

Diagnosis of Transferable Competences of Young People in the Dual Vocational Education—A German Perspective

Andreas Frey, Jean Jacques Ruppert

University of Applied Labour Studies, Mannheim, Germany
Email: andreas.frey@hdba.de

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Abstract

In Germany the dual vocational education system plays a central role in preparing young people for work. In order to succeed on the labour-market they need competences that go way beyond knowledge and cognitive skills. A quarter of trainees however dropout of vocational education raising questions about their professional action competence. This paper discusses the issue as to what extent subjective ideas of trainees from different occupational fields about their competences compiled using a questionnaire for Social, Methodical, and Personal Competences (SMP-C) are reliable and valid regarding the social, methodical, and personal competence classes. This entails an examination as to whether the SMP-C competence assessment questionnaire features satisfactory psychometric characteristics, on how the formed ability concepts behave towards each other and other constructs, and which competence values can be diagnosed. In order to examine these questions 937 trainees were asked about their competences and tendencies to dropout of vocational training. The analysis attests the assessment procedure overall satisfactory to good reliability, which speaks in favour of surveying social, methodical, and personal ability concepts using the subjective ideas of trainees regarding the application of competences. Furthermore, it seems that a stronger manifestation of specific social, methodical, and personal competences reduces the tendency to dropout of vocational training. Hence it might be possible to prevent early dropout from vocational training through specific strengthening of these competences.

Keywords

Diagnostic, Transferable Competencies, Dual Vocational Education, Trainees

1. Introduction

In Germany the dual vocational education system plays a central role in preparing young people for work, in developing their competences, and in responding to the labour-market needs of the economy (Field, Hoeckel, Kis, & Kuczera, 2009; Frey & Ruppert, 2013; Maclean & Wilson, 2009). The dual vocational education system consists of a training programme in which young people work for three or four days for a company that pays them and teaches them relevant competences. The rest of the time, the trainees attend specialised courses at a vocational school. The Chambers of Crafts, Commerce and Industry make sure that practical work and theoretical teaching are matched. After an average of three years of training, the trainees are certified. About two in four young Germans go through the dual system in about 327 accredited vocational careers. Furthermore, the fact that one in three 15-year-old Germans expects to have a high-skilled blue collar job by the age of 30 emphasises the attraction of the German dual system (Fazekas & Field, 2013). The obvious advantages of the dual system lie in the practical nature of the education as well as in the mutual screening between potential employers and potential employees during training. Another strength of the dual system resides in the fact that the partnership between the world of education and training and the world of crafts, commerce or industry guarantees that the competences acquired by the trainees have real relevance on the labour market. It should however also be stressed that the German dual system is based on a cooperation between the state, the unions, the employers, and the world of education that evolved over many generations and that might render the adoption by other countries of a similar vocational and educational training set-up very complicated indeed.

However, vocational education and training is not always completed successfully. In 2014 on average 10% of young people in Germany did not pass their final vocational examinations. Furthermore, in the same year about 25% of apprentices dropped out prematurely of vocational training (FIVET, 2016). According to Frey, Balzer, & Ruppert (2014) such dropouts cannot always be avoided and can, under certain circumstances, even be necessary and useful, e.g. when changing the training company. Nevertheless, active prevention of dropout is extremely important because a dropout always implies a loss of resources for the training company and has a demotivating effect on the trainees (Schmid & Stalder, 2012). At worst, it may lead to both the trainee giving up on education and training for good and the training company no longer taking on trainees (Forsblom, Negrini, Gurtner, & Schumann, 2016). A dropout should however not always be equated with an exit from the education and training system. A study by Uhly (2013) observed that about 60% of those young people who had dropped out in 2012, had later on taken up training again, though in another profession or with another company.

Today's society presents young people with complex challenges in the field of dual vocational education. They need competences that go way beyond know-

ledge and cognitive skills: “It involves the ability to meet complex demands, by drawing on and mobilising psychosocial resources (including skills and attitudes) in a particular context. For example, the ability to communicate effectively is a competency that may draw on an individual’s knowledge of language, practical IT skills and attitudes towards those with whom he or she is communicating” (OECD, 2005: p. 6). The OECD classifies these key competences into three categories:

Young people need to be able to use a wide range of different media, aids, or tools such as information technology or language efficiently, and to understand, adapt and use such tools interactively.

In an interdependent world, young people need to be able to engage with people from different cultures and interact in socially heterogeneous groups.

Young people need to be able to take responsibility for themselves, situate their lives in broader contexts, and act autonomously (OECD, 2005: p. 7).

