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Conceptualizations and implementation of creativity in higher vocational teacher education – a qualitative study of lecturers

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Abstract

Creativity is one of the most important skills in the 21st century student's toolkit and important to vocational education and training (VET). In the context of vocational teacher education, creativity has not yet played a significant role at universities. This is due in part to the fact that it is unclear what creativity means and how it is fostered in the context of higher education. This interview study explores how creativity is conceptualized by lecturers in vocational teacher education and what creativity-promoting measures or teaching/learning scenarios are applied by them in their courses. Generally, the lecturers interviewed associated creativity in their jobs as lecturers with creating something new. From the lecturer's perspective, student creativity is categorized into a 5-category model in which lecturers 'see' student creativity represented by (1) student self-reflection, (2) independent decision-making, (3) curiosity and motivation, (4) producing something and (5) developing original new ideas. Categories identified by the lecturers that promote creativity in courses are openness, individualization, interaction, student activity and generating solutions. In practice, creativity-promoting measures or teaching/learning scenarios are implemented very differently. The type of implementation determines the implementation depth of the individual category. The findings provide an understanding of creativity from the perspective of university lecturers, which could be valuable for designing university courses in the future.

Keywords Creativity, Teacher education, Empirical study, Vocational education and training

Introduction

Creativity is necessary for growth in every field. Creative thinking can solve problems in both professional and personal contexts. Due to 'new work' patterns, e.g., remote work, that have led to structural changes within workplace organizations, *creativity contributes to employees' responses to challenges* and changing demand for goods and services. Employees increasingly need to consider alternative perspectives and develop new, creative thinking patterns that foster innovation. Creative minds even represent a decisive competitive advantage for companies, as they design products and processes

innovatively and thus solve professional problems in an adequate manner mostly to the customer's advantage. Further, creativity plays an important role in mental wellbeing, coping with challenging situations, and emotional growth (Forgeard 2018). For example, Tang et al. (2021) showed that creativity was instrumental in increasing well-being during times of the COVID-19 pandemic. In their study, the perceived impact of COVID-19 was positively related to creative process engagement, which was positively related to employees' self-reported creative growth. Creative growth was related to higher levels of well-being. Fiori et al. (2022) similarly reported that creative individuals were more satisfied with their lives during COVID-19 times. Their results showed that creativity promoted positive emotions that reduced perceived stress, which in turn led to a more positive COVID-19 experience. Besides, Kapoor and Kaufmann (2020) argued that people with creative accomplishments and skills at all levels have attempted, and succeeded, in responding to the challenges posed by COVID-19 with a wide range of innovation and originality. They even think that creativity is a way to make sense of current events. Therefore, creativity is also regarded as one of the most important skills in the 21st century student's toolkit, according to the Future of Jobs Report (World Economic Forum (WEF) 2020).

Creativity has become a buzzword in the educational debate, especially in high-income countries (HICs), as they account for the majority of leadership positions in labour markets (Grigorenko 2019). Following the call to make creativity an educational imperative (Skiba et al. 2010), it has been integrated into many national vocational education and training (VET) systems of HICs. In recent years, various international organizations have developed different frameworks to support the implementation of creativity (and other so-called 21st century skills) in VET, e.g., the "*Global framework on core skills for life and work in the 21st century (2021)*" by the International Labour Organization (ILO). In VET and in these frameworks, creativity is understood as a transversal and cross-curricular skill that can be acquired in a specific context or situation and can be transferred to other situations; hence, it cannot be taught separately from the subject matter. In this way, creativity is equally relevant for many subjects and professions. Creativity as a transversal skill has also found its way into the educational curricula of many HICs (cf. Calero López and Rodríguez-López 2020; Findeisen and Wild 2022), e.g., Switzerland. In Switzerland, for example, creativity is often mentioned in the area of methodological skills (cf. curriculum of design engineers (2015) or individual facets of creativity (cf. Lubart et al. 2013), such as divergent thinking, convergent thinking, mental flexibility, are implicitly referred to in the curricula (cf. new curriculum of commercial clerks (2021). Correspondingly, in VET creativity is defined as "*creative problem solving ability*" (Leone 2001, p. 385). Creativity means "*wisely exploiting the given scope for solutions and design when identifying and solving professional tasks, taking into account the situational circumstances*" (Rauner 2019, p.4).

