all levels (Council of the European Union, 2016; OECD, 2019; Ministry of Science and Education, 2023; UNESCO, 2023) and is promoted as crucial for addressing various contemporary challenges we face. In this context, it is not unusual that the importance of developing critical thinking in vocational education and training is also emphasized. Authors dealing with this topic point out that critical thinking is important for vocational school students because it enables them to solve existing problems in everyday life and at work (Yuliati, Fauziah, Hidayat, 2018), promotes the development of mutual respect and a better understanding of themselves (Suarniati, Hidayah, Handarini, 2018), enables a better understanding and evaluation of information for making life and business decisions (Lopez et al, 2023) and helps students to develop into autonomous professionals who can influence policies and standards in their own professional practice (Zuurmond et al, 2023). Although the importance of developing critical thinking in VET is recognized, there is a lack of clear recommendations or guidelines for VET teachers on how to specifically develop critical thinking in students. Academic and professional literature suggests that critical thinking can be developed in VET through authentic problem solving, experiential learning, project-based

learning, discussions with students, civic education and the use of various innovative teaching methods, among others. However, the question arises as to whether incorporating project-based learning into the teaching is enough to develop critical thinking in our students. To answer this and similar questions, we need to go back to basics and ask ourselves: **What is critical thinking and how is it taught?**

Critical thinking competency and teaching for critical thinking

This section will examine and define two fundamental concepts related to critical thinking in education – critical thinking competency and teaching for critical thinking – as a response to the question of how to develop critical thinking competency.

Critical Thinking Competency

In a pedagogical sense, critical thinking is defined as a complex competency that encompasses a specific set of knowledge, skills and values. It is important to note that critical thinking in a philosophical and psychological sense is usually defined as a set of cognitive skills such as interpretation, analysis, evaluation, reasoning, explanation and self-regulation. One of the best-known studies on critical thinking that included these aspects was conducted in 1990 by the American Philosophical Association (APA) led by American philosopher Peter Facione (see Facione, 1990). More recent research on critical thinking, particularly in the educational context, has moved toward a broader definition of critical thinking. In the national research context, Buchberger (2020: 52) offers a more comprehensive definition, emphasising that critical thinking in a pedagogical sense is defined as a complex competency that includes, in addition to cognitive and metacognitive skills, "thoughtful action by the individual, action based on reflection, considering ideas and decisions from multiple perspectives while promoting democratic values such as freedom, equality, tolerance and openness to discussion, ultimately developing a vision and proposing reasoned solutions".

Critical thinking in a pedagogical sense is therefore defined as a complex competency and certain elements of knowledge, skills and values can be presented as follows:

Critical thinking competency		
Knowledge	Skills	Values
Knowledge about various topics that are thought about and discussed	*Questioning skills*	*Clarity*
Knowledge about critical thinking, listening, reading and writing	*Evaluative skills*	*Precision*
Knowledge about concepts and judgements	*Argumentation skills*	*Enterprise*
Knowledge of how to conduct a debate	*Synthesis and structuring skills*	*Intellectual courage*
Knowledge of how to properly formulate an argument	*Discussion skills*	*Consistency*
Knowledge of how to properly formulate a definition	*Critical (active) listening skills*	*Coherence*
Knowledge of how to draw proper conclusions	*Critical reading skills*	*Intellectual vigilance*
Knowledge of logical fallacies	*Critical writing skills*	*Responsibility*
Knowledge of criteria for determining which information is accurate	*Critical decision-making skills*	*Openness to discussion*
Knowledge of criteria for determining which sources of information are reliable	*The skills of developing a vision and proposing solutions*	*Confidence*
Knowledge of various democratic values – freedom, solidarity, tolerance, etc.	*The skills of imagining possible situations*	*Humility*
Knowledge of epistemic values – clarity, precision, intellectual caution, curiosity, etc.	*The skill of seeing phenomena from different perspectives*	*Curiosity*
…	*Skill in modifying steps of an action in response to a new situation*	*Appreciation of other people's opinion*
	Skill in devising a new method for performing a particular action	*Tolerance*
	Skill in self-reflection and self-evaluation	*Empathy*
	Skill in monitoring and managing emotions	*Assertiveness*
	Skill in monitoring and managing thought processes	*Non-discrimination*
	…	*Intellectual generosity*
		Equality
		Peace
		Freedom
		Love
		Intellectual autonomy
		Sustainability
		…

Defining critical thinking as a competency and establishing the knowledge, skills, and values associated with it is the first step in developing critical thinking competency through the process of teaching for critical thinking.

Teaching for Critical Thinking

The answer to the question of how to develop critical thinking competency is teaching for critical thinking. In other words, a teacher develops students' critical thinking competency by applying teaching for critical thinking.

When it comes to teaching for critical thinking, it should be emphasised that there are two main approaches – a separate approach to teaching for critical thinking and an integrated approach to teaching for critical thinking (the approaches are summarised in the table below[2]).

APPROACHES TO TEACHING FOR CRITICAL THINKING	
SEPARATE APPROACH	INTEGRATED APPROACH
Critical thinking is taught as a separate, distinct module/subject. Critical thinking pertains to both the content and the method of teaching. What is taught? *Critical thinking.* How is it taught? *Critically.*	Critical thinking is taught in a way that it is integrated into existing modules/subjects. Critical thinking primarily pertains to the manner of teaching, not the teaching content. What is taught? *Materials, Interior layout, Ship construction and strength, Introduction to rehabilitation...* How is it taught? *Critically.*

2 A more detailed categorisation of teaching for critical thinking can be found in: Buchberger, I. (2023a). Benefits, challenges and ways to improve teaching for critical thinking. Educational Topics, 6(1), 7–26. https://doi.org/10.53577/oot.6.1.1

It is important to highlight that this handbook primarily discusses an integrated approach to teaching for critical thinking. Therefore, it examines the critical manner of teaching—considering ways in which critical thinking can (and should) be integrated into various modules/subjects.

Teaching for critical thinking is teaching that is primarily student-centred and focuses on developing student competencies. The overarching competency is critical thinking competency as it is a general, generic, key, transversal, core, life and global competency (Buchberger, 2023). Teaching for critical thinking is characterised by the fact that the teaching content is developed in an active and collaborative relationship between student and teacher. This kind of teaching is realised through the achievement of outcomes from all areas (cognitive, psychomotor and affective) at all levels of achievement. Learning outcomes established in this way require the use of different teaching methods and active assessment methods. Finally, teaching for critical thinking is teaching that develops and maintains a democratic classroom environment in which students and teachers openly communicate, discuss, collaborate and respect each other.

In order to provide support for teachers in applying teaching for critical thinking, a model of teaching for critical thinking has been created with dimensions related to the basic didactic elements – learning outcomes, teaching content, teaching methods and organisational forms of teaching, assessment methods and classroom atmosphere. The following chapters aim to address and elaborate the aforementioned model of teaching for critical thinking in the context of vocational education and training.

Model of teaching for critical thinking in vocational education and training

In this part, the model of teaching for critical thinking in VET is presented to provide support and guidance to VET teachers on how to develop students' critical thinking competency and how to integrate critical thinking into their module/subject (for more on the model of teaching for critical thinking in VET, see Vignjević Korotaj and Buchberger, 2025).

MODEL OF TEACHING FOR CRITICAL THINKING IN VET	
DIMENSION	MAIN CHARACTERISTICS
LEARNING OUTCOMES FOCUSED ON THE DEVELOPMENT OF CRITICAL THINKING	Learning outcomes from different domains and different achievement levels are included, with a focus on analysis and evaluation for the cognitive domain, adaptation and creation for the psychomotor domain, and organization and internalization for the affective domain. Contextualised for VET: *The focus is on skills development, i.e. the psychomotor domain, and the learning outcomes are predominantly related to work practice, different work situations and the work process, which is further explained by the dimension of a critical approach to lesson content.*

continued

CRITICAL APPROACH TO LESSON CONTENT	It goes beyond the mere transfer of teaching content from the teacher to the student, it includes the active shaping of teaching content through interpretation, analysis, synthesis, application, evaluation and innovation. Contextualised for VET: *Giving examples from working practice when interpreting the lesson content* *Relating the lesson content to everyday work situations.* *Identifying key information about the work process.* *Presenting the lesson content to learners from the perspective of the employer/user or customer and the learner as a future employee.* *Questioning the efficiency of the work process and the quality of the end result/product.* *Encouraging learners to interpret and explain the work process 'in their own words'.* *Encouraging learners to relate the lesson content to everyday work situations.* *Encouraging learners to suggest possible solutions to problems from work practice in an informed and reasoned way.* *Encouraging learners to relate the lesson content to the characteristics of the occupation (status, attractiveness and potential of the occupation).*
ACTIVE TEACHING METHODS AND ORGANISATIONAL FORMS OF TEACHING	It goes beyond the dominance of the oral presentation of lesson content by the teacher with an emphasis on frontal teaching and the passive role of the students. It involves the active participation of students through the use of various active teaching methods and cooperative learning. Contextualised for VET: *Application of various teaching methods (from the oral presentation method to the demonstration method, the problem-solving method, the simulation method (including the use of virtual and augmented reality), the praxeological method, the visit method, the excursion method, etc.)* *Application of various active learning and teaching techniques (e.g. brainstorming, learning by discovery learning by creating, learning by doing).*