These three categories are interrelated and form the basis for identifying and mapping key competences. The need to think and act reflectively is central to this conceptual framework of competences. “Reflectiveness involves not just the ability to apply routinely a formula or method for confronting a situation, but also the ability to deal with change, learn from experience and think and act with a critical stance” (OECD, 2005: p. 7).

The aim of the following study is to present selected definitions of “professional competences” and to address the question of competence diagnostics. In addition, the issue of the premature termination of training contracts is described. This is followed by a demonstration of how the detection of competences and the diagnosis of dropout tendencies from vocational education can be empirically approached with the SMP-C assessment survey.

2. The Concept of Competence

Erpenbeck & Heyse (2007) define cognitive knowledge as the basis of competence: “Competences are based on knowledge, constituted through values, disposed as skills, consolidated through experience, and realised through willpower” (Erpenbeck & Heyse, 2007: p. 163). In order to act in a competent way, young people must be motivated to transform the reflected processes into activities. However, an action can only be regarded as competent if it is based on the consideration of individual and social values and standards. Hence, individuals must also be able to classify knowledge and skills in value relationships (Erpenbeck & Heyse, 2007: p. 162). However, to this end, a value system must exist which is formed through experience, reflected, and internalised in case of a positive assessment of its effect. Knowledge, abilities, and values then become components of a young person’s experiences. Together the specified characteristics are united in an individual’s personality; and that is why competence is also sometimes described as a dimension of personality (Erpenbeck & Heyse, 2007: p. 176).

Weinert (2001) describes competence as “the cognitive abilities and skills existing within individuals or which can be learned by them to solve certain prob-

lems as well as the motivational, volitional, and social dispositions and abilities to be able to use problem solutions in variable situations successively and in a responsible way” (Weinert, 2001: p. 27 et seq.). He thus addresses the characteristics described before and adds additional aspects to the concept of competence. A young person’s individually existing resources, i.e. their physical and psychological assets, form the basis for acting competently. Moreover, individuals have knowledge, abilities and attitudes that can be learned. This implies that competence includes the ability to further develop one’s own resources (Frey & Ruppert, 2013: p. 186 et seq.). This self-organised application of the above mentioned dispositions can be described as competent actions. Erpenbeck thus also describes competence as a self-organisation disposition (Erpenbeck, 2007: p. 136 et seq.).

Only those individuals act completely competent who “act consciously, willingly, and responsibly, in accordance with criteria which are socially respected, not in the sense of a technically satisfactory (poiesis) but also an ethically correct performance (praxis): that is why the competent subject enjoys professional and, in a more comprehensive sense, social authority” (Ghisla, Bausch, & Boldrini, 2008: p. 22). Responsibility means more than just being reliable. That which is presented to the world as a new creative/innovative solution must not only be functionally reliable; it is mandatory that it is also reconcilable with the basic values of a society and/or legitimate rather than just opportune. “Competence is therefore not simply rooted in the resources (knowledge, abilities, and attitude) from which it arises in the respective situation, nor in the sum of these, but in the act of creative and functional combination and mobilisation of these resources in concrete situations” (Ghisla, Bausch, & Boldrini, 2008: p. 23). Hence, what is important is that the three aspects of knowledge, abilities and attitudes in combination with responsible actions in different situations “coincide” with each other (Frey & Ruppert, 2013: p. 187). In this context, Ghisla et al. (2008) explain that a specific competence becomes apparent when a young person appropriately masters a specific class of situations and mobilises specific resources to do so (cf. **Figure 1**).

The interaction of competences and resources in situations as illustrated in **Figure 1** can be described as follows: A professional situation defines which competences are required to master the situation. This implies that every competence needs a pool of resources (knowledge, abilities, attitudes) which the young persons developed or further developed in their vocational training. A particular professional situation therefore allows the identification of the resources which are developed, and must then be pooled and connected to form different competences.

As an occupation is characterised by several professional situations, a young person needs many different (action) competence constellations, which feed from different resources and can be accessed as required and demanded by the situation (cf. **Figure 2**).

The constellations in **Figure 2** show that to process Situation 1, you require Action Competence 1 consisting of Resources 1, 2, 4, and 5. To process Situation

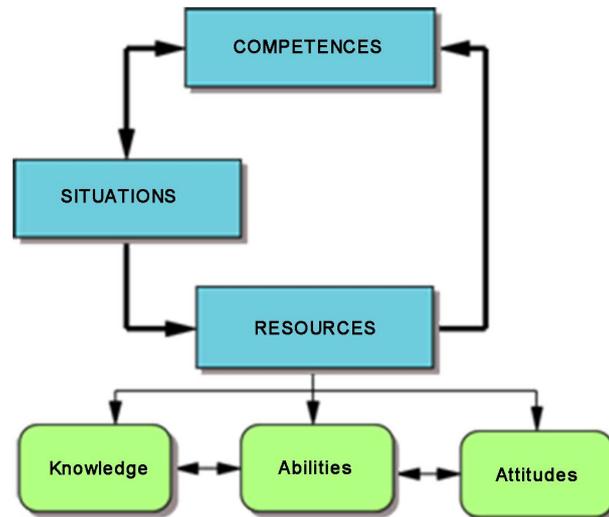


Figure 1. Interaction of competences and resources in situations (Ghisla et al., 2008).