Due to the importance of creativity and its inclusion in many VET curricula, it seems important that higher vocational teacher education also addresses the topic of creativity. In this context, it is important to distinguish between creative teaching and teaching for creativity (Grigorenko 2019). Creative teaching encourages free thinking with the objective of making learning more enthusiastic and effective. Teaching for creativity or teaching creativity refers to developing creativity in one's thinking and behavior. While in the course of teacher training, certainly creative in the sense of good teaching is taught,

the question arises, however, if and to what extent teaching for creativity should also be taught. Or in other words: Where in the course of vocational teacher education do prospective teachers learn to teach creativity as a transversal competence? In order to discuss creativity in higher teacher education, it is important to understand what creativity means in this context in the first place. This paper provides initial insights into the topic of creativity in higher vocational teacher education. Therefore, the following objectives guided this study: (1) What conceptualizations do lecturers have of creativity ((a.) creativity in their job as a lecturer and (b.) student creativity) in higher vocational teacher education and (2) how is creativity fostered in higher vocational teacher education?

This paper is structured as follows. The first section gives a brief overview of the relevance of creativity and its assignment as a transversal skill in VET. Then, in the second section, creativity is defined. The third section addresses the challenges of creativity, e.g., the lack of formal embedding of creativity in curricula and course descriptions, in the context of higher education. The methodological approach is explained in the fourth section, before the findings of this study are presented in the fifth section. Finally, the findings are summarized and discussed in the sixth section.

Understanding creativity

Creativity has been a subject of particular attention in psychology and its related disciplines. In the field of psychology, creativity research goes back to the 30s. At latest since the 50s, the first standard definition of creativity has been established (Runco and Jaeger 2012). Until today, only in psychology exists a standard definition of creativity, which consists of the following two criteria: “*Creativity requires (a) novelty or originality and (b) utility or usefulness*” (Simonton 2012, 97). A creative idea or product must be new and valuable for someone and is hence judged by a certain group of people. The evaluation process is strongly subjective and depends on the respective time period, which is why novelty (or originality) and utility (or usefulness) cannot be measured with universally valid terms (cf. Corazza 2016). Further, the term creativity is used differently in varying disciplines and depending on the activity to be performed (Silvia et al. 2009). This is because it is generally accepted that creativity in writing a story is different from creativity in solving a mathematical or technical problem. Whether an idea, a product or a person is perceived as creative and labeled accordingly depends on the respective context. In their study, Weinstein et al. (2014) showed that creativity in general has increased in some domains, e.g., visual arts, in recent years, whereas creativity has decreased in other disciplines, e.g., writing.

To broaden the understanding of creativity, Kaufman and Beghetto (2009) developed the ‘*Four-C Model of Creativity*’, which classifies creative output into different categories (‘*Big-C*’, ‘*little-c*’, ‘*mini-c*’, and ‘*Pro-c*’ creativity). ‘*Big-C*’ defines creative greatness, meaning creative contributions made by legendary personalities, e.g., Marie Curie, who “*have impacted the world*” (p. 95). ‘*Little-c*’, on the other hand, refers to daily activities performed by nonprofessionals, such as a musical composition by someone who is not a professional musician. The ‘*little-c*’ category shows that everyone can be creative in one way or another. Hence, creativity is important in daily life, as well as in the classroom. Teachers are often assigned to the ‘*little-c*’ category because they have professional knowledge and display it in their daily work, but generally do not receive the status and creative recognition associated with that work (Bloom and Vanslyke-Briggs 2019).

'*Mini-c*' encompasses the creativity inherent in the learning process, which is often not yet expressed in a tangible form. It includes initial creative interpretations that can result in recognizable creative output at a later stage, e.g., a learner's first ideas (or even attempts) about drawing light and shadow. '*Pro-c*' as the last category refers to persons who are "*professional creators*" who have not reached "*eminent, 'Big-C; status*" (Kaufman & Beghetto, 2009, p. 100).

In summary, creativity is evaluated by the output, e.g., an outlined idea or a product. To be considered creative, it must be perceived as new and useful. The evaluation of the output is thus subjectively shaped and strongly context-dependent due to the respective time period and discipline. Creative output can further be assessed according to various categories (cf. Kaufman & Beghetto, 2009). In the context of higher education, creative output is categorized as '*little-c*' and '*mini-c*'. '*Little-c*' refers to the creative output of lecturers, whereas '*mini-c*' describes the creative output of students.

