CHAPTER 10.

Understanding creativity as an occupation-specific competence

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10.1. Introduction

Particularly relevant within vocational education and training (VET) in Switzerland is the acquisition of skills that support workers in seeking new solutions to workplace challenges: this means skills to think and act creatively. This new requirement is reinforced by the development and introduction of new technologies, which will replace workers in some fields and will require new jobs in others. Switzerland is considered an innovation leader in the world, with about 90% of innovation taking place within industry ([51]). Its research infrastructure and strong apprenticeship system are guarantors for this success: more than 70% of each cohort complete a vocational education and training (VET) programme at secondary II level (SERI, 2019). Taking into consideration that many innovative ideas come from workers at the lower hierarchical levels within an enterprise, it signals that this level of education is highly valued in the country and supports innovation. Accordingly, VET is particularly challenged to support the development of creative thinking skills and action competence, abilities that can be expected to support individuals in managing their careers successfully and advancing professionally through their creative contributions at the workplace.

Creativity is a complex phenomenon, only vaguely defined. There is disagreement on the scientific definition of creativity and there are different approaches to description and explanation. In vocational and business education, creativity is seen as an interdisciplinary competence as components of it belong to the area of self and social competence. Several authors claim that creativity (or at least parts of it) can be learned and be unleashed in apprentices.

Although, apprentices need to build up skills and competences, they are also a source of ideas that enterprises can build on when further developing their products or even working on radical innovations. Enterprises are increasingly discovering the creative potential of their staff and support new forms of work collaboration that help to unleash this potential and lead to innovation. Curriculum frameworks for vocational training programmes start to address creativity development as one competence development goal. There is a variety of skills, that are relevant to producing original work, such as suspending judgment, self-discipline, perseverance and nonconformity. Also, eagerness to work diligently is considered to be an essential component of high levels of creativity. While productivity and effectiveness are driving forces at the workplace, it helps apprentices to be provided with room to explore and play, either at school or, to some extent, in a protected space at the workplace. Particularly supportive is participation in teams that work creatively and develop innovations as much as the possibility to create individual projects with the provision of sufficient time and a realistic framework of expectations to realise them.

Conclusions from various studies on profession-specific creativity development suggest the need to understand creativity and creative potential in a domain-specific perspective as differences emerge across professional fields. Not much is known yet about creativity development within professions for which an apprenticeship

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([51]) https://www.globalinnovationindex.org/gii-2019-report [accessed 21.11.19].

would be the entry point. Similar to the notion of competence, the ways in which individuals actuate their potential depends on various contextual factors, including the required abilities related to each specific task. It is well known that different abilities are required in different job domains depending on particular work tasks that are typical of each domain.

This chapter summarises findings from studies concerned with creativity development among VET students. It first addresses the question of how creativity could be measured within professions. It follows with the question of how creativity is playing out in different professions and how it can be supported during workplace training.

10.2. Defining creativity

Creativity is a complex phenomenon and only vaguely defined (Schuler and Görlich, 2007; Palmer 2015). In scientific literature, there is disagreement on the definition of creativity and there are different approaches towards describing and explaining it. One of the most commonly used definitions is that of Amabile (1996). According to her, creativity is 'the generation of novel and useful ideas in any domain' (Amabile, 1996, p. 2). Creativity is attributed to a certain output orientation, since it is understood through the creation of results in the sense of new products. Oldham and Cummings (1996) broaden the understanding of Amabile (1983; 1996) by considering processes as well as new and useful ideas: 'Creativity refers to the development of novel, potentially useful ideas. Employee creativity refers to individuals' generation of novel and useful products, ideas and procedures' (ibid., p. 608). According to Oldham and Cummings (1996), an idea, a product or a process is new if either a recombination of existing materials or the use of a completely new material takes place. Another frequently used definition of creativity comes from Lubart (1994) and refers to creative potential as a latent ability to act creatively and to produce new, primal work that considers task bounds. Later, Lubart et al. (2013) and Caroff and Lubart (2012) make a further differentiation. Accordingly, creativity consists of cognitive facets, such as divergent thinking, analytic thinking, mental flexibility, associative thinking and selective combination, as well as conative facets, such as tolerance of ambiguity, risk taking, openness, intuitive thinking and motivation to create.