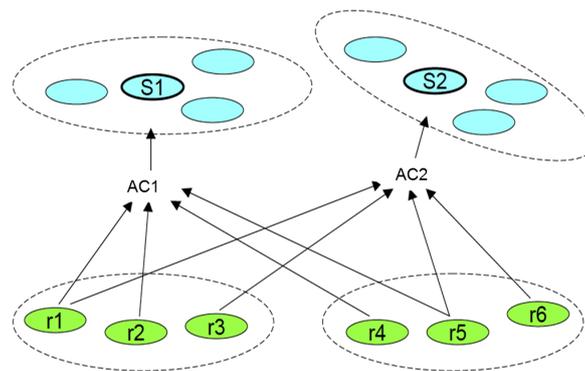


Figure 2. Competence constellations and resources (Scharnhorst, 2009).

2, you require Action Competence 2 consisting of Resources 1, 3, 5, and 6. This means that there is an ideal competence constellation for every situation, which in turn feeds from different resources to solve the respective situation. At the same time, the figure shows that Resources 1 and 5 must be important (knowledge, abilities, and attitudes) as they are accessed by two competence constellations.

Nägele (2013) assumes that competences are situation-related. This means that acting competently becomes apparent when a young person is able to assess the exterior framework conditions of a situation and applies the existing situational (circumstantial) resources combined with the personal resources for their intentions (Nägele, 2013: p. 291). Not only can competences be applied in specific professional action situations, they are also used to act appropriately in personal situations. Thus, they can be applied variably across several contexts.

According to Frey & Ruppert (2013) and Frey, Balzer, & Ruppert (2014), competence can be described as follows: Those who have competence are able

to act and hence able to access, according to the specific situation, these resources from the ones they have developed (knowledge, abilities, attitudes) which are required to solve the task at hand in a target-oriented and responsible way, to assess this solution, and to further develop their own competence constellations. The competence constellations can be divided into four sub-classes: the technical competence class on the one hand and, on the other hand, the methodical, the social, and the personal competence classes. The three latter are also summarised under the term “interdisciplinary competences” and/or “key competences”. The four competence classes are composed of different knowledge, abilities, and attitudes which again can be divided into different skills. All competence classes and the respective knowledge, abilities, and attitudes are interconnected and interdependent. Together, they form the professional action competence.

The *technical competence* includes knowledge and abilities which are geared towards the discipline and/or occupation and are subject to change, thus requiring constant further training. These technical ability areas constitute the purely technical specific basic knowledge required for a given occupation. Without technical skills, working in any occupation is impossible as they provide a person’s specialisation.

Social competence describes, according to the situation and task at hand, the behaviour required to responsibly solve a task autonomously or in cooperation with others. If more than one person contributes to a problem-solving process—even in part—then the agent is confronted with more behavioural dispositions which are components of the ability to deal with conflict and to communicate, but also of leadership ability and situation-appropriate behaviour. In detail, this includes the following abilities:

1) The *ability to cooperate* describes the ability to cooperate with others. Cooperation is a work behaviour of at least two persons who work towards achieving a common goal in a conscious, organised, coordinated way, complementing each other. Therefore, cooperation always refers to a network of persons who are in a working or learning situation with each other.

2) *Social responsibility* describes the ability to act responsibly, autonomously, and considering values and standards as well as the effects that can be anticipated on oneself, on others, and on situations, and also to consciously bear the resulting consequences.

3) The *ability to deal with conflict* describes the ability to engage in a confrontation with someone else or a group and to persist until a compromise can be reached or the problem is solved. The prerequisite for this is that a person can react to criticism appropriately—sometimes also calmly—and is able to accept and voice constructive criticism.

4) The *ability to communicate* describes the ability to assume different functions in a communicative feedback loop. On the one hand, this includes abilities such as expressing oneself clearly and precisely and presenting complicated facts intelligibly and, on the other hand, abilities such as (active) listening to others as

well as including others in a conversation.