Challenges of creativity in higher education

Despite the recognition of the benefits of creativity for the individual and for society, the promotion of creativity is anything but a priority in higher education (Papaleontiou-Louca et al. 2014). Various studies show that creativity of students tends to decline in the formal educational system (Csikszentmihalyi 2007; Pfeiffer and Wechsler 2013). Csikszentmihalyi (2007) describes the knowledge transfer in the formal educational system as follows: "*Schools teach how to answer, not to question*" (p. xix). The formal education system discourages students from taking intellectual risks, which in turn are essential for creative performance (Kettler et al. 2018). This is due in part to the fact that most of today's teaching still takes place in repetitive frontal instruction settings that predominantly promote convergent thinking processes in which students pursue only one, the best solution, at a time. In order to think out-of-the-box and to perform creatively, however, divergent thinking processes in which several and, if possible, different solutions are generated are particularly important (Siburian et al. 2019). Conventional instruction favors students who are strong analytical thinkers but disadvantages students who have creative abilities (Sternberg 2006). In addition, the purely functional orientation of the educational system, which educates students primarily to "*teach to the test*", is also criticized in this context (Klieme et al. 2007, p. 229; Robinson 2011; Piske et al. 2016). Common assessments and testing procedures lack the dimensionality needed to identify students' creative abilities (Sternberg 2006). Student creativity is also dependent on teacher creativity, i.e., the more creative a teacher is, the more desirable that teacher judges learner characteristics associated with creativity (Hwang 2017). Generally, creative contributions and abilities of students are even often perceived by teachers as disruptive, distracting from learning objectives. Teachers seem to be afraid of losing control in the classroom due to creative contributions of students. Studies (Chan and Chan 1999; Kumar and Chahar 2016) have shown that students' non-conforming, disruptive behavior is associated with creativity. Creativity is therefore frequently even sanctioned in the context of classroom management. For this reason, creative contributions are often repressed in educational settings, including higher education (Gibson 2010; Hosseini 2011; Robinson 2011).

In the formal education system, there is also much room for improvement about fostering creativity in schools (Anderson et al. 2022; Cachia et al. 2010). To date, almost no

educational institutions teach for creativity or train teachers to teach for creativity (Papa-leontiou- Louca et al. 2014; Kaplan 2019). Creativity is also not often found in college course curricula and is rarely stated as an explicit learning objective in courses (Jackson 2006). According to Jackson (2006), this is because lecturers know too little about creative approaches in higher education and are also not familiar with the relevant literature on creativity promotion (cf. Matraeva et al. 2020). As mentioned at the beginning, this literature is also not addressed in teacher education. Jahnke and Liebscher's (2020) study of the use of mobile devices to promote creativity in higher education shows that lecturers do not explicitly use creativity as a didactical design element in their teaching either. However, learning with mobile devices encourages student creativity or the emergence of creativity-friendly learning environments. In this context, three types of implicitly integrated creativity that promote meaningful learning with mobile technologies were identified (cf. Jahnke and Liebscher 2020). This implies that creativity should also be perceived by lecturers as a digital didactical design element, but this has not yet been done in teaching practice. Beyond that, fostering creativity in the higher education context also promotes other 21st century skills, such as critical thinking (Siburian et al. 2019) and entrepreneurship (Alshebami et al. 2022; Machali et al. 2021). Usually, higher education institutions place importance on critical thinking, while the importance of creativity in teaching and learning processes is significantly underestimated (Jackson et al. 2007; Islam et al. 2021).

Another challenge of creativity in the higher educational context is the perception of students' creative achievements. According to the standard definition (cf. Section 2), however, the evaluation of a creative performance of students proves to be difficult, as they usually do not produce new and useful products for a market; they are not entrepreneurs or inventors (Jahnke et al. 2015). In a general sense, the creative outputs produced by students are not tangible products and the creative actions vary according to the subject. Consequently, it is difficult for lecturers to recognize a creative performance of students in the first place and to evaluate it adequately afterwards. To that date, there is no common understanding of creativity in higher education; however, some initial research has been conducted to define creativity in higher education. The study of Pavlović and Maksić (2019) revealed five types of lecturers' implicit theories of the concept and development of creativity: individualistic, activity, result-oriented, relational, and growth theories. There are some characteristics, e.g., social dominance, open minded etc. (individualistic theories) and activities like coping with practical situations, using tools in effective ways etc. (activity theories) which are assigned to creativity. The result-oriented theories refer to the originality, i.e., personal innovations and appropriateness, i.e., successful applications, of products. In addition, the environment can foster creativity by allowing freedom of choice or suppress it by imposing constraints on creative ideas and actions (relational theories). Growth theories describe creativity as something that can be developed during university studies through various pedagogical measures, such as an appreciative climate. Jahnke et al. (2015) developed a '6-Facet-Model' that categorizes student creativity through (1) student self-reflections, (2) independent decisions, (3) through curiosity and motivation, (4) producing something, (5) multiperspectives and (6) when students develop original new ideas. To this point, creativity has not been studied in vocational teacher education.