10.3. Studying creativity in VET

10.3.1. Can creativity in VET be measured?

In order to understand what role the transversal competence creativity plays in the professions, it would need to be measurable. Would it be possible to assess to what extent it may either exist or has been developed among professionals? A systematic overview was taken between July and August 2018 of the current status of existing studies (see Cooper, 1988) on measuring creativity in the occupational context. The review searched for publications in the following databases and journal hierarchies: EBSCO, ERIC, *International journal for talent development and creativity, PsycINFO*, Nebis, Swissbib and Google Scholar. Only studies that collected primary data were considered. Publications based on secondary data, such as other literature reviews, were not considered, as they already refer to studies with primary data. Among most existing studies there were methods to measure creative competences among workers.

In recent years, methods for measuring creativity in the professional context have largely been of a quantitative nature or based on a mixed-method approach. Questionnaires and test items were mostly used as survey instruments. In the publications examined, data collection was predominantly carried out through a combination of self-assessment and external assessment using prominent scales. Measuring tools have often been developed for a very specific professional context, such as design and language. The most frequently used is the 13-item scale of George and Zhou (2001) followed by the 30-item scale of Gough (1979) and the scale of Scott and Bruce (1994) to measure employee creativity. Applied test procedures are the EoPC (Evaluation of potential creativity) of Lubart et al. (2011) and the job-related creativity tests

TBK-GS (design and language related activities) (Schuler et al., 2013; Winzen, 2011), DBK-PG (planning and design) (Schuler et al., 2013) and DKB-TE (technology and development) (Palmer, 2015). The EoPC measures the creative potential of children and young people whereas the TBK–GS, DBK-PG, DKB-TE refer to the measurement of creativity in the previously mentioned occupational contexts.

The measurability of creativity is complicated by the many, and partly blurred, definitions. A large proportion of the studies that were examined view creativity as a multidimensional construct with different components, such as divergent thinking, problem solving, willingness to take risks, and openness. In contrast, only a few authors understand creativity as a one-dimensional construct and therefore do not explain what 'acting creatively' exactly means; it is difficult to make the inaccurate construct of creativity empirically ascertainable. It seems questionable whether those studies that interpret creativity as a one-dimensional construct really do justice to this very complex concept.

The idea of researching creativity in VET, including apprenticeships is relatively new and, so far, no measuring instrument has been developed for this area. Since creativity is contextual, measuring creativity in VET would first require an activity analysis of creative situations in individual occupations in order to identify the relevant occupational facets. These facets of creativity would then have to be made operational through suitable test tasks. Since creativity in VET is regarded as an interdisciplinary competence, the basic principles of competence measurement must be taken into account, such as problem-oriented learning. The test items would have to consist of real vocational problem situations that reflect as many facets of vocational competence as possible.

10.3.2. **Creativity in the professions**

In order to understand what role creativity as a transversal skill (SBFI, 2018) or 21st century skill (Chalkiadaki, 2018) plays within particular professions, the following assumptions are made: anyone can be creative and VET can contribute to supporting creativity in the context of work. These assumptions have led to an interview study, conducted in winter/spring 2019. The researchers investigated conative and cognitive facets of creativity in selected occupational fields. For this, practitioners were interviewed from the professions hotel communication specialist, retail trade specialist and commercial specialist (with the direction of trade). Since creativity research mostly features creative persons, these occupations were chosen because one would not necessarily assume creative potential in them. Further, commercial clerk is the most frequently chosen basic vocational training in Switzerland in terms of numbers (SERI, 2019).