5) In general, *leadership ability* describes influencing the attitudes and behaviour of individuals and the interaction of persons in and between groups with the purpose of achieving certain goals together. Leadership is a trend-setting and steering influence on the behaviour of others to achieve a goal; it frequently includes utilising material resources. An essential characteristic of successful leadership in particular is the dynamic process in which responsibility is assigned and self-responsibility is motivated. Those being led are deliberately informed about the goals and the kind of influence. Successful leadership behaviour seeks to maintain and promote the motivation of those being led—sometimes despite conflicting interests. Furthermore, the promotion requirements of individuals and appropriate promotion measures are identified and presented in this process.

6) *Situation-appropriate behaviour* describes the ability of applying good manners and behaving and acting confidently in different situations as well as being impartial towards others.

Methodical competence describes the ability of being able to think and act within a defined subject field (Frey, Balzer, & Ruppert, 2014). This includes the abilities to handle tools in a competent and reflective way, to structure work processes, to acquire knowledge and expertise about tools, working conditions, and partners of interaction as well as about individually and socially effective work contexts, to apply these abilities, and to expand or to modify them if necessary (Nägele, 2013). Methodical competence frequently includes abilities assigned to the areas of autonomy, the ability to analyse, flexibility, target-oriented behaviour, working techniques, and reflectiveness.

1) *Autonomy* describes the ability to take the initiative in social situations, to set goals, and to select and apply methods to reach these goals independently. Additionally, this includes abilities such as managing projects autonomously and acting confidently. Autonomy furthermore includes the learning and working behaviour of showing socially accepted and development-appropriate performances under existing socio-cultural circumstances.

2) The *ability to analyse* describes the ability of being able to analyse a situation systematically. The ability to analyse is very closely linked to problem solving. An improved ability to analyse is achieved through synthesis and evaluation of cognitive goals.

3) *Flexibility* describes the ability to react and adapt to changed circumstances in a straightforward way and to adjust to them as well as to work on different tasks at the same time. This is a complex disposition helping individuals to approach one or several problems using different solutions. This behaviour also includes the ability to question old facts and try new approaches.

4) *Target-oriented behaviour* describes the ability to solve a problem, to get an insight, or reach a target by using specific action methods, application techniques, and cognitive strategies. Characteristic features are abilities such as

working systematically, differentiating important from unimportant matters, prioritising, and setting realistic goals. Solving problems leads to an increase in insight and allows independently finding ways of coping also in new situations in the future. Tasks are mastered and problems are solved through the combination of different rules learned.

5) *Working techniques* describes the ability to learn and internalise numerous treatment techniques of varying precision and methods in a pool of practical action methods, and to have them available at any time in order to achieve a specific goal. Working techniques thus refer to having many regulated and planned approaches available to gain different insights and achieve goals in general.

6) *Reflectiveness* describes the ability of assessing one's own actions and oneself critically; this is important for the quality and efficiency of one's own work. Reflective behaviour evaluates one's own past or current actions and structures and should be geared towards rationality, objectivity and authenticity. Reflection, for instance, begins when actions become problematic, when the desired success does not ensue, when undesired side effects occur, or when certain situations are unclear. The reflection of practical actions and situations when this occurs, can lead to knowledge towards which actions can be oriented, provided this is seen from the point of view of practical benefit.

Personal competence includes ability concepts, attitudes, actions, or characteristics required to act in a self-responsible and motivated manner (Frey & Ruppert, 2013). The ethical ability is of significant importance here; insights gained which have become "guidelines of life" for the respective individual are reflected in virtues which can also be described as ethical attitudes. Personal competence is all about acting based on self-reflection paired with a moment of solitude—in the sense of a solitary decision—when an idea, a belief, or a conviction forces decisions which need to be made alone and which no one else can take for you (Roth, 1971).

1) *Helpfulness and empathy* describe behaviour such as making others happy, being reliable and tolerant, and being considerate of others. This also includes friendly, honest, and trustful behaviour towards others.

2) *Composure and patience* describe happy, patient, and composed behaviour. In addition, this can be understood as fair thinking and acting.

3) *Sense of duty* describes behaviour such as showing self-discipline, keeping order, and fulfilling one's duties. Additionally, this includes being on time, hard-working, and sensible.

4) *Love of freedom* means loving life, being cheerful and free, and striving for happiness in general.

5) *Curiosity* describes behavioural aspects such as being creative and continuous learning and exploring. Additionally, this includes abilities such as being able to evaluate and being critical.

On the whole, the technical, social, methodical, and personal competence classes are not facets of competence that are independent of each other, standing vaguely next to each other, but must rather be seen as linked and/or intercon-

nected units which, when brought together, reflect a person's professional action competence (Frey & Ruppert, 2013), where the setup and synthesis of the competence units over time and across different areas of activity and employment leads to the development of a comprehensive action competence (Nägele, 2013).