continued

ACTIVE ASSESMENT METHODS	It goes beyond assessment of learning through objective-type tasks. It entails assessment for learning, assessment as learning and the assessment of learning. Contextualised for VET: *Self-evaluation of work by students (students evaluate their work at school/employer/regional competence centre).* *Student evaluation of teachers/mentors and work-based teaching and learning.* *Evaluation of student performance by teachers, mentors and/or employers.* *Evaluation of student performance by teachers, mentors and/or employers in the process of work-based learning according to the predefined learning outcomes.* *Use of different methods to assess student performance (evaluation through observation, laboratory-type tasks...).* *Self-evaluation of teaching and work-based learning with the aim of improvement.*
CRITICAL ACTION	It includes the transfer of developed competencies to everyday life and the labour market as well as active participation in the community. Contextualised for VET: *Encouraging students to be proactive in employment and self-employment.* *Encouraging students to recognize problems in the professional environment and in the community.* *Encouraging students to reflect on their own professional roles and responsibilities in their immediate work environment and wider social environment.* *Encouraging students to develop a vision, propose solutions and choose the best solution to perceived problems in work practice.* *Encouraging students to proactively balance individual needs, the needs of the labour market and the needs of the community.* *Encouraging students to continually work to improve the status, reputation and recognition of their profession.*

continued

DEMOCRATIC CLASSROOM ATMOSPHERE	It refers to the active involvement of all stakeholders in the learning and teaching processes while developing an atmosphere of cooperation, interaction, openness, tolerance and mutual respect. Contextualised for VET: *Active involvement of students by teachers/mentors/ employers in the different phases of the work process in accordance with legal requirements and acquired competencies* *Encouraging students to actively participate in the different phases of the work process in accordance with the legal requirements and the competencies acquired.* *Encouraging students to take responsibility during the work process and for the results achieved.* *Developing an atmosphere of cooperation, interaction, tolerance and respect.* *Discovering students' strengths and focusing strongly on developing their self-confidence while building pride in their (future) profession.*

In the following chapters, each dimension of teaching for critical thinking is explained in detail through (a) statements from vocational teachers about a specific dimension, (b) an introductory theoretical text about the dimension with general examples, (c) application in vocational teaching with specific examples, and finally through (d) reflection questions.

Learning outcomes focused on the development of critical thinking

Vocational teachers on learning outcomes

(...) what vocational education fails to do (...) is to help teachers understand (...) what benefit they get from these outcomes, what benefit they get from moving from content-based instruction (...) that focuses only on the subject, the concept, the definition, the categorization, to the one that develops skills. Well, that's the paradigm shift that should be happening, but it's not happening. Then people see it as something imposed, as a formality that has to be fulfilled, and it's not a formality at all.

Yes, that's right, that's 24 students, now we have 20 of them and 10 of them have difficulties, do you understand? (..) My colleague has just said that one of the students can't draw a triangle, he can't draw two parallel lines with a ruler. And I said to him: "(...) come on, imagine this child somewhere else, we'll understand him best, let's keep him here at school, let's see, let's find something for this child, surely, he can do something, he surely can do something, we just have to find it."

Introduction

Teaching is primarily aimed at developing students' competencies, i.e. their knowledge, skills and certain values and attitudes. Accordingly, the teacher should primarily think about and focus on the development of students' competencies, i.e. on creating and providing educational situations (lessons) in which students find optimal conditions for the development

of their competencies. The planning of lessons aimed at the development of students' competencies starts with the statement of learning outcomes - i.e. a clear and measurable statement of what students will be able to do after actively participating in the teaching of a particular module/subject or, more precisely, a lesson. Competencies and learning outcomes are linked in a way that implies that learning outcomes clearly, precisely and measurably explain which elements of competency (knowledge, skills, values and attitudes) we as teachers develop in students. Often several learning outcomes correspond to one competency element. The link between competencies and learning outcomes with examples is shown in the table below.

Competency		
Example: critical thinking competency		
Cognitive domain	Psychomotor domain	Affective domain
Knowledge and cognitive skills	Psychomotor skills	Values and attitudes
Example: knowledge about the topic of discussion	*Example: the skill of performing an alternative step in a process*	*Example: openness to different ideas*
Learning outcomes	Learning outcomes	Learning outcomes
Example: The student extracts key information about the discussion topic. [3]	*Example: The student performs an alternative step in the execution of a certain action in order to achieve better efficiency.*	*Example: The student is open to other ideas in the discussion.*

There are various categorizations of learning outcomes in VET, which are shown in the following tables.

continued

3 The examples of learning outcomes provide a general guide for VET teachers and require further specification in relation to their specific module/subject, i.e. the content of the course. Some examples of the development of specific learning outcomes of the chosen teaching content from the chosen module/subject are given in the further text of the handbook entitled Application in VET teaching to make them clearer.

Learning outcomes in relation to different levels	
Learning outcomes at the level of the sector	Learning outcomes set out in sectoral curricula developed on the basis of qualification standards for a particular sector.
Learning outcomes at qualification, module/ course level	Learning outcomes defined by vocational curricula for a specific qualification, module/ subject
Learning outcomes at the lesson level	Statements that answer the question of what students will be able to do after active participation in the module/subject. Learning outcomes determined by the teacher according to the vocational curriculum. Statements that are written in teaching preparations and/or teaching scenarios. They are more specific and precise than learning outcomes at the sector, module or subject level.

Based on the previously described link between learning outcomes and competencies, different domains of learning outcomes can be identified and are explained in more detail in the table below.

Learning outcomes in relation to different domains	
Domain	Explanation
Learning outcomes in the cognitive domain	Learning outcomes that contain statements about what students will know and think about after actively participating in the teaching of a specific module/ subject, i.e. a lesson. They include the following levels of student achievement: remembering, understanding, applying, analysing, evaluating and creating
Learning outcomes in the psychomotor domain	Learning outcomes that contain statements about what students will be able to do after actively participating in the teaching of a specific module/ subject or lesson. They include the following levels of student achievement: perception, readiness, guided response, automated response, complex response, adaptation, creation.

continued

Learning outcomes in the affective domain	Learning outcomes that contain statements about what students will feel and consider after actively participating in the teaching of a specific module/subject, i.e. a lesson. They include the following levels of student achievement: receiving, responding, evaluating, organizing, internalizing.

The categorization of the learning outcomes is followed by their elaboration according to domains with regard to the different levels of student achievement. The elaboration is shown in the following tables.

Learning outcomes in the cognitive domain	
Levels of achievement	Explanation and an example of the learning outcome
Remembering	It refers to recognizing, repeating, reproducing, stating, defining, enumerating facts and generalizing. *Example: The student defines a key term.*[4]
Understanding	It includes explaining, interpreting, giving examples, comparing, classifying, exemplifying. *Example: The student gives an example.*
Applying	Includes demonstration of a procedure, performance, proof, use. *Example: The student performs an exercise.*
Analysing	It refers to parsing, organizing and arranging. *Example: The student breaks down the concept into key elements.*
Evaluating	It refers to criticizing, arguing, verifying, justifying. *Example: The student lists advantages and disadvantages.*

continued

4 The examples of learning outcomes provide a general guide for VET teachers and require further specification in relation to their specific module/subject, i.e. the content of the course. Some examples of the development of specific learning outcomes of the chosen teaching content from the chosen module/subject are given in the further text of the handbook entitled Application in VET teaching to make them clearer.