These examples show that creativity has received little attention in higher education so far. There are many reasons for this. On the one hand learning and testing in the educational system is geared toward achieving learning objectives as efficiently as possible and, consequently, convergent thinking processes (cf. Klieme, 2007). Creative achievements and contributions on the part of students are thus usually perceived as disruptive by lecturers (Sternberg 2006). On the other hand, creativity has rarely been formally integrated into curricula, course descriptions, and learning objectives (Jackson 2006). Besides, it is difficult to capture what creativity in higher education specifically means and whether concepts differ, if at all, across disciplines.

Methods

The overall objective of this study was to find out what creativity is in the higher education context from the perspective of lecturers and how it is promoted in vocational teacher education in Switzerland (in context of our survey). To this purpose, the following research questions were formulated:

1. What are the interviewed lecturers' individual conceptualizations of creativity ((a.) creativity in their job as a lecturer and (b.) student creativity) in higher teacher education?
2. Which creativity-promoting measures or teaching/learning scenarios are applied?

The study was conducted from June to mid-October 2021. 19 semi-structured interviews were completed with lecturers that train VET teachers from five teacher training colleges in the German-speaking part of Switzerland, e.g., Swiss Federal University for Vocational Education and Training (SFUVET), Zurich University of Teacher Education, University of Zurich and the pedagogical colleges of Luzerne and St. Gallen. The interviewees were selected by the institutions themselves.

The methodology of this explorative study approach is based on a study from Jahnke et al. (2015), which examined the promotion of creativity in a higher education context in Germany. For this purpose, the interview guideline used by Jahnke et al. (2015) was adapted to the situation of the Swiss university context of vocational teacher training. The interviewees were asked to describe one of their courses in detail, i.e., learning objectives, learning activities, performance records, didactic concepts, alignment of instruction and design, etc. In addition, they were also explicitly asked 'How can you 'see' if/when a student is being creative?' How do you know that your students are creative? What is a creative achievement of your students?' The interviews were conducted online via MS Teams. After their transcription, the interviews were analyzed with MAX-QDA by means of (structured) content analysis (Mayring & Frenzl, 2019) and open coding (Brymann, 2008). First, each interview was analyzed individually to capture the interviewee's understanding of creativity. Subsequently, all interviews were compared, analyzed, condensed, and summarized at a higher level and compared with the categories identified by Jahnke et al. (2015). Finally, a first theoretical model was derived from the interview data, which was valid for the respondents at the time of the interview and is presented in the following section.

Findings

Demographics

A total of 19 interviews (N=19) were conducted with lecturers from five universities of teacher education in German-speaking Switzerland. The average interview duration was around 58 min. 10 participants (53%) were female, nine participants (47%) were male. At the time of the interview, the participants were on average 48 years old, the youngest participant was 36 years old and the oldest participant was 60 years old. The teaching experience of the participants at the university level averaged 11 years. 14 participants had an average teaching experience of 11 years at a vocational school, whereas five participants had no teaching experience at a vocational school at all. Six participants held a leadership position, e.g., program director, at the time of the interview. The participants covered all subject areas of vocational teacher education, i.e., subject didactics, educational science, educational psychology etc.¹

Conceptualizations of creativity in higher teacher education

Creativity in the job as a lecturer

The findings for the following questions are presented below: ‘What does creativity mean to you in your job as a lecturer? Under which conditions are you (particularly) creative?/ In which situations are you (particularly) creative? What stimulates your creativity?’

From the interviewee’s perspective, creativity in their job as a lecturer means creating something new. This can be confirmed by statements like the following statements: “*When I find new solutions to challenges*” [interviewee_1], “*when I freely associate new things or things that have not yet been put together and something new comes out of it*” [interviewee_3] and “[...] *create something new, so to speak [sic!]. Maybe create something outside of norms*” [interviewee_8]. The new can also result from the combination of what is already known. Accordingly expert nine answered: “*When I combine something new. So from the existing make new combinations [sic!]. (...)*” [interviewee_9].

Interviewee 12 refers directly to his expertise: “*If I am to generate something new [sic!]. (...). If I can fall back on a certain expertise. And on the basis of this expertise, I can recombine elements that I know*” [interviewee_12]. Interviewee 14 has a generic conception of creativity and refers to the fact that every situation involves something creative in which concepts must be adapted to it: “*(...) Every situation requires a certain creativity. After all, it’s always about creating something new. Because every situation is new, existing concepts must also be adapted to every situation*” [interviewee_14].