3. Ascertainment of Competences

An approach inquiring competences through self-assessment lends itself to questions of competence diagnostics.

From a methodical perspective, self-assessments using questionnaires have the advantage that they can be completed by many people in little time. Furthermore, the prevailing opinion on quantitative self-assessment procedures is that the concerned people themselves are best suited to provide information regarding professional competences or professional behavioural dispositions (Kaslow, 2004). However, assessing competences requires that the respective individuals know themselves well, that they are able to observe and assess themselves realistically in retrospect, that they do not consciously want to rate themselves better or worse than they are, and, in addition, that they do not unconsciously base their assessment on social desirability or acquiescence. Even if an individual's self-assessment were objectively incorrect, this self-assessment would be subjectively more conducive to action and thus definitely be of central importance for the description of behaviour (Nägele, 2013). Moreover, teachers, trainers, lecturers, managers, personnel development managers, or other HR representatives desiring information about the competence levels of individuals or groups must make sure that the evaluations of such self-assessments have no negative consequences on individual or group levels but are instead processed in the sense of pedagogic diagnostics and help locate competence deficits and initiate promotion measures.

As compared to subjective self-assessments, measuring methods allowing for direct observing and recording of competences or attitudes in on-the-job situations have an important advantage: Assessment centres, for instance, allow interviewing, watching, and assessing people in the context of social interaction situations, which means for the assessor that he/she can ask or present further or deepening questions, and set tasks or roles (Kaslow, 2004). In this process, displayed behaviour leads to conclusions about personal characteristics. Since most of the times this behaviour is more complex than this is the case in self-assessments, the expectation is that observation methods have a higher prognostic validity (Kaslow, 2004). However, Oser, Renold, John, Winther, & Weber (2009) point out that the objective identification of competences (so-called professional standards) entails significant timely and financial expenses. Additionally, the observation method frequently underestimates the intelligence of the persons to be observed and the observation errors; here, above all the construct validity is problematic, as it generally turns out that the observers differentiate only a little between individual characteristics and have their evaluations influenced by their

overall impression instead.

Objective measuring methods, such as for determining emotional or social intelligence, are tests including exercises which have right or wrong solutions only and from which a total value for the potential when handling situations or problems is calculated. However, these tests to measure abilities in social situations did not prevail, as the underlying, mostly very abstract and decontextualised items have little or nothing to do with what constitutes the actual competence of a person in a professional situation (Frey & Ruppert, 2013).

Regarding the pros and cons of the methodical measurement methods presented, subjective self-assessments are preferred to observation methods; otherwise, data of a sample as large as this could not be weighted for economic reasons. Intelligence tests are rejected out of hand because you cannot inquire right or wrong behaviour within social, methodical and personal ability concepts; instead, the focus of the investigation rests on the degree of the individual or collective manifestation regarding social, methodical, and personal competences of different individuals and groups of persons.

4. The Assessment Sheet for Social, Methodical, and Personal Competences (SMP-C)

These theoretical explanations will be followed by the description of an empirical approach for the diagnosis of social, methodical, and personal competences.

A six-level response format is used. Statements regarding competences and the tendency to dropout of vocational education can be assessed using the responses “Fully applies”, “Applies”, “Applies somewhat”, “Does not really apply”, “Does not apply” and “Does not apply at all” to determine to which extent the respective statement is a competence indicator regarding individual behaviour. The surveys mentioned here generally are self-assessments in writing on questionnaires.

4.1. Structure of the SMP-C Assessment Sheet

The current version of the SMP-C measures the social, methodical, and personal competence classes distributed over 17 ability concepts:

The social competence class is divided into the six ability concepts *Social responsibility* (SV), *Ability to cooperate* (KO), *Ability to deal with conflict* (KF), *Ability to communicate* (KM), *Leadership ability* (FÜ), and *Situation-appropriate behaviour* (SA). The associated statements (e.g. “Cooperating with others”) are rated on a six-level scale of 1 (“Does not apply at all”) to 6 (“Fully applies”).

The methodical competence class includes the six ability concepts *Ability to analyse* (ANA), *Flexibility* (FLE), *Target-oriented behaviour* (ZIE), *Working techniques* (ARB), *Reflectiveness* (REF), and *Autonomy* (SE). The associated statements (e.g. “Reflecting on your own knowledge and skills”) are rated on a six-level scale of 1 (“Does not apply at all”) to 6 (“Fully applies”).