Creating	It includes generating, making, designing, innovating. *Example: The student devises a new solution.*

Elaboration of the learning outcomes in the psychomotor domain

Levels of achievement	Explanation and an example of the learning outcome
Perception	It involves observing the steps of an action and repeating them. *Example: The student reproduces the steps necessary to perform a certain action.*
Readiness	It refers to ensuring the necessary conditions for the execution of the action and at the same time recognizing one's own limitations and advantages for the execution of the action. *Example: The student chooses a suitable environment for carrying out the action.*
Guided response	It involves the imitation of a psychomotor action under guidance. *Example: The student performs all the steps of the action with the help of the teacher.*
Automated response	It refers to the imitation and automatization of psychomotor actions. Showing a certain degree of self-confidence. *Example: The student performs all steps of the action independently.*
Complex response	It involves fast, precise and coordinated execution of the action. *Example: The student performs all steps of the action independently, quickly, precisely and in a coordinated manner.*
Adaptation	It involves the ability to modify action steps in order to meet the specific requirements and conditions of certain situations. *Example: The student performs an alternative step in the execution of a certain action in order to achieve better efficiency.*
Creation	It refers to proposing and creating a new course of action and developing a new way of performing a specific action. *Example: The student designs and implements a new way of performing a particular activity.*

continued

Elaboration of the learning outcomes in the affective domain

Levels of achievement	Explanation and an example of the learning outcome
Receiving	It involves accepting values as positive values one must develop in oneself and others. It refers to expression in words, not behaviour. It entails listing rules, not following them. *Example: The student explains that openness to accepting other ideas is a positive value that should be developed in themselves and others.*
Responding	It relates to behaviour that corresponds to a certain value, which is usually externally motivated. It involves listing and following rules without internalizing them. *Example: The student follows the rules when it comes to accepting different ideas during the discussion.*
Evaluating	It relates to evaluating values and the beginning of the internalization of certain values (or elements of values). *Example: The student explains how important it is to be open-minded during the discussion in order to accept different ideas.*
Organizing	It involves organizing certain values according to priorities. *Example: The student selects the priority values that should be considered during the discussion.*
Internalizing	It refers to exhibiting consistent behaviour in accordance with a particular value that is consistent with the person's developed value system. Constructive response to behaviour that is inconsistent with a particular value. *Example: The student consistently demonstrates openness in accepting different ideas and views openness to different ideas as a positive value that should be developed in themselves and others.*

After the general theoretical introduction to learning outcomes and their different categorizations, it is important to specify which learning outcomes are focused on the development of critical thinking. Put simply, these are learning outcomes that explain in a clear, concise and measurable way the elements of critical thinking competency that we as teachers develop in our students. Teaching that focuses on developing students' critical thinking – teaching for critical thinking – entails learning out-

comes at all levels of achievement (from remembering to creating in the cognitive domain; from perceiving to creating in the psychomotor domain; from receiving to internalizing in the affective domain). For example, to develop critical thinking competency the students will be able to do the following after active participation in class (formulated by learning outcomes in the table below).

Examples of learning outcomes focused on the development of critical thinking		
Cognitive domain (knowledge and cognitive skills domain)	Psychomotor domain (psychomotor skills domain)	Affective domain (values and attitudes domain)
The student extracts key information about the topic. *The student distinguishes between correct and incorrect information.* *The student distinguishes between reliable and unreliable sources of information.* *The student discusses the topic in an argumentative way.* *The student evaluates the effectiveness of the steps to carry out a specific action.* *The student structures the information into a meaningful whole.* *The student lists advantages and disadvantages.* *The student leads the discussion.* *The student actively listens to the discussion partners and asks questions for further discussion.* *The student formulates a discussion question.* *The student makes decisions based on justified reasons.* *The student creates a vision and proposes solutions.* *The student argues his/her decision*	*The student performs an alternative step in the execution of a certain action in order to achieve better efficiency.* *The student adapts the execution of the action in view of the new circumstances.* *The student notices an unnecessary step in the action and skips it during execution.* *The student designs and implements a new way of performing a particular action.* *The student uses equipment and tools for alternative purposes.* *The student innovates the practice.* ...	*The student shows autonomy in carrying out activities.* *The student shows openness to other ideas.* *The student shows enterprise in their work.* *The student forms their own opinion on the topic.* *The student justifies their own opinion on the topic.* *The student defends their own views on the topic.* *The student criticizes different views on the topic.* *The student respects the opinions of others on the topic.* *The student promotes tolerance and non-discrimination.* *The student actively improves the status and reputation of their profession.* ...

Application in vocational education and training: examples

With the aim of a clearer presentation of learning outcomes focused on the development of critical thinking as a dimension of teaching for critical thinking in the context of VET, the following text presents concrete learning outcomes related to the selected teaching unit of a specific module/subject of the selected sector in the field of VET.

Example 1:

Sector: Forestry and wood technology		
Qualification/profession: Woodworking technical designer		
2nd grade		
Subject: Materials		
Learning content (topic/unit): Bird house		
Learning outcomes:		
Cognitive domain	Psychomotor domain	Affective domain
Examples of learning outcomes from the vocational curriculum for the profession of woodworking technician designer[5]		
The student will be able to describe the technological process of drawing, cutting solid wood, making joints, drilling holes and assembly methods.	*The student will be able to assemble the toy by gluing and pressing.*	*The student thinks critically independently.*
Examples of additionally designed specific learning outcomes aimed at the development of critical thinking, that the vocational teacher can specify and adapt to the needs of the respective class		
The student will be able to determine the advantages and disadvantages of a particular technological process.	*The student will be able to design and make a toy by gluing and pressing.*	*The student shows autonomy in carrying out the activity of assembling the toy.*

5 Available at official website of the Agency for Vocational Education and Training and Adult Education https://www.asoo.hr/obrazovanje/strukovno-obrazovanje/kurikulumi-nastavni-planovi-i-programi/sumarstvo-prerada-i-obrada-drva/ (11 January 2024.)

Example 2:

Sector: Agriculture, food and veterinary medicine		
Qualification/profession: Assistant florist		
2nd grade		
Subject / Module: Use and maintenance of flowering species		
Learning content (topic/unit): Flower harvesting of flowering species, Drying methods and procedures for flowering species		
Learning outcomes:		
Cognitive domain	Psychomotor domain	Affective domain
Examples of learning outcomes from the vocational curriculum for the profession of assistant florist[6]		
The student will be able to describe the flower harvesting procedure of individual flowering species with the teacher's assistance.	*The student will be able to carry out the preparation of flowers of flowering species for drying under the teacher's supervision.*	/
Examples of additionally designed specific learning outcomes aimed at the development of critical thinking, that the vocational teacher can specify and adapt to the needs of the respective class		
The student will be able to justify the selection of a specific flower harvesting procedure for individual flowering species.	*The student will be able to carry out the preparation of flowers of flowering species for drying in different circumstances.*	*The student will be able to express his/her opinion on the importance of a positive attitude towards greenery.*

In Example 2, it is evident that the learning outcomes of the selected vocational curriculum emphasize the cognitive and psychomotor domains, while those related to the affective domain are noticeably absent. It is commonly observed that in (vocational) education, the primary focus is placed on the development of students' knowledge and skills, while the cultivation of their positive personal traits, values, and attitudes remains implicit—often occurring incidentally or even unintentionally. Conse-

6 Available at official website of the Agency for Vocational Education and Training and Adult Education https://narodne-novine.nn.hr/eli/sluzbeni/2024/142/pdf (3 May 2025.)

quently, it is essential that vocational teachers critically reflect on, explicitly define, and deliberately and consistently integrate the formative dimensions of their teaching practice. In this context, even when affective learning outcomes are not formally included in the curriculum, it remains the responsibility of VET teachers to design, implement, and assess such outcomes. The goal is the holistic development of students—not only as competent professionals equipped with the necessary knowledge and skills, but also as individuals who embody the values, attitudes, and personal integrity that define both good professionals and good human beings.

Example 3:

Sector: Mechanical engineering, shipbuilding and metallurgy		
Qualification/profession: Shipbuilding technician		
3rd grade		
Subject: Construction and strength of the ship		
Lesson content (topic/unit): Partitions, partitioning of the ship		
Learning outcomes:		
Cognitive domain	Psychomotor domain	Affective domain
Examples of learning outcomes from the vocational curriculum for the profession of shipbuilding technician[7]		
The student will be able to list the procedures for testing the tightness of partition walls.	*The student will be able to measure and remove sheet metal from shop drawings.*	*The student develops a tolerant attitude towards others.*
Examples of additionally designed specific learning outcomes aimed at the development of critical thinking, that the vocational teacher can specify and adapt to the needs of the respective class		
The student will be able to assess the procedures for testing the tightness of partition walls.	*The student will be able to measure sheet metal using alternative measurement methods.*	*The student shows tolerance towards others.*

7 Available at official website of the Agency for Vocational Education and Training and Adult Education (11 January 2024.)

Reflection

Consider the following learning outcomes and answer the questions:

The student will have a positive attitude towards flowers and green plants.
The student shows tolerance towards others.

1. Are the above learning outcomes well formulated? Why?
2. Are the stated learning outcomes clear, precise and measurable? Explain.

Consider the following learning outcome and answer the questions:

The student will be able to state the application of each partition depending on the type of load.

1. Is the stated learning outcome well formulated? Why?
2. Which domain and which level of student achievement is expressed by the stated outcome?
3. Do you think that the level of student performance can be raised for the stated learning outcome? Explain.