First, education plans and VET ordinances for the relevant occupations were analysed. Then a total of 12 semi-structured expert interviews were conducted with vocational trainers from companies in the hotel and trade sectors. The interview partners were selected by experts from the relevant professional organisation (OdA) ([52]). The interview method used was the critical incident technique (CIT) according to Flanagan (1954). This method was chosen to collect precise creative descriptions of workplace situations in which the workers can or have to act creatively. The results were deductively evaluated according to the conative and cognitive creativity facets defined by Lubart et al. (2013). Such factors are joined-up thinking, creative communication, flexibility, openness and generating a creative product.

The results show that creativity as a 21st century skill is already represented either explicitly or implicitly in the framework curricula of the respected apprenticeships. While there are only indirect references to creativity in the education plan and VET ordinances for hotel communication specialist, creativity is shown in the education plan and VET ordinance for retail trade specialist as a technique and methodological competence. For commercial specialist, creativity is mentioned in the educational plan as a learning ability but is not addressed in the VET ordinance.

([52]) OdA are providers of Swiss VET. They define educational content, initiate the development of new occupations and organise inter-company courses.

The results show that different cognitive and conative facets of creativity are significant for the occupations studied. For the hotel communication specialist, the creative facets divergent thinking, creative communication, mental flexibility and openness have been identified. The following factors were determined for the occupations of retail trade specialist and commercial specialist on the basis of the occupational situations described by the experts: divergent thinking, analytic thinking, associative thinking, selective combination and intuitive thinking. These results suggest that creativity in apprenticeships should be promoted differently in different occupations, according to the facets identified by experts.

10.4. Supporting creativity within workplace learning

The understanding of creativity within professional practice is an important precondition for embedding it in curricula and training ordinances as well as developing teaching and learning methods to build up this competence. Both are relevant for teaching and learning at VET schools (Barabasch, 2019). However, training at the workplace plays a particularly relevant role in supporting the development of creativity. Based on various case studies in which industry-specific learning cultures in apprenticeships were examined (Barabasch, 2020), several situations have been identified in which creativity is supported in workplaces (Barabasch et al., forthcoming).

The dual training approach in Switzerland makes the enterprise the primary training place where the apprentice spends about three or four days a week and one or two days at VET school. Therefore, workplace learning in the enterprise is the major socialisation context for the world of work and vital to individual learning pathways (Barabasch and Keller, 2019). Examining a learning culture of an enterprise means studying attitudes, values and beliefs of the members of a community of practice: in this case, the staff involved in VET in the enterprises Swisscom and Login in Switzerland. The case studies involved interviews with 46 apprentices, 13 coaches, four employees closely working with apprentices and 24 managers at different levels. In addition, four focus groups were held with about six apprentices each. Observations were conducted at 14 working sites. Among these sites were venues where creative work was in the foreground (Barabasch and Keller, 2019). One of the interests in the data analysis was to find out how creativity is supported within different work environments throughout the apprenticeship training; several examples were identified.

Overall, there are large differences between the apprenticeships. While apprenticeships in occupations related to ICT provide a lot of scope for creative work, sales professions have this to a lesser extent and professions such as track builder at railway companies have almost none. The opportunities for working creatively seem to be connected to the different forms of work organisation, with those being able to work in agile work settings (Barabasch et al., 2020) being more inclined and supported to work creatively. Here, working in changing teams and projects contributes to opening one's mind, practising divergent and convergent thinking, and learning from being exposed to new experiences. This includes informal communication at eye level as much as new work structures. Forms of agile work have been introduced within occupations in informatics and media design, such as the scrumming method with its two-week long sprints, human-centred design (HCD) workshops that can lead to bigger projects or other projects for which the design-thinking method was used.

The project-based apprenticeship system introduced at Swisscom also offers apprentices the possibility to bring their own team together in an individual project. This supports identification with, and commitment to, work. Enthusiasm about working in real projects and taking over a lot of responsibility often creates high motivation and an experience of 'flow'. The working atmosphere is inspired by the interior design of the different working and learning locations. Apprentices in the IT field may especially have opportunities to work in hubs and meet employees from other departments or enterprises. Shared working spaces enable exchange, which can be especially valuable for the generation of new ideas.