The personal competence class includes the five ability concepts *Love of freedom* (FRL), *Composure and patience* (GG), *Helpfulness and empathy* (HE), *Cu-*

riosity (NEU), and *Sense of duty* (PFB). The associated statements (e.g. “*Being tolerant*”) are rated on a six-level scale of 1 (“Does not apply at all”) to 6 (“Fully applies”).

The tendency to dropout of vocational education is identified on agreement with the statement “*I am currently thinking of dropping out of training*”. The scale ranges from 1 (“Does not apply at all”) to 6 (“Fully applies”).

Both the three competence classes and the above mentioned ability concepts can be evaluated separately. **Table 1** shows an extract of the SMP-C.

4.2. Current State of Empirical Analyses

The following discusses the question to what extent subjective ideas about the application of competences surveyed using the SMP-C are reliable and valid regarding the social, methodical, and personal competence classes. This entails an examination as to whether the current version of the SMP-C competence assessment sheet features satisfactory psychometric characteristics, on how the formed ability concepts behave towards each other and other constructs, and which competence values can be diagnosed. A study with trainees from diverse occupations forms the basis for this test.

The trainees were interviewed on their competences and tendencies to dropout of vocational education in order to examine these questions.

4.3. Sample

A total of 937 individuals participated in the competence assessment survey. The participants were aged between 15 and 30 years with a majority i.e. 722 individuals (77%) being between 16 and 19 years old.

More than 3/4 of the participants i.e. 735 individuals (78.4%) were male; female participants were underrepresented: 202 individuals (21.6%).

The sample was distributed as follows across years of vocational training and studies among participants:

426 (45.5%) were in their 1st year and 287 (30.6%) in their 2nd year of training/studies with 145 (15.5%) in their 3rd year and 79 (8.4%) in their 4th year of training/studies.

Regarding the occupational fields of the different vocational trainings, the fields of vehicles with 154 individuals (16.4%), electrical engineering with 117

Table 1. Structure of the SMP-C self-assessment sheet.

	① = Does not apply at all; ② = Does not apply; ③ = Does not really apply; ④ = Applies somewhat; ⑤ = Applies; ⑥ = Fully applies	I apply these competences:
Being able to listen to others		① ② ③ ④ ⑤ ⑥
Working independently		① ② ③ ④ ⑤ ⑥
Reflecting critically on my own behaviour		① ② ③ ④ ⑤ ⑥

individuals (12.5%), metal/machines with 154 individuals (16.4%), and health with 102 individuals (10.9%), were the most strongly represented (see **Table 2**).

Additionally, a gender-specific difference could be observed for the occupational fields mentioned above. The male participants came mainly from the following fields: 150 individuals (20.4%) hailed from the occupational field of vehicles, 114 individuals (15.5%) from electrical engineering, and 146 individuals (19.9%) from metal/machines. The majority of female participants i.e. 90 individuals (44.6%), hailed from the health sector (see **Table 2**).

4.4. Descriptive Scale Characteristics

A first step depicted the descriptive measures of the individual ability concepts of the SMP-C. **Table 3** responds to the mean values, standard deviations, and skewness of the ability concepts of the SMP-C based on the total sample.

The mean values reported in **Table 3** were calculated as follows: Initially, the six responses were coded in the numbers 1 - 6 (the higher the number, the higher the agreement; a high number thus corresponds to a high competence). Then, the mean value was calculated across all items of an ability concept, i.e. the total of reported item values was divided by the number of items responded.

When considering the mean values resulting from this and their standard deviations and skewness, it becomes apparent that the participating individuals

Table 2. Occupational fields.

Occupational field	Female	Male	Total
Nature	.6% (N = 6)	5.5% (N = 52)	6.2% (N = 58)
Food	.1% (N = 1)	1.5% (N = 14)	1.6% (N = 15)
Accommodation and food service	3.3% (N = 31)	2.5% (N = 23)	5.8% (N = 54)
Design, art	.6% (N = 6)	.4% (N = 4)	1.1% (N = 10)
Print	.7% (N = 7)	1.1% (N = 10)	1.8% (N = 17)
Construction	.4% (N=4)	5.4% (N = 51)	5.9% (N = 55)
Wood, interior finish	.3% (N = 3)	5.4% (N = 51)	5.8% (N = 54)
Vehicles	.4% (N = 4)	16.0% (N = 150)	16.4% (N = 154)
Electrical engineering	.3% (N = 3)	12.2% (N = 114)	12.5% (N = 117)
Metal, machines	.9% (N = 8)	15.6% (N = 146)	16.4% (N = 154)
Planning, construction	.4% (N = 4)	3.2% (N = 30)	3.6% (N = 34)
Economy, administration	1.4% (N = 13)	1.0% (N = 9)	2.3% (N = 22)
Traffic, logistics	1.5% (N = 14)	4.1% (N = 38)	5.5% (N = 52)
Computer sciences	.3% (N = 3)	2.1% (N = 20)	2.5% (N = 23)
Health	9.6% (N = 90)	1.3% (N = 12)	10.9% (N = 102)
Other	.5% (N = 5)	1.2% (N = 11)	1.7% (N = 16)
Total	21.6% (N = 202)	78.4% (N = 735)	100.0% (N = 937)

Table 3. Mean values, standard deviations, and skewness of the SMP-C ability concepts.