A creative achievement in the profession of a lecturer is thus the creation of a new, innovative teaching/learning arrangement within university teaching, e.g., by embedding open, self-regulated learning arrangements etc. Thus, many interviewee replied like the following: “*This production of teaching/learning settings in the classroom really comes to mind. (...)*” [interviewee_2]. Interviewee 12 further specifies the innovative teaching/learning arrangement in terms of duration, which can be a sequence or an entire day of instruction. “*We create teaching settings and that is a creative act for me, (...) The design of a teaching day, the preparation, the development of a teaching day or a sequence is of course a creative process*” [interviewee_12]. A similar understanding of a creative performance as lecturer has interviewee 11: “*I can be creative in teaching methods, (...), in*

¹ Creativity can be taught in the context of any discipline (Cachia et al. 2010).

lesson structure” [interviewee_11]. In contrast, interviewee four argues from a constructivist perspective, in which she/he sees her-/himself as a coach:

“For me, this means in particular that I try to offer learning arrangements that are as open as possible. I very often practice self-directed teaching, where I myself am active as a coach. So I am more of a learning coach and let the students go their own way. (...) But I think that’s my role, to be creative.” [interviewee_4].

Another interviewee said: *“As a lecturer, it means that I always provide situations in my lessons that allow for absolutely new and different solutions”* [interviewee_16].

The interviewees found a certain openness (with regard to the result and the approach to the solution), freedom, team exchange and time pressure, but not excessive, to be conducive to creativity. Accordingly, answers like the following were given: *“Free spaces with few defined specifications that can be filled individually, taking into account the current situation”* [interviewee_13], *“(…) If the external framework allows me a relatively large amount of self-organization and self-direction and I am also allowed to decide for myself how I shape it. (...)”* [interviewee_16]’ and *“(…), when a little pressure forces you to be creative or find solutions that aren’t quite conventional, then that’s certainly beneficial. (...)”* [interviewee_6]. When it comes to team exchange, an open climate in the team is particularly important. Interviewee 11 said, for example: *“Open people with whom I can exchange ideas”* [interviewee_11]. From interviewee nine this was described as follows:

“My creativity is encouraged, for example in a team. So there is also creative thinking together with others. And I notice that when I feel comfortable in a team, i.e. when I don’t have to deal with how I am accepted, am I accepted at all in a team, but when I feel comfortable, the learning climate is right, I am also ready to contribute with my ideas [sic!]. And I am also prepared to contribute something that is perhaps not conformist” [interviewee_9].

Student Creativity

The findings show the interviewees’ responses for the following questions ‘How can you ‘see’ if/when a student is creative? How do you know that your students are creative?’

The following answers were given by two-thirds of the interviewed lecturers: *“Understand their own learning itself”, “representing their own further development”, “analyzing their own learning output”*.² These answers have in common that the learning process is reflected on a meta-level. However, self-reflected learning also includes reflection in relation to their learning product, so that a meaningful new arrangement can be created. This also includes the transformation of reflection processes into knowledge. Both aspects – self-reflection on a meta-level and the production of a meaningful composition (or learning product) – are represented in this cluster, which we therefore named self-reflective learning.

Another cluster that could be identified from the interviewees’ response behavior relates to self-organized or independent learning. This involves expanding knowledge independently and dealing with new aspects of a topic on one’s own in- and outside the courses. It also implicates thinking further about the topic beyond the existing literature. Respectively, answers such as *“creative is just when an own contribution comes”, “going*

² Authors: These responses refer to students’ learning process, progression, and learning output.

beyond the arguments of the literature” and “in the sense of transfer performance, where a person has made very exciting connections” were assigned to this cluster.

The interviewed lecturers also link the students’ interest and engagement in a topic with creativity. Therefore, the third category was named showing curiosity and motivation. The following statements were summarized under this heading “*it takes enthusiasm to be creative*”, “*interest, engagement and participation in class*”, “*students who think actively, question things, get involved in discussions*”, “*when you link the theory with your own ideas or experiences*” as wells as “*question things critically*”.

A fourth cluster combined responses that were output-oriented and included examples and descriptions of learning products. Some of these responses were very specific. Typical responses assigned to this cluster were “*creating a role play in computer science class for the installation of a router*” and “*designing own learning works*”.

The last cluster we identified focuses on the achievement of original and completely new arrangements. In contrast to the category self-reflective learning, this assignment is not only about meaningful arrangements, but above all about original and new arrangements. The following responses were assigned to this category: “*Using what you have learned in an original way in your lessons*”, “*search for new, unusual ways, possibilities*”, “*out of the box thinking*”, “*develop an efficient solution that is not foreseeable from the outset*”. Since the courses are mostly about creating a learning product and, thus, finding own solutions, in the name of this category, we have used the word solution (reaching for original, new solutions).

In summary, a total of five categories of lecturers’ conceptualizations of creativity in higher teacher education were derived based on the data collected. These are summarized in the following table (cf. Table 1).