A number of tools support creative work, such as the kick box, a tool for the generation of ideas. The enterprise is supportive of creative and entrepreneurial projects and provides funding for the further development of ideas. If they are approved as marketable products, at different stages, there is also further funding provided to take the project to a successful end. Within this culture, there is the spirit, that one should and can realise one's own ideas. Rooms are often flexibly furnished, so that they can be easily redecorated, which should encourage employees to experiment and play with ideas, which may help in finding new solutions. There is, for example, the Pirates Hub, a shared working space mostly for developers; the decoration is familial and friendly, and the rooms resemble a cosy coffee shop atmosphere. Several seating arrangements are designed for informal exchanges.

Alongside the methods agile work, creative workspace environments, design thinking approaches or the work with the kick box, the online market place, where projects are announced, is supporting and creating the preconditions for creative work. Cultural aspects manifest themselves further in the egalitarian form of communication, the coaching culture, the freedom and autonomy that apprentices have in their worktime and workplace decisions as much as in choosing among a number of projects according to their competence requirements or creating a project themselves. A positive culture of encouraging and communicating about mistakes, trustful relationships and plenty of opportunities to network all support creative work among apprentices.

While the telecommunication industry is by character widely innovation-oriented, the public transport industry also introduces various innovations, often connected to new digital technologies. Apprentices work within this innovation dynamic and understand how important it is to contribute to it. Innovation needs creativity and creativity is enhanced by leaving one's comfort zone and being exposed to new challenges and experiences. Enabling creative work has become an incremental aspect of the learning culture wherever possible.

The enterprise Login is the main provider for VET programmes in the public transportation sector in Switzerland. It operates as a training company for various occupations. In many cases, to cover all the requested competences set in the framework curricula of each apprenticeship programme, apprentices learn at different sites in different companies. Due to this rotation (often apprentices change training places at enterprises several times over the course of their apprenticeship), they can familiarise themselves with different workplaces of the public transportation sector and gain a more holistic insight than they would acquire remaining in one specific field of work at the same enterprise. An apprentice may work for one year at the Swiss Federal Railways (SBB), the main train operator in the country, then at a logistic enterprise, a bus operator or ferry company on one of the lakes or rivers, a local historic train company and eventually return to the host company where the journey started.

The enterprise employs apprentices for VET programmes that require high levels of general subject knowledge and good school grades in maths and languages, such as the VET programmes to become an IT specialist or mediamatician. There are also apprenticeships that require less general subject knowledge and students with lower grades can enter their compulsory school exams, such as specialist for customer dialogue or specialist for maintenance management. The diversity of VET students in the enterprise is high and the enterprise uses this plurality as an advantage to benefit from the diversity of ideas and approaches. Social connectedness is a central aspect in its learning culture. Since workers as much as apprentices are widely oriented towards their team, a functioning culture of trust is a central pillar for working creatively. This must be reinforced by workplace trainers, who tend to trust apprentices in making informed decisions, finding solutions and managing challenging situations successfully.

Acting creatively is particularly relevant in communicating both with customers and colleagues, in developing marketing tools or shaping workplaces and in sales more generally. In situations where apprentices assume a lot of responsibility (such as managing an entire train

station with mostly apprentices), finding creative solutions to problems arising is particularly important. Initiative-taking and planned action are demanded in this respect. A certain tolerance towards making mistakes helps apprentices to learn from challenging situations, especially when timely and constructive feedback is provided by workplace trainers.

Login uses so called innovation expeditions, a tool in which apprentices from different partner firms work on topical questions on the world of transportation. Including the views of the apprentices is considered especially valuable in early project phases. For example, the topic can be the establishment of new teaching and learning conditions or finding a recruitment strategy for a career for which it is difficult to recruit the requested number of apprentices. The innovation expeditions provide an easy way for (further) development through actively including the main target group in idea generation. The different topics (that can be introduced by Login or one of the partner firms), are sometimes worked on in mixed teams of apprentices and experienced workers and sometimes by a team of apprentices only.