Total (N = 937)			
Ability concepts of the social competence class	M	SD	Skewness
Social responsibility	4.77	.54	-.52
Ability to cooperate	4.92	.52	-.61
Ability to deal with conflict	4.59	.58	-.36
Ability to communicate	4.74	.50	-.49
Leadership skills	4.55	.55	-.30
Situation-appropriate behaviour	4.90	.52	-.68
Ability concepts of the methodical competence class	M	SD	Skewness
Ability to analyse	4.42	.58	-.21
Flexibility	4.53	.55	-.39
Target-oriented behaviour	4.75	.55	-.25
Working techniques	4.66	.53	-.22
Reflectiveness	4.60	.64	-.43
Autonomy	4.68	.59	-.46
Ability concepts of the personal competence class	M	SD	Skewness
Love of freedom	5.15	.63	-.95
Composure and patience	4.99	.61	-.63
Helpfulness and empathy	5.20	.49	-.69
Curiosity	4.61	.70	-.74
Sense of duty	4.96	.61	-.57

assign quite high levels between $M = 5.20$ and $M = 4.42$ of the stated competences to themselves; the response behaviour thus leans to the right. The competence assessed highest in the ability concept is *Helpfulness and empathy*, the competence assessed lowest in the ability concept is the *Ability to analyse*.

4.5. Reliability

Statements regarding the reliability of the SMP-C and its 17 ability concepts are made using reliability analyses (Cronbach's α as characteristic for internal consistency). Cronbach's α can be calculated as follows regarding the ability concepts of the SMP-C:

The *reliabilities* for the ability concepts of the social competence class of the SMP-C (see **Table 4**) are between $\alpha = .63$ and $\alpha = .76$. For the ability concepts of the methodical competence class they are between $\alpha = .70$ and $\alpha = .81$, and for the ability concepts of the personal competence class between $\alpha = .73$ and $\alpha = .78$. The reported coefficients thus indicate a satisfactory to good degree of internal consistency of the individual ability concepts. When summarising the ability

Table 4. Reliabilities of the SMP-C ability concepts.

Ability concepts of the social competence class	α	Ability concepts of the methodical competence class	α
Social responsibility	.76	Ability to analyse	.81
Ability to cooperate	.73	Flexibility	.70
Ability to deal with conflict	.72	Target-oriented behaviour	.73
Ability to communicate	.63	Working techniques	.78
Leadership skills	.71	Reflectiveness	.76
Situation-appropriate behaviour	.64	Autonomy	.72
Ability concepts of the personal competence class	α		
Love of freedom	.78		
Composure and patience	.73		
Helpfulness and empathy	.73		
Curiosity	.75		
Sense of duty	.75		

concepts into the three higher-level classes of social competence, methodical competence, and personal competence, the α of .90 and/or the α of .79 for personal competence show very good reliability coefficients.

4.6. Validity

The validity of a measuring instrument indicates how well it is able to measure what it intends to measure. There are various ways of determining validity. The following will initially describe questionnaire-specific findings thus detailing the internal structure (content validity, structural validity, differential validity). This will then be extended to include correlative results for external criteria (criterion validity).

4.7. Content Validity

The content validity specifies to what extent the content conveyed by the items can actually be assigned to the postulated concepts. Since content validity is frequently determined by subjective judgement, it is often also referred to as “face validity”. In the present case it was defined by 15 assessment experts (professors from German-speaking countries). The result of the expert consultation substantiated that the 17 ability concepts cover the field of social, methodical, and personal competences, and that the respective statements (items) are important competence indicators that can be summarised into ability concepts—as we did.

4.8. Structural Validity

Structural validity describes a statistical measuring method. As explained in the theory section earlier on, social, methodical, and personal competences and their

ability concepts are no independent competence facets which stand next to each other incoherently; they must be seen as interconnected units instead. The following **Tables 5-10** list the individual measures of coherence.