Table 1 The ‘5-Category-Model’ – conceptualizations of student creativity by lecturers in our survey

No.	Category	Examples given by lecturers
1.	Self-reflective learning	<ul style="list-style-type: none"> • Understanding own learning itself/ reflection on own learning growth • Representing the own further development • Analyzing the own learning output (learning product) • Combining several concepts into a meaningful arrangement
2.	Independent learning	<ul style="list-style-type: none"> • Dealing with new aspects • Own acquisition of knowledge • Independently conducted products/assignments • Finding arguments that go beyond the literature (rationales, arguments, connections)
3.	Showing curiosity and motivation	<ul style="list-style-type: none"> • Enthusiasm for the topic/subject/discipline • Exchange ideas about new things that have been tried out • Lively discussions • Critical examination of the objects and topics and questions we deal with (critical thinking)
4.	Producing something	<ul style="list-style-type: none"> • Creating a learning video about all the modules they had in the course of study • Filming a teaching sequence that they have planned independently • Creating a role play in computer science class for the installation of a router • Writing a good, perhaps unexpected, critique, e.g., of a subject being taught
5.	Reaching for original, new solutions	<ul style="list-style-type: none"> • Adapting newly acquired knowledge to their context and derive new possibilities for action for themselves • Extraordinary ideas in well-known issues • Creation of a transfer performance for your own teaching, with new, exciting links • Out of the box thinking

Source: Own representation based on Jahnke et al. (2015, p. 6)

Creativity-promoting measures in higher teacher education

Perceptions of creativity-promoting measures

The findings for the following questions are shown below: ‘What characterizes a creative teaching course for you? What do you think promotes creativity development in a course? How would you (a. under the given conditions / b. ideally), design your course so that it is conducive to creativity?’

The first response cluster of the interviewees that could be identified relates to the topic of openness or free spaces. According to the interviewees, creative teaching requires a certain openness, i.e., not too narrow specifications in terms of ready-made solutions, e.g., criteria grids, or solution paths. Consequently, the following answers were summarized under the cluster openness: “*Open tasks*,” “*allowing free spaces*,” “*no predefined solutions*,” “*open-ended sequences*” and “*working on a topic without many specifications*”.

Closely related to the openness cluster is the next cluster found, which was called individualization. Here it is about the students being able to experiment in creative learning settings, e.g., to find their own way of dealing with a topic or a task according to their preferences. Typical answers assigned to this cluster were “*finding their own way*,” “*experimenting, allowing mistakes*,” “*improvising*,” “*allowing own thought processes and procedures*”. The lecturers can also specify different approaches, from which the students can then choose in different social forms depending on the task.

A third category analyzed in relation to fostering creativity in higher education teaching was called interaction. Creativity is fostered, according to the interviewees, by students working together in different social forms, e.g., partner or group work. “*Teamwork*,” “*interaction between students*,” “*different social forms*,” “*generating and discussing new things together with others*” were typical responses in this cluster.

Creative learning settings also require a high level of (cognitive) activity on the part of the students, according to the interview partners, as is also found in constructivist learning settings. Therefore, the following responses were assigned the cluster student activity: “*High self-involvement of learners*,” “*high activation of the participants*,” “*constructivist learning settings*,” “*highly active learners*,” “*activation of the resources of the learners*”.

The interviewees also closely associated creativity with solving problems in the lesson. The problems to be solved in the lesson result on the one hand from the theoretical inputs imparted and on the other hand from the challenges of school practice, which are to be further developed or solved for one’s own teaching. The focus is on generating solutions, which is why this response cluster was named accordingly. The solutions developed are then made visible to the lecturer in learning products, e.g., learning videos, role plays as well as the use of digital tools. Responses assigned to this were “*finding solutions*,” “*possibility to develop different approaches to solutions*” and “*designing settings in which students design their own solutions*”.

The following table (cf. Table 2) summarizes the clusters that emerged from the data collected for creativity-promoting measures.

Creativity techniques

The interviewees were also asked about the use of creativity techniques (‘What creativity techniques do you use in your courses?’).

Table 2 Perceived creativity-promoting measures by lecturers in our survey

No.	Category
1.	Openness
2.	Individualization
3.	Interaction
4.	High student activity
5.	Generating solutions

Source: Own representation

Most lecturers reported to use “*brainstorming*” and “*mindmapping*”, occasionally “*design thinking*” was mentioned as well. Responses like the following show that that some interviewees have little knowledge in the field of creativity techniques. For example, interviewee one said: “*Yes, I used that. I just didn’t realize that it promotes creativity. Really, brainstorming promotes creativity?*” [interviewee_1]. Another interviewee responded: “*I do brainstorming, sure, but no, I don’t associate that with creativity*” [interviewee_2]. In addition, it appeared that some of the interviewees had little knowledge about creativity techniques. “*I don’t know that many [authors: creativity techniques are meant] by name consciously. What comes to my mind now is mindmapping or brainstorming. I don’t know if that also falls under creativity technique...*” [interviewee_8]. More than the majority of the interviewees also confused creativity techniques with creative teaching methods such as structure laying, world cafe and playing bingo. Here responses like the following were given: “*All [authors: all creativity techniques are used]. Brainstorming always, (...). (...). We have also just done introductory games, bingo games on the topic of heterogeneity*” [interviewee_5].