Space for your ideas

Critical approach to lesson content

Vocational teachers on critical approach to learning content

When I show them how to draw blood from a particular animal, I always try to get them to figure out for themselves why it is important to wear gloves, why it is important to disinfect the injection site, and what could happen if this is not done.

If our goal is for the patient to be able to sit independently, then we now want to find out what we need to do with him so that he can sit independently, with the help of some kind of analysis. Then it's necessary to refresh our students' memory from many subjects so that they can come up with the solution themselves (...) We don't give them the answer. Let's say, working in a group, if they can't work it out themselves, then I bring another student into the patient's room: Come on, what would you do here and now? Through this discussion with me and their classmates in the group, they then come up with the solution themselves. I think they remember it much better than if they just learn everything by heart. It happens very often that a student says to me: "So, teacher, now I understand what you were talking about in theory."

Introduction

A critical approach to lesson content is a dimension of teaching for critical thinking that is most closely linked to the dimension of learning outcomes aimed at developing critical thinking. A critical approach to the lesson content means going beyond the mechanical reproduction and involves actively co-creating the lesson content:

- ✓ By extracting and distinguishing essential from non-essential content
- ✓ By extracting and distinguishing correct from incorrect information
- ✓ By recognizing reliable and unreliable sources of information
- ✓ By interpreting content from different perspectives, respecting different contexts
- ✓ By connecting different content and recognizing similarities and differences
- ✓ By evaluating the lesson content
- ✓ By innovating the lesson content

It is important to emphasize that the lesson content is critically considered and actively shaped by both the teacher and the student. When we speak in terms of reproducing the content, we can say that when teaching for critical thinking, 'only' essential information is reproduced.

A critical approach to lesson content involves the application of various critical thinking strategies. Some of them, which are suitable for use in vocational education and training, are presented and described below.

Critical thinking strategies	
Strategy	Description
Asking open questions	Critically engaging with the lesson content by asking open questions about the content. The characteristics of open questions include: ✓ Focusing on multiple answers and correct solutions ✓ Encouraging communication ✓ Opening a discussion on a topic

continued

Extracting essential information	Critically engaging with the lesson content by extracting essential information. It is important to answer the question: What is important and why is it important? The criteria for determining essential information relate to: ✓ What makes something what it is? ✓ What answers the most important questions? ✓ What is fundamental, what forms the central content of the topic? ✓ What is part of the general structure (skeleton of the topic)? ✓ What is useful?
Comparing information and determining their relationship	Critically engaging with the lesson content by determining the similarities and differences of a particular lesson content with the selection of a clear criterion for comparison.
Evaluating information	Critically engaging with the lesson content by identifying the advantages and disadvantages of a particular lesson content with the selection of a clear evaluation criterion.
Imagining possible situations	Critically engaging with the lesson content by imagining possible situations and the consequences of these imaginary situations. Questions that guide the activity of imagining possible situations are, for example: ✓ *What would happen if ...?* ✓ *What would happen if there were no...?* ✓ …
Viewing information from different perspectives	Critically engaging with the lesson content by looking at it from different perspectives.
Recognising problems and developing different solutions	Critically engaging with the lesson content by recognising problems and developing different solutions.
Transferring	Critically engaging with the lesson content by transferring information to everyday and work situations.

It is important to emphasize that vocational teachers evaluate and choose which and how many critical thinking strategies to use in the classroom, and the choice depends on the topic they

are covering, the students they are working with, etc.

Application in vocational education and training: examples

With the aim of providing a clearer picture of the critical approach to teaching content as a dimension of teaching for critical thinking in the context of VET, the following text presents the application of the strategy of open questions and the strategy of recognising problems and developing different solutions in a selected teaching unit of a specific module/subject of a selected sector in the field of VET.

Sector: Health and social care
Qualification/profession: Physiotherapeutic technician
1st grade
Subject: Introduction into rehabilitation
Lesson content (topic/unit): medical rehabilitation
Learning outcomes: *After active participation in class, students will be able to:* ✓ *explain medical rehabilitation*[8] ✓ *define and differentiate rehabilitation aids*[9] ✓ *formulate an open question on the topic of medical rehabilitation*[10] ✓ *work out a solution and develop an alternative means of rehabilitation*[11]

continued

8 Learning outcome from the vocational curriculum

9 Learning outcome from the vocational curriculum

10 Additionally designed specific learning outcome aimed at developing students' critical thinking

11 Additionally designed specific learning outcome aimed at developing students' critical thinking

Application of the strategy of open questions as a strategy of critical approach to lesson content:

The strategy of open questions can be applied to the topic of medical rehabilitation in such a way that, starting from basic information on the topic of medical rehabilitation, open questions on the topic are asked, such as:

- *Why is medical rehabilitation considered a humane branch of medicine? What does this mean?*
- *Why is it important to use the patient education method in medical rehabilitation?*

Applying the strategy of recognising problems and developing different solutions as a strategy of critical approach to lesson content:

The strategy of recognising problems and developing different solutions can be applied to the topic of medical rehabilitation in a way that attempts to identify a problem related to the topic – for example: a physiotherapist may lack rehabilitation equipment (e.g. dumbbells) in their work environment. Questions can be asked such as - *What can a physiotherapist do constructively in this situation? How can they solve this problem?*

After the question has been asked, several solutions can be found. One solution may be for the physiotherapist to design and make alternative tools for the job – in this case, an alternative tool to dumbbells may be a half-litre plastic bottle filled with sand. Finally, some solutions can be put into practise.

Reflection

Can every teaching content be approached critically? Explain. Give examples.

Space for your ideas

Active teaching methods and organisational forms of teaching

Vocational teachers on active teaching methods

So, there's a point where you can't just teach students theoretically and with symbols, because it's one thing if I draw a symbol on the board, say a 3 by 2 manifold (...) he just doesn't see it in his head. But if he takes this 3 by 2 manifold and puts it on the pneumatic board and connects the pipes and sees how it works, then it's very interesting for him.

Everyone said, "Just do frontal teaching, that's the safest way," but I said, "Okay, but..." And I went with the buzz groups, and that's probably my favourite idea that I've implemented.

Introduction

The elaboration of the critical approach to teaching content as a dimension of teaching is followed by the elaboration of the dimension of active teaching methods and organisational forms of teaching. It should be emphasized that in contrast to the dimension of the critical approach to teaching content, which is made explicit through critical thinking strategies that provide general guidelines for the approach to the design of teaching content, active teaching methods and organisational forms of teaching

represent the way in which all (critically) designed teaching content can be presented (teaching methods) and in which all kinds of interaction between teacher and students take place (organisational forms of teaching).

Active teaching methods refer to different ways of presenting lesson content in which both the teacher and the students are actively involved. Active organisational forms of teaching refer to forms of two-way/multidirectional interaction established between the teacher and the students during teaching/learning and between the students themselves, as well as their explicit active relationship and level of independence towards the teaching content.

Active teaching methods and organisational forms of teaching as a dimension of teaching for critical thinking therefore include (a) the use of different teaching methods, from the method of oral presentation and conversation to various active learning and teaching techniques such as brainstorming and role-playing; (b) the use of different organisational forms of teaching, from frontal and individual to cooperative forms of work (pair work, group work, team work). The dimension of active teaching methods and organisational forms of teaching also refers to the design and innovation of teaching in this sense. Some of the teaching methods suitable for use in VET are presented and described below.

Think is an active teaching method that stimulates students' activity in the simplest and most basic way. The teacher asks the students to think about a particular lesson content before giving them ready-made information about the lesson content. Students do not have to be asked to always verbalize and/or share their thoughts on the topic with the group, but only to record their thoughts individually.

The conversation method is an active teaching method in which the teacher does not give the students ready-made information but asks them questions about the lesson content so that the students can find the answers themselves. In this way, the activity of the students is achieved, and their involvement is ensured during the teaching process. It also builds on the students' prior knowledge and encourages the development of new ideas, different perspectives, etc. when dealing with the lesson content.

The problem-solving method is an active teaching method in which the teacher formulates a problem relating to a specific lesson content, which the students then attempt to solve independently. The process of independent problem solving can take place individually, in pairs, in a group or in a team. The teacher is the facilitator of the process. Problem solving includes the phases of exploring possible solutions, searching for and selecting the optimal solution and its final implementation. Artificial intelligence tools (e.g. Chat GPT) can also be used to develop different solutions. It is important that it is explicitly mentioned that the tool has been used and that the solutions are critically considered and further evaluated.

The discovery method is an active teaching method in which the teacher formulates a research question on a specific lesson content. The students arrive at an answer independently (individually, in pairs, in a group or in a team) through research and discovery. The process of arriving at an answer involves the following steps: Determining the research plan and methods, collecting data and formulating a hypothesis, analysing the data, refuting or confirming the hypothesis, presenting the results.