Apprentices can also contribute to improvement through the apprentice-committee, which represents all Login apprentices. Its members gather requests and ideas for improvement from apprentices, elaborate possible steps for improvement and bring them to the management board. After evaluations by the apprentice population, the apprentices of the committee help to make sense of the results and respond to further questions. The committee has an internal platform through which they can be contacted. In being active in the committee, apprentices learn how to communicate with different target groups (peers, management, fellow workers), develop ideas and turn them into action or products, but also learn about participatory methods of decision-making and inclusive participation.

Some occupations in the transport world require high creative competences, as with apprentices working in the rail-service-management (*Zugverkehrsleitung*). Events such as delays or accidents cause unforeseen situations and consequential effects that require finding and implementing adequate solutions as soon as possible. In many other occupations of the sector, routine skills, reliability and teamwork competences are required while the development of creative solutions may be constraint due to safety regulations. Nevertheless, there is a common attitude that apprentices can and should contribute to improvements in their daily work and speak up if they have good ideas.

The relevance of apprentice (creative) contributions is introduced in the introductory week (*Einführungswochen*). Workplace trainers (that work in the partner firms but are trained by Login) are sensitised to the fact that apprentices need space to ‘play’ and try out different ways of doing something to find their own strategies. The provision of junior stations and junior business teams enables apprentices learn within holistic work situations and learn in different challenging situations. They can learn how to lead an office, work with clients, plan work and personal resources and how to do accounting. Workplace trainers are generally in the background and intervene, if needed, as a coach. Examples of how apprentices contribute with their creative ideas are also found in many other workplaces, such as trainers trusting apprentices to work on challenging tasks. For example, the apprentice or a small group of apprentices may have to find an adequate solution to a problem, supported by the workplace trainer when needed. Other apprentices plan activities for junior days when pupils come to the Swiss Federal Railways to be informed about the different apprenticeships. Many partner firms have tools to gather ideas from their employees, such as an idea-blackboard for announcing new ideas.

The public transportation sector is a more traditional sector where change is largely related to digitalisation. This carries the expectation that workplaces will disappear or be modified in the future and young adults need to be prepared to adjust to these challenges. Job rotation, work in apprentice teams, increasingly taking over responsibilities, acting within diverse teams of colleagues or finding and realising solutions in a particular setting of time and place contribute to the development of creativity and creative work. Apprentices can already be initiators of

innovative approaches and develop early leadership skills, solving challenging situations in the team creatively.

10.5. Conclusion

Creativity as a recognised 21st century skill and indispensable requirement for numerous professional tasks and positions has, so far, been insufficiently researched in VET. Yet current challenges such as digitalisation and industry 4.0 are making creativity increasingly important in VET and it is already regarded today as an 'indispensable prerequisite' for innovation (Schubert, 2009, pp. 10-13). The Danish creativity researcher Tanggaard (2017) concludes that 'the creative potential of trainees must be encouraged' if Europe is to maintain its innovative performance potential. Consequently, the promotion of creativity should take place in VET at all sites of learning, e.g. school, company and inter-company classes. Initial research results suggest that creativity in VET, including apprenticeships should be supported differently in different occupations, since different facets of creativity are relevant within them. It will be important to recognise the relevance of transversal skills, including creativity, in training ordinances and curricula. Based on the belief that they need to be trained, teaching and learning practices may respond to it, including the development of new didactic approaches. Initial findings from the learning culture project in Switzerland point to a variety of innovative measures undertaken by companies to support the development of creativity within workplace learning. These might inspire other enterprises to follow. More research is needed to understand how the different 21st century skills can be supported collectively, what kind of training teachers and trainers will need, and how new approaches to workplace learning can be implemented in different apprenticeship training.

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