Application of the ‘6-Facet-model’

The interviewees were also asked how they implement the single categories of the ‘6-Facet Model’ of Jahnke et al. (2015) in their modules. The findings for the following questions are presented below: “The following characteristics promote creativity in courses: (1) Reflection of learning in the learning process, (2) promotion of independent learning, (3) promotion of curiosity, enthusiasm and motivation to learn, (4) creation of learning products, (5) multiple perspectives, (6) encouraging new ideas. Please describe as precisely as possible whether and how you promote these characteristics in your course!

Due to the pedagogical freedom of the lecturer, i.e., a certain discretionary and decision-making scope within the teaching, the individual categories of the ‘6-Facet Model’ of Jahnke et al. (2015) are, however, implemented very differently in practice. Basically, all categories of Jahnke et al. (2015) can be found in all modules. However, the type of implementation in the individual modules determines the importance of the particular category for promoting creativity. For example, reflection is given greater importance in the context of a “*reflection text*” than in merely orally posed “*reflection questions*”. With regard to the promotion of independent learning, for instance, it makes a difference whether modules contain large or small “*proportions of self-study*” or whether independent learning only takes place as part of “*work assignments*” etc.

- (1) Reflection on learning is applied in different forms, e.g., in the form of “*orally formulated reflection questions*”, “*reflection texts*”, “*reflection works*” which at the same

time serves as performance records, *“learning portfolios/journals”*, *“peer-reviews”* and complete *“reflection modules”*.

- (2) Promotion of independent learning is used in the following ways: *“Differentiated assignments”*, *“work assignments with individual reference”*, *“self-organized learning sequence”* with large or small *“proportions of self-study”* and *“setting own learning objectives”*.
- (3) The question about fostering curiosity, enthusiasm, and motivation to learn was answered very differently by the interviewees. Some answers which were given based on the own person/personality of the lecturer. These answers included the following: *“Being a role model, as a teacher, as a lecturer”* and *“being motivated and enthusiastic as a lecturer”*. Another response scheme was based on the learning content. Typical answers were *“current relevance of the topic”* and *“establishing a reference to everyday professional life”*. Current relevance of the topic means a reference to current issues, such as climate change, etc. The third scheme that could be identified can be attributed to didactics. Under this scheme, the following answers can be summarized: *“multifaceted events”*, *“motivating start of lessons”*, *“enabling competence experience”* and *“use of digital tools”*.
- (4) The creation of learning products is very important in all courses. Often the learning products have a direct relation to the classroom, i.e., products can be used directly in the classroom like *“learning sequences”* etc. Other learning products reflect and document the students' own learning or level of achievement. Such reflective learning products can be the *“reflection on a protocol of a classroom visit”*, *“learning journals”* etc. The learning products created are also innovative in terms of their form, e.g., *“explanatory videos”*, *“short films”*, *“texts”*, *“presentation”* and *“posters”*.
- (5) Interviewees promote multiple perspectives in terms of teacher and learner perspectives. The general education subject also promotes environmental, economic and political perspectives.
- (6) New ideas of students were encouraged in various ways by the interviewed lecturers. Some of the interviewees give *“innovative assignments”*, i.e., trying out new things in the classroom, and use *“innovative methods”* like a book vernissage where each student has to present a book or keeping a *“book of ideas”* in their courses. Others promote the *“exchange of experiences”*, also in the sense of a *“peer-review”*, i.e., two or three people assess assignments and ideas on the basis of previously defined criteria. In addition, students are *“verbally encouraged to try new ideas”* and read *“professional literature”*.

The table below (cf. Table 3) gives an overview of the application of the ‘6-Facet Model’ of Jahnke et al. (2015) in the courses of the interviewed lecturers.

Discussion

In our study, the following two research questions were addressed: (1) What conceptualizations do lecturers have of creativity ((a.) creativity in their job as a lecturer and (b.) student creativity) in higher vocational teacher education and (2) how is creativity fostered in higher vocational teacher education?