Application in vocational education and training: examples

Sector: Health and social care
Qualification/profession: Physiotherapeutic technician
1st grade
Subject: Introduction into rehabilitation
Lesson content (topic/unit): medical rehabilitation
Learning outcomes: *After active participation in class, students will be able to:* ✓ *explain medical rehabilitation*[12] ✓ *define and differentiate rehabilitation aids*[13] ✓ *formulate an open question on the topic of medical rehabilitation*[14] ✓ *work out a solution and develop an alternative means of rehabilitation*[15]
Applying the strategy of recognising problems and developing different solutions as a strategy of critical approach to lesson content: The strategy of recognising problems and developing different solutions can be applied to the topic of medical rehabilitation in a way that attempts to identify a problem related to the topic – for example: a physiotherapist may lack rehabilitation equipment (e.g. dumbbells) in their work environment. Questions can be asked such as - *What can a physiotherapist do constructively in this situation? How can they solve this problem?* After the question has been asked, several solutions can be found. One solution may be for the physiotherapist to design and make alternative tools for the job – in this case, an alternative tool to dumbbells may be a half-litre plastic bottle filled with sand. Finally, some solutions can be put into practise.

continued

12 Learning outcome from the vocational curriculum

13 Learning outcome from the vocational curriculum

14 Additionally designed specific learning outcome focused on developing students' critical thinking

15 Additionally designed specific learning outcome focused on developing students' critical thinking

Application of the problem-solving teaching method:

The teacher presents the students with a problem: the physiotherapist lacks work equipment (e.g. dumbbells).

The students are given a sheet of paper with the following table on it:

<table>
<tr><td colspan="4">Problem: The physiotherapist lacks working aids (e.g. dumbbells).</td></tr>
<tr><td colspan="2">Solution 1</td><td colspan="2">Solution 2</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>Advantages</td><td>Disadvantages</td><td>Advantages</td><td>Disadvantages</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">Optimal solution:</td></tr>
<tr><td colspan="4">Argumentation: I chose the optimal solution because...</td></tr>
</table>

Students find two solutions to the given problem, then state the advantages and disadvantages of each solution and finally decide on a particular solution, giving reasons for their choice.

Reflection

Do you think the oral presentation method is a teaching approach that promotes critical thinking? Give reasons for your answer.

Do you think it is justified to sometimes use artificial intelligence tools, such as Chat GPT, in the classroom? Explain your answer. List the possible advantages of using artificial intelligence in the classroom. Name the possible disadvantages of using artificial intelligence in the classroom.

Space for your ideas

Active assessment methods

Vocational teachers on active assesment methods

(...) Students need a very long time if they have not come into contact with self-assessment, peer assessment or criterion assessment, it takes a very long time for them to understand what it is all about, namely not that we all have an A and maximum points.

I don't give theory (…) I give application in the exam, these are tasks that you have to solve logically, minimize, draw a circuit, write a table and things like that. And then the other day a student asked me: "Teacher, is there any theory in your exam?" I replied: "What's the point of theory, son, if you can't apply it? It's better if we go for a walk instead."

Introduction

The dimension of teaching for critical thinking that involves active assessment methods refers to methods of evaluating and grading student performance that actively involve students as well as teachers. Assessment approaches include assessment for learning, assessment as learning and assessment of learning. The following table provides a brief overview of these approaches with examples of assessment.

APPROACHES TO ASSESMENT		
FORMATIVE ASSESMENT		SUMATIVE ASSESMENT
ASSESSMENT FOR LEARNING	ASSESSMENT AS LEARNING	ASSESSMENT OF LEARNING
It refers to the involvement of students in the assessment of their own learning process with the aim of raising students' awareness of the progress made and competencies acquired so far. Students are expected to use feedback from the teacher/mentor to improve their work, develop the necessary competencies and take responsibility for their own learning process. Example: Qualitative oral or written feedback from the teacher/mentor on the task that the student has completed. Activity 1: Two roses and a thorn (After working through the lesson content, the students write down two pieces of information/concepts/ ideas that they have understood and one that is still unclear to them. Activity 2: Practical work of the students (e.g. students make a bridal bouquet, the teacher observes the practical work and gives specific feedback during the making of the bouquet to improve this process).	It involves students in the assessment process so that they learn to think critically, i.e. to develop critical thinking competency. In this process, it is important to involve students in various forms of assessment so that they can eventually give and accept constructive criticism for the purpose of their own progress and the progress of others. Example: Evaluation of teachers and teaching, mentors and work-based learning, self-evaluation and peer evaluation. Activity 1: Student portfolio (students collect materials about their own work and progress and record and self-assess their own progress). Activity 2: Peer evaluation sheet (students evaluate each other's work based on given criteria)	It includes checking whether the defined learning outcomes have been achieved, i.e. determining the level of achievement. Example: Checking whether the specified learning outcomes have been achieved, where a grade is the final result of the examination Activity 1: Written or oral assessment (students take a written or oral assessment of the lesson content through objective or essay-type tasks) Activity 2: Project assignment (students are given a project to work on over a period of time and produce a report or presentation of the results)

Assessment for learning enables students and teachers to continuously manage the learning and teaching process, which has an impact on the effectiveness of the teaching process, but also on the motivation and self-confidence of students and teachers. Also, in the context of teaching for critical thinking, assessment for learning promotes the development of skills for managing the learning and teaching process, thus encouraging students and teachers to reflect critically on the effectiveness of their own learning and teaching. Assessment as learning involves the active role of students in the assessment process, whereby students develop critical thinking competencies through peer assessment, self-evaluation and evaluation of teaching. On the other hand, teachers are required to evaluate their own work in addition to evaluating students' work, promoting the idea of a reflective practitioner who should continuously and critically evaluate their work in order to improve it. Ultimately, the assessment of learning makes it possible to check the learning outcomes achieved, i.e. to determine the performance level of the students which leads to a grade.

Active assessment methods respond to the needs expressed in the previous dimensions of teaching for critical thinking. Consequently, it is necessary to reiterate the importance of appropriately defined learning outcomes that should guide the whole teaching process. Well-articulated learning outcomes that clearly and measurably express the elements of competencies that teachers need to develop in students should be aligned with the teaching content, the teaching methods and the organisational forms of teaching used, as well as the assessment methods. This process of coordination is called *constructive alignment*. Constructive alignment enables the teacher to successfully plan the teaching process that will contribute to the realization of the established learning outcomes. In this sense, and in the context of teaching for critical thinking, the starting point is the idea that

it is important above all to set learning outcomes in a way that encompasses different levels of achievement in all domains of learning outcomes (cognitive, psychomotor and affective). This results in a focus on a critical approach to the content, the use of active methods and organisational forms of teaching and, finally, active methods for assessing the defined learning outcomes. Consequently, it is clear that the assessment of what has been learned (summative assessment), which leads to a grade, is not sufficient for a comprehensive performance assessment, which becomes particularly clear in connection with the assessment of learning outcomes in the affective domain. In this sense, assessment in the context of teaching for critical thinking certainly implies both assessment for learning and assessment as learning (formative assessment).

To provide a clearer picture of some active assessment methods in the context of teaching for critical thinking, the following are examples of critical thinking development tasks, an example of evaluation of teaching and teachers' work, and teachers' self-evaluation.

Examples of critical thinking development tasks
Indicate the meaning of process X.
Compare X and Y according to criterion C.
Name the features in which X and Y differ.
Name the characteristics in which X and Y are similar.
Name the advantages of using tool X.
Name the advantages of using tool X compared to tool Y.
Name the disadvantages of using tool X.
List the ways in which the disadvantages of tool X can be overcome.
Describe how the implementation of tool X can be adapted to the circumstances of Y.
Make a decision about X.
Justify the decision in favour of X.
Design a new way of working in X.
…

Evaluation of teaching and teachers' work	
Criterion	**1 – Not at all; 2 – Mostly not; 3 – Partly no, partly yes; 4 – Mostly yes; 5 – Completely yes**
The teacher presents the lesson content in a clear and structured way.	1 2 3 4 5
The teacher presents the lesson content in an interesting way.	1 2 3 4 5
The teacher gives useful examples of real-life situations to better explain the purpose of the teaching content.	1 2 3 4 5
The teacher creates a stimulating and cooperative atmosphere in the classroom. …	1 2 3 4 5