The presentation of results in **Table 5** shows that the ability concepts are in an intercorrelating connection which significantly differs from zero (in all cases $p < .01$). The highest connection exists between *Ability to cooperate* and *Social responsibility* ($r = .67$), the lowest between *Ability to cooperate* and *Ability to deal with conflict* and between *Ability to deal with conflict* and *Situation-appropriate behaviour* as well as between *Leadership ability* and *Situation-appropriate behaviour* (each $r = .55$).

The measures of coherence in **Table 6** prove that generally all ability concepts are in a highly intercorrelating network which significantly differs from zero (in all cases $p < .01$). The highest connection exists between *Working techniques* and *Ability to analyse* ($r = .69$), the lowest between *Reflectiveness* and *Autonomy* ($r = .42$).

The measures of coherence in **Table 7** prove that generally all ability concepts are in a highly intercorrelating network which significantly differs from zero (in all cases $p < .01$). The highest connection exists between *Helpfulness and empathy* and *Composure and patience* ($r = .67$), the lowest between *Love of freedom* and *Sense of duty* ($r = .23$).

The measures of coherence in **Table 8** prove that all ability concepts correlate significantly, differing from zero (in all cases $p < .01$). The highest connection exists between *Ability to analyse* and *Leadership ability* ($r = .57$), the lowest between *Reflectiveness* and *Ability to cooperate* ($r = .38$).

The measures of coherence in **Table 9** prove that all ability concepts correlate significantly, differing from zero (in all cases $p < .01$). The highest connection exists between *Helpfulness and empathy* and *Social responsibility* ($r = .57$), the lowest between *Love of freedom* and *Situation-appropriate behaviour* ($r = .21$).

The measures of coherence in **Table 10** prove that all ability concepts correlate significantly, differing from zero (in all cases $p < .01$). The highest connection exists between *Ability to analyse* and *Curiosity* ($r = .55$), the lowest between *Reflectiveness* and *Love of freedom* ($r = .24$).

The structural dependencies of the individual ability concepts formed the starting point for a factor analysis of the third order conducted with the 17

Table 5. Intercorrelations of the ability concepts of the social competence class (All correlations are (bilaterally) significant on the level of $\alpha = .01$).

	SV	KF	KM	FÜ	SA
KO	.67	.55	.63	.57	.59
SV		.61	.64	.61	.62
KF			.60	.56	.55
KM				.58	.64
FÜ					.55

Table 6. Intercorrelations of the ability concepts of the methodical competence class (All correlations are (bilaterally) significant on the level of $\alpha = .01$).

	ANA	FLE	ZIE	ARB	REF
SE	.54	.54	.59	.59	.42
ANA		.65	.66	.69	.65
FLE			.60	.66	.51
ZIE				.68	.53
ARB					.57

Table 7. Intercorrelations of the ability concepts of the personal competence class (All correlations are (bilaterally) significant on the level of $\alpha = .01$).

	HE	NEU	PFB	FRL
GG	.67	.34	.49	.38
HE		.39	.53	.35
NEU			.47	.46
PFB				.23

Table 8. Correlations between the ability concepts of the methodical competence class and the ability concepts of the social competence class (All correlations are (bilaterally) significant on the level of $\alpha = .01$).

	SE	ANA	FLE	ZIE	ARB	REF
SV	.51	.47	.49	.46	.45	.41
KO	.50	.46	.46	.48	.45	.38
KF	.50	.50	.51	.47	.47	.47
KM	.47	.50	.52	.51	.50	.42
FÜ	.47	.57	.54	.52	.52	.47
SA	.45	.41	.48	.48	.43	.41

Table 9. Correlations between the ability concepts of the personal competence class and the ability concepts of the social competence class (All correlations are (bilaterally) significant on the level of $\alpha = .01$).

	HE	GG	PFB	FRL	NEU
SV	.57	.48	.44	.26	.41
KO	.49	.42	.45	.26	.36
KF	.45	.39	.39	.29	.46
KM	.48	.40	.39	.22	.36
FÜ	.46	.41	.39	.34	.45
SA	.50	.41	.40	.21	.34

established ability concepts. Since the intercorrelations of the ability concepts (see **Tables 5-10**) indicate that they are not independent of each other, a skewed

Table 10. Correlations between the ability concepts of the methodical competence class and the ability concepts of the personal competence class (All correlations are (bilaterally) significant on the level of $\alpha = .01$).

	SE	ANA	FLE	ZIE	ARB	REF
HE	.32	.35	.40	.37	.34	.39
GG	.32	.33	.39	.33	.32	.33
PFB	.47	.45	.42	.50	.44	.51
FRL	.27	.34	.31	.29	.27	.24
NEU	.49	.55	.50	.45	.48	.53

factor analysis (principal component analysis, oblimin