Table 3 Application of the '6-Facet-Model' (Jahnke et al. 2015) by lecturers in our survey

No.	Facet	Examples given by lecturers
1.	Reflection of learning in the learning process	<ul style="list-style-type: none"> • Writing reflection texts (criteria: variety of perspectives, differentiability, argumentative style; reflection models) • Learning portfolios/journals • Reflection questions (oral) • Peer-Reviews • Reflection modules
2.	Promotion of independent learning	<ul style="list-style-type: none"> • Differentiated assignments • Work assignments with individual reference • Self-organized learning sequences/ proportions of self-study • Setting own learning objectives
3.	Encouraging curiosity, enthusiasm and motivation to learn	<ul style="list-style-type: none"> • Enthusiasm, motivation and interest of the lecturer in the subject of learning ('exemplify') • Selection of relevant learning content • Use of digital tools • Enabling competence experience • Motivating lesson introductions
4.	Creation of learning products	<ul style="list-style-type: none"> • Products that can be used in teaching practice, e.g., learning sequences • Reflective learning products, e.g., learning journals • Creation of innovative learning products, e.g., explanatory videos, short films, texts, presentations, posters etc.
5.	Multiple perspectives	<ul style="list-style-type: none"> • Teacher and learner perspective • Ecological, economic and political perspective in the subject of general education
6.	Encouragement of new ideas	<ul style="list-style-type: none"> • Innovative assignments • Using innovative methods, e.g., 'book vernissage – each student has to present a book,' 'book of ideas' • Peer-review of assignments, ideas etc. • Exchange of experience • Verbal encouragement to try new ideas • Reading professional literature

Source: Own representation

(1) Our study findings show that lecturers' conceptions of creativity ((a.) creativity in their job as a lecturer and (b.) student creativity) in higher vocational teacher education are very complex. However, previous research findings (cf. Kettler et al. 2018; Mullet et al. 2016) on the conceptualization of creativity can be confirmed by our study: Accordingly, the surveyed lecturers in higher vocational teacher education also recognize that novel or original products are a part of creativity, but they fail to consider utility or usefulness as an attribute of creativity. Interviewees believe that (a) creativity means creating something new in the context of being a lecturer. Thus, lecturers associate the first criterion of the standard definition, novelty or originality, with creativity in their lecturing job. The second criterion of the standard definition, utility or usefulness, on the other hand, is not associated by lecturers in higher education in our study with creativity in their job. Furthermore, no common understanding of the interviewed lecturers regarding (b.) student creativity in higher vocational teacher education could be identified. Therefore, we have developed a '5-Category-Model' in accordance to the '6-Facet-Model' of Jahnke et al. (2015) by which lecturers 'see' the creativity of the students of higher teacher education. From the lecturer's perspective, in our study, student creativity is expressed through (1) self-reflective learning, (2) independent learning, (3) showing curiosity and motivation, (4) producing something and (5) developing original, new solutions. Unlike the '6-Facet-Model' of Jahnke et al. (2015), our model does not include the category 'multiple perspectives', which could not be derived from the statements made in the interviews.

(2) The findings of our study have also shown that creativity in higher vocational teacher education can be promoted through measures that, according to the surveyed lecturers, are assigned to the following categories: Openness, individualization, interaction, high student activity and generating solutions. The findings also show that the surveyed lecturers use only three types of creativity techniques (mindmapping, brainstorming and occasionally design thinking). There also appears to be uncertainty among faculty in this area, as a large number of those surveyed, confused creativity techniques with creative teaching methods. The uncertainty of the interviewed lecturers regarding creativity techniques also confirms Jackson's (2006) thesis that lecturers usually have little knowledge about teaching/learning scenarios in higher education that promote creativity. The individual categories of the '6-Facet Model' of Jahnke et al. (2015) are implemented very differently in the individual modules. Basically, references to all categories can be found in all modules of the interviewed lecturers. Here, the type of implementation determines the implementation depth of the individual category.

Our study is limited in its representativeness due to the small size of the sample. The findings are therefore not universally valid and apply only to our survey context. In principle, it would be interesting to repeat this study with a larger sample size or to extend it to other professional groups. In this way, a generally valid definition of student creativity in higher education could possibly be generated or student creativity could be discussed against the background of different professional backgrounds. Furthermore, it would be interesting to validate the '5-Category-Model' we developed in school-based practice and determine if perceptions of student creativity differ between university faculty and teachers in vocational education and training.

Further, our study should help encourage discussion about the teaching of creativity and other transversal skills in higher teacher education. Against this background, the question arises whether the instruction of transversal skills for prospective teachers should be a task of higher teacher education in the future.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s40461-023-00144-y>.

Supplementary Material 1

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Authors' contributions

SF: conceptualisation, data collection, data analysis, writing, editing. AB: conceptualisation, editing. All authors read and approved the final manuscript.

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Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Competing interests

"The authors declare that they have no competing interests."

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