Teachers' self-evaluation	
Criterion	**1 – Not at all; 2 – Mostly not; 3 – Partly no, partly yes; 4 – Mostly yes; 5 – Completely yes**
When preparing and conducting lessons, I extract key information and interpret the lesson content in a clear and structured way.	1 2 3 4 5
When preparing and conducting lessons, I use examples from professional practice, link the lesson content with other subjects and with the requirements and dynamics of the labour market.	1 2 3 4 5
I encourage students to question the efficiency of work processes.	1 2 3 4 5
I encourage students to propose informed and well-argued possible solutions to practical problems.	1 2 3 4 5
I use a variety of teaching methods (from oral presentation methods and discussions to various active learning and teaching techniques such as brainstorming and role-playing).	1 2 3 4 5
I use different organisational forms of teaching in my lessons (from frontal and individual work to cooperative forms of teaching).	1 2 3 4 5

continued

I use different methods to assess students' performance (objective tasks, essay tasks, project tasks, practical tasks, etc.).	1 2 3 4 5
I use collaborative assessment (students assess each other's work). …	1 2 3 4 5

Application in vocational education and training: examples

In order to contextualize active assessment methods for VET, it is necessary to return to the example of additionally designed learning outcomes aimed at developing critical thinking, presented in the chapter *Learning outcomes aimed at developing critical thinking.*

Sector: Forestry and wood technology		
Qualification/profession: Woodworking technical designer		
2nd grade		
Subject: Materials		
Learning content (topic/unit): Bird house		
Learning outcomes:		
Cognitive domain	Psychomotor domain	Affective domain
Examples of additionally designed specific learning outcomes aimed at the development of critical thinking, that the vocational teacher can specify and adapt to the needs of the respective class		
The student will be able to determine the advantages and disadvantages of a particular technological process.	*The student will be able to design and make a toy by gluing and pressing.*	*The student shows autonomy in carrying out the activity of assembling the toy.*

Assessment of learning outcomes in the cognitive domain: *The student will be able to determine the advantages and disadvantages of a particular technical procedure.*

The assessment of this learning outcome can be approached in

different ways. A simple example of the assessment of learning can be a written exam to check the achievement of this learning outcome. The following examples of tasks may appear in the written examination.

Example 1: Assessment of learning: Written exam

Essay task:

Explain how drawing plans contributes to the efficiency and accuracy of woodworking projects. Give examples of situations where detailed plans are essential.

Explain how the choice of type and size of drill can affect the functionality and aesthetics of woodworking projects.

Objective tasks:

What is the advantage of using electric saws compared to hand saws when cutting solid wood?

A) Greater speed and precision

B) Less risk of injury and lower costs

C) Greater flexibility and less noise

D) Better control and easier maintenance

What is the advantage of using pocket joints over conventional gluing and clamping methods in woodworking projects?

A) Higher strength and stability of the joint

B) Faster construction and less need for quality glue

C) Aesthetic appearance and traditional value

D) Greater flexibility and adaptability during assembly[16]

...

16 The examples of exam tasks were formulated with the help of ChatGPT. Tools such as ChatGPT can be used for evaluation purposes, but the teacher must approach the generated questions critically and always keep the defined learning outcomes in mind. The teacher can also use this tool in such a way that the students try to compose a short exam using ChatGPT and then evaluate the formulated questions using ChatGPT, some of which may then be included in the final version of the exam.

In addition, teachers can evaluate the stated learning outcome in such a way that they want to give the students feedback on their work (assessment for learning). In this context, the teacher can use the following worksheet, which the students first solve independently and then discuss together with the teacher.

Example 2: Assessment for learning: worksheet

Introduction: Patrick and Roberto both want to build a birdhouse. They have all the necessary materials at their disposal and start building. While they are building the birdhouse, they make different decisions. Your task is to read their decisions carefully, note down your comments on their decisions and finally evaluate how successfully Roberto and Patrick have completed their task.

1. Patrick starts drawing his birdhouse idea, while Roberto decides to get to work right away because he estimates that drawing is not necessary since making the birdhouse is a simple task. How might this decision by Roberto affect the further process of making the birdhouse? Explain.

2. Patrick and Roberto are in a carpenter's workshop sawing solid wood for a birdhouse. Roberto puts a protective cap on the dividing wedge of the circular saw, but Patrick does not. What could happen to Patrick in this case? Explain.

3. When making the joints for the house, Roberto decides to use a saw blade 160X2, 4X20 with 12 teeth, while Patrick takes a concave saw with a negative tooth inclination. Which of these saws is the better choice and why?

4. Patrick drilled several small holes in the bottom of the birdhouse, and the main hole was drilled 3 cm from the bottom of the house, while Roberto drilled the main hole 10 cm from the bottom of the house and did not drill any small holes in the bottom of the house. How might Patrick and Roberto's decisions in this case affect their outcome?

In relation to the assessment of learning outcomes in the psychomotor and affective domains - *the student will be able to design and make a toy by gluing and pressing, and the student shows autonomy in carrying out the activity of assembling the toy* - the teacher can also decide on the assessment methods to use. For example, the teacher may use the technique of observing the work process to assess the student in making a birdhouse. For this purpose, the teacher uses rubrics during the observation to evaluate the fulfilment of the given criteria. Rubrics can be used both as assessment for learning and as assessment of learning. The following is a rough example of assessment using rubrics, which needs to be elaborated in more detail with regard to the individual stages of making a birdhouse. The better the rubrics are developed (each representing a specific stage of a process), the easier it will be to describe the criteria for each stage. Accordingly, in the following rough example, it is possible to divide one criterion into two criteria for the third criterion of *precision in cutting materials and assembling the birdhouse: Precision in cutting materials and precision in assembling a birdhouse.* Depending on the complexity of the process, but also on the learning outcome to be assessed, the vocational teacher should decide independently which assessment criteria should be elaborated through rubrics. The dimensions of the rubric criteria generally range from 1 – the student is not yet able to carry out the activity - to 5 – the student is able to carry out the activity independently and at a high level.

Example 3: Assessment for learning or assessment of learning: Rubrics

Making a birdhouse	1	2	3	4	5
Choosing the work materials	The student is not able to choose a material to work with, to present the characteristics of the material and its advantages and disadvantages, even with additional encouragement from the teacher.	The student can choose a material to work with and briefly present the characteristics of the material and some of its advantages and disadvantages, with considerable encouragement from the teacher.	The student can choose a material to work with and briefly present the characteristics of the material as well as some of its advantages and disadvantages with additional support from the teacher.	The student can independently choose the material to work with and briefly describe the characteristics of the material and explain various advantages and disadvantages of the working material.	The student can independently choose the material to work with and present in detail the characteristics of the material and all the advantages and disadvantages of each material.

continued

Selection and preparation of woodworking machines	The student does not recognize the difference between woodworking machines and is unable to select a suitable machine or prepare it for work, even with additional encouragement from the teacher.	The student can recognize the difference between woodworking machines and can select a suitable machine and prepare it for work with considerable additional support from the teacher.	The student can recognize the difference between woodworking machines and, with additional support from the teacher, can select the appropriate machine and prepare it for work.	The student can independently recognize the difference between machines by explaining the general difference in the use of woodworking machines and can select and prepare a suitable machine for work.	The student can independently recognize the difference between woodworking machines, explain the various advantages and disadvantages of the individual machines and accordingly select a suitable machine and prepare it for work.
Precision in cutting materials and assembling the birdhouse	The student cannot cut the material precisely and is unable to assemble the birdhouse even with additional support from the teacher.	The student can cut the material with greater inaccuracy and assemble the birdhouse with considerable additional support from the teacher.	The student can cut the material relatively accurately and assemble the birdhouse with sporadic additional support from the teacher.	The student can cut the material to size and assemble the birdhouse independently, although there may be minor inaccuracies.	The student can independently and very precisely cut the material and assemble the birdhouse.

continued

In addition to the active assessment methods mentioned above, the teacher can involve all students in the process of assessing the birdhouse construction by conducting collaborative assessment. Each student is given one or more birdhouses to evaluate according to the given assessment criteria.

Example 4: Assessment as learning: Peer assessment form

Making a birdhouse: Peer assessment	
Name and surname of the student whose work is being assessed: Name and surname of the evaluating student:	
Criterion:	**1 – Not at all; 2 – Mostly not; 3 – Partly no, partly yes; 4 – Mostly yes; 5 – Completely yes**
The birdhouse has all the necessary parts, which are placed in a suitable position (roof, all sides, main hole and smaller holes at the bottom of the house...)	1 2 3 4 5
All parts of the birdhouse are precisely cut, glued and assembled, giving the birdhouse a clean appearance.	1 2 3 4 5
The birdhouse is characterised by creative and alternative solutions that do not compromise the functionality of the house.	1 2 3 4 5

Example 5: Assessment as learning: Self-assessment form

Making a birdhouse: Self-assesment			
Claim	☺	😐	☹
I recognize different types of materials for making a birdhouse.			
I know how to choose the right material to make a birdhouse.			
I can precisely cut, glue, and assemble a birdhouse.			
I can make a birdhouse that is carefully built and neatly finished.			
I am interested in the process of making a birdhouse.			

Reflection

Choose some learning outcomes within your module/subject and write down how you assess these learning outcomes. Then think about the following:

- ✓ Are the assessment criteria clearly explained to students?
- ✓ Do students understand the methods and purpose of the assessment method used?
- ✓ Does this assessment method allow me flexibility in assessing student progress?
- ✓ Does this assessment method allow me to reliably assess the learning outcomes achieved?
- ✓ Are there other assessment methods I can use to get a clearer picture of students' current level of competence?

Space for your ideas

Critical action

Vocational teachers on critical action:

They ask, they ask, here's an example, they come from their practice (at the hospital) and say (...) "You told us not to touch blood units without gloves, but they drew blood all morning without gloves, so we told them: Put your gloves on."

(...) we also do assignments, for example the students have to program a system as they wish, so design a system (...) that helps for example an elderly person who lives alone in a household (...) they have programmed it now, some bracelets that monitor the heart rate and notify the doctor if something is wrong, or a family member (...) and in this way we try to give them a connection to real life.

Introduction

In a general sense, critical action encompasses various activities that individuals carry out after critical reflection in their environment in order to solve certain perceived problems in the community. If critical action is transferred to the field of education and considered as one of the dimensions of teaching for critical thinking, it involves perceiving and responding to a specific problem in the environment that is related to the lesson content. Therefore, the idea is that students, in collaboration with teachers, identify a specific problem in the environment, create

a vision and propose solutions related to the lesson content, then choose the best solution and justify this choice, and finally carry out activities in the environment and the community. In VET, critical action refers on the one hand to learners' own initiative in relation to their own employability and self-employment, and on the other hand to their own initiative in challenging the status quo in the professional and wider social environment. Therefore, the idea of critical action in VET should enable students and teachers to better understand the connections between their own professional practice and the social and cultural context and to improve and innovate their own work and the work of the organization in which they will work in the future.

Below is a template that shows the steps for applying critical action in teaching.

CRITICAL ACTION
STEP 1 Identify a problem in your environment. Write down the identified problem in the form of a clear statement.
PROBLEM:
STEP 2 Work out possible solutions to the identified problem.
SOLUTION 1: SOLUTION 2: SOLUTION 3:
STEP 3 Choose the best solution. Give reasons for it.
CHOSEN SOLUTION: THE SOLUTION WAS CHOSEN FOR THE FOLLOWING REASONS 1: 2:
STEP 4 Implement the selected solution

continued

STEP 5
After implementing the solution, carry out evaluation and reflection.

Application in vocational education and training: examples

To carry out the critical action, students can be divided into teams in which each team member should have a specific, independent role and should also participate in all joint team activities. Students start by identifying problems that may be closely related to their direct experience in professional practice (e.g. during practice in a hospital, students have noticed that nurses do not wear protective gloves when drawing blood), more general problems in their profession (how to apply the principles of good agricultural practice and sustainable development), problems related to future self-employment (students have noticed that they do not have sufficiently developed IT skills that they could use for self-marketing on the job market) and the like.

Let us assume that the students are dealing with the topic of good agricultural practice and sustainable development and that the teacher wants the students to become active in their local community through critical action.

CRITICAL ACTION : Good agricultural practice and sustainable development
STEP 1 Identify a problem in your environment. Write down the identified problem in the form of a clear statement.
PROBLEM: There is a small plot of land near the agricultural school that no one takes care of, it is neglected and detracts from the appearance of the school, most of whose surroundings are beautifully landscaped and well used for school gardens.
STEP 2 Work out possible solutions to the identified problem.

continued

SOLUTION 1: It is necessary to form a team of students and teachers and start landscaping the plot. The plot needs to be cleared, ornamental plants planted, and seating furniture purchased so that students can spend time in the garden.

SOLUTION 2: It is necessary to form a team of students and teachers and start landscaping the plot. The plot must be cleared and turned into a garden with herbs from which the students can make various cosmetic preparations.

SOLUTION 3: It must be checked whether the school or another person is the owner of the land in question. Once the owner is identified and agrees, the land should be cleared and turned into a garden with flowering edible plants that will attract bees to pollinate the plants grown in the school gardens. Seating furniture should also be built from pallets so that students can spend time in the garden.

STEP 3

Choose the best solution. Give reasons for it.

CHOSEN SOLUTION: SOLUTION 3

THE SOLUTION WAS CHOSEN FOR THE FOLLOWING REASONS:

1: It is important to clarify the ownership of the land before starting landscaping, otherwise students and teachers may have undesirable problems with unhappy owners.

2: Since bees and other insects are important for pollinating other plants around the school, it is necessary to create such a garden and thus ensure the sustainability of the entire school garden.

3: As the students want to have a place in the garden where they can spend time, they will make seating furniture from the pallets available to them and in this way not invest large additional resources.

STEP 4

Implement the selected solution

continued

1. Find the property on the land register and cadastre portal and identify the property owner 2. Agree with the landowner how the plot is to be landscaped 3. Organize the cleaning of the plot 4. Design and draw a plan for the layout of the plot 5. Procure plants for planting (buy, transplant, etc.) 6. Procure the necessary tools, paints and brushes for the design of the pallets …
STEP 5 After implementing the solution, carry out evaluation and reflection.
What are the concrete results of the critical action? What obstacles/challenges did you encounter during the implementation of the critical action? How were the obstacles/challenges overcome? Did all team members participate equally in the implementation of the critical action? Who is responsible for maintaining the plot in the long term? …

Reflection

Think about issues that could be addressed through critical action and write them down.

What benefits and challenges do you see in engaging students in critical action within these topics? List them.

For which of the issues listed do you see that critical action could be implemented without an excessive investment of time and resources, with a potentially powerful impact on students and the community?

Space for your ideas

Democratic classroom atmosphere

Vocational teachers on democratic classroom atmosphere:

> *So, I also need to know my boundaries, but what we agree on, we should stick to. That way it will be easier, nicer, we will get better results, and when we meet again one day, we will remember these moments with joy.*

> *(...) developing these work habits is extremely important because they enter the labour market at the age of eighteen (...) I think that part is really, really, really important, teaching them responsibility, teaching them to tolerate discomfort when it occurs, because that actually teaches them for the real world of work. That's exactly the situation, here comes your boss and tells you that you didn't do something well and that you missed something, and now what? You're not going to change your apprenticeship because of it, but you learn (...) to take responsibility and learn a lesson from it and move on.*

Introduction

The dimension of a democratic classroom atmosphere represents a dimension of teaching for critical thinking that refers to the active involvement of all students in the learning and teaching process while creating an atmosphere of tolerance, cooperation and interaction without belittlement, ridicule and fear. The teacher ensures and enables students to freely discuss, ask questions and ultimately openly express their agreement (or disagreement) with the views of others. It is important to point out that this dimension of teaching for critical thinking is achieved primarily through the application of all the aforementioned

dimensions, as the critical approach to learning content, the use of active teaching methods and organisational forms of teaching, active assessment methods and the application of critical action imply that teaching takes place in a tolerant and cooperative atmosphere.

In the context of ensuring a democratic teaching (and learning) atmosphere, it should be emphasized that a vocational teacher (like any other teacher), in addition to developing students' specific competencies related to their profession and preparing them for the labour market, also has the obligation to develop some general skills and values in their students. In this sense, a vocational teacher strives to instil in his/her students a sense of responsibility, initiative, accuracy and adherence to the rules and norms of the profession, as well as cooperation and open and constructive communication with others, which are the characteristics of a democratic classroom atmosphere. In addition, the fact that certain vocational programs are not highly valued within the secondary school structure and are not attended by high-achieving students should not be overlooked. Therefore, vocational education is often associated with students with low self-esteem, limited skills and often with developmental and behavioural difficulties. Consequently, the implementation of teaching for critical thinking and thus the dimension of a democratic classroom atmosphere is a particular challenge for vocational education. A vocational teacher therefore has the task of creating a democratic classroom atmosphere, by discovering the strengths of his or her students and focusing strongly on developing their self-confidence while strengthening pride in their (future) profession.

Application in vocational education and training: examples

Achieving a democratic classroom atmosphere within work-based learning

Work-based learning involves acquiring relevant competencies for work through the active involvement of students in authentic work processes according to predetermined learning outcomes. It can take place in real working conditions with employers, where students are involved in authentic work situations and establish real business relationships with employees, or it can take place partly in an educational institution but in special classrooms or areas that simulate authentic working conditions. The idea of work-based learning is that theory is understood together with practice, i.e. students have the opportunity to reflect on theoretical content through practical work, but also the other way around. In order to achieve a democratic classroom atmosphere as a dimension of teaching for critical thinking through work-based learning, it is necessary to consider several important features of work-based learning that enable teachers and mentors to develop professional expertise as well as other relevant competences in their students (communicative, organizational, social competences) and at the same time develop the characteristics of a democratic atmosphere of teaching and learning - a sense of responsibility, autonomy, self-confidence and pride in one's profession precisely through work-based learning.

Work-based learning feature	Achieving a democratic classroom atmosphere
Task-oriented	In work-based learning, students should be given specific tasks to work on. The tasks should be simple at the beginning and become more complex over time. Teacher/mentor support should be more intensive at the beginning (close observation of students' work, detailed instructions on the task and demonstrations as needed) and become less intensive over time (observation of students' work and reflection on task completion). This ensures the development of students' independence in carrying out work tasks and taking responsibility first for simple and then for increasingly complex tasks.

continued

Problem-solving oriented	Work-based learning should enable students to work on solving problems from everyday work practice. Students are presented with a problem (simpler or more complex) and individually or in teams, they try to find possible solutions to the problem as well as potential risks in applying each solution. The students then select a solution and apply it in practice. Finally, they reflect on the effectiveness of the solution and any obstacles they encountered. Mentors/teachers play the role of facilitators (they present the problem and monitor the implementation of the process with additional support as needed). In this way, through their active involvement in solving simple or complex work problems, students develop a sense of self-confidence and the ability to take responsibility and risks when making professional decisions.
Innovative	Work-based learning is designed to promote students' innovative ability and creativity in their work. As practice is rapidly developing and changing in various fields, students should be enabled to apply and, more importantly, develop new techniques and approaches to meet professional challenges. This requires open and stimulating communication between mentors/teachers and students, as well as openness to students' ideas and solutions to identified challenges and critical reflection on the solutions offered. In this way, assertiveness, creativity, self-reflection and self-criticism are encouraged in the students.
Developing autonomy and self-regulation	Work-based learning should progressively encourage students to take responsibility for their own learning, not just the end result, through active participation in authentic work processes and reflection on that work. More specifically, work-based learning should take place according to predefined learning outcomes, but in an environment where mentors/teachers do not necessarily provide detailed instructions and formal training on the work process. Mentors/teachers are expected to motivate students to work by explaining the purpose and importance of each work process, monitoring their progress in developing the key competencies required for their future work and giving them concrete feedback on their assignments. This encourages students to self-reflect in the context of gaining a clear picture of their own competencies, but also to take responsibility for their own learning during their involvement in work-based learning.

continued

Improving personal performance and the performance of the work process/ organization.	Work-based learning should encourage students to improve their personal work performance, but also the performance of the work process itself in which the student is involved, and potentially the performance of the work organization as a whole. Since work-based learning should encourage students to go beyond their own basic expectations, it is expected that students will find more efficient ways to perform a task in order to improve their personal work performance, but also the efficiency of the work process and the work organization. This requires that mentors/teachers encourage students to continuously think and communicate about how their personal work, or the work of the organization can be improved and made more efficient. In this way, students develop initiative, self-confidence, thinking outside the box, norms and standards of the profession and constantly question the status quo.

Peer-to-peer teaching can be a valuable means of ensuring a democratic classroom environment, since on the one hand, students who take on the "mentor role" develop feelings of collegiality, tolerance, empathy, understanding, self-confidence and general values and skills such as taking responsibility, the importance of teamwork, communication skills, etc. On the other hand, the students who are in the position of "mentees" develop general and specific skills and values that contribute to a democratic classroom atmosphere, in addition to being provided with the support in completing tasks within the class. Peer-to-peer teaching is organized in such a way that if the teacher determines that a student or students need additional help in mastering a subject or additional motivation and support in implementing work-based learning, the teacher, in consultation with the students, determines the student(s) who will provide them with the necessary support. The following should be considered:

1. Recognise what kind of support the student(s) need(s)

2. Assess which student(s) could provide this type of support

3. Determine the methods and timing of support in consultation with the student(s)

4. In consultation with the students, determine the methods by which they can provide feedback to the teacher on the implementation of peer teaching

The teacher is responsible for coordinating this process, mediating in case of doubt and maintaining regular communication with the students.

Conducting simulated job interviews can have multiple benefits for students, both in the context of developing employability skills and in the context of developing a democratic atmosphere in the classroom. The activity can be carried out as part of the homeroom period or, if it fits into the teaching of individual vocational subjects, during the lesson itself. It can also be a specially organized activity that takes place as part of Career Day. If job interviews take place during lessons, it is desirable that they do not only take place during a single lesson, but continuously throughout the semester and/or year, so that a job interview is simulated at an agreed date and time at the beginning or end of the lesson. A simulated job interview can be organized so that the teacher interviews all students or some students take on the role of the employer and others are potential future employees who come to the interview, which makes it easier to work with larger groups and gives students the opportunity to experience both roles. Another option is for employers to conduct the interviews with the students (live or online) if there is a good working relationship with the employers. The number of students participating in the activity (all or only those who wish) and the method of evaluating the activity are determined by the teacher and the students.

A possible sequence of simulated job interviews is shown in the table below.

PREPARATION PHASE	1. The teacher prepares the roles (description of the vacancy, guidelines for employers, possible questions for the interview, criteria for evaluating the person coming for the interview, CV template, application, etc.) alone or with the students (depending on the time available) 2. Students in the role of the employer decide on the questions they want to ask about what is important to them in a prospective employee and create an assessment based on the criteria of their company/ profession 3. Students going for a job interview prepare their CV and application, study information about employers, write down questions they want to ask employers 4. An exact time is agreed for each job interview.
REALISATION PHASE	1. Students must be on time for the interview 2. The interview lasts a maximum of 15 minutes and consists of an introductory part (short introduction, questions from the employer, questions from the interviewer, greeting at the end of the interview)
EVALUATION/ REFLECTION PHASE	1. The evaluation/reflection can be done orally or in writing using a few short questions (how they felt, what they found easy during the conversation and what they found difficult, would they change anything now, in retrospect) 2. The students and the teacher who observed the interview can also reflect on the interview orally or in writing (how they experienced the employer and the person at the interview, what went well and where there is still room for improvement, whether they noticed any verbal or non-verbal peculiarities in the interview participants, etc.)

Reflection

Think about how you as a teacher can promote the development of a democratic classroom atmosphere in your daily work with students.

Do you know the different teaching styles? Research the relevant literature and consider which teaching style(s) are most prevalent in your work. Also think about whether and how teachers' teaching style and the way they manage the classroom can contribute to the development of a democratic classroom atmosphere.

Space for your ideas

Beginning

Teachers and students (…), co-intent on reality, are both Subjects, not only in the task of unveiling that reality, and thereby coming to know it critically, but in the task of re-creating that knowledge.

Paolo Freire

Having reviewed and considered the basic elements of teaching for critical thinking and its contextualization for vocational education this handbook provides; here is the Beginning. The Beginning refers to the first step towards the actual implementation of teaching for critical thinking in the teaching practice of vocational schools, in which you, the vocational teachers, play an irreplaceable role in collaboration with your students.

Vocational teachers critically reflect on and shape their teaching practice and ensure that the critical thinking competency of their students is optimally developed, promoted and strengthened, always in interaction with them and with regard to their commitment, but also to their actual potential. In this whole process, it is important to emphasize that the environment and conditions in which VET teachers work contribute to some extent (or not) to the realization of teaching for critical thinking in classroom practice but are not the key moment. The key moment for the realization of teaching for critical thinking in classroom practice is precisely the direct interaction and communication between VET teachers and students who are curious, who perceive, summarize, compare, make connections, ask questions, argue, evaluate, create, and who are moderate, confident, clear, courageous, empathic, creative and enterprising.

We invite you to initiate and achieve positive change in vocational education!

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I found DID YOU KNOW YOUR HANDS CAN THINK? - Teaching for Critical Thinking in Vocational Education and Training: A Handbook for Vocational Teachers to be a very comprehensive and well-thought-out guide to vocational teaching. The content is research-based but provides many practical examples of methods and strategies for effective instruction in vocational education and training. This handbook should be part of any vocational educator's professional library.

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Critical thinking is important part of every individual's life and their personal development. It is essential for participating in a democratic society, taking critical action, being proactive, being employable and self-employable and for identifying and solving problems in any aspect of life. This handbook reminds us of that. The authors cover fundamental theoretical knowledge and provide a range of practical examples making this handbook an excellent foundation for implementing teaching for critical thinking in vocational schools. For vocational teachers, this handbook is of great importance because they will finally have, in one place, clear guidance on how to develop and apply critical thinking in their work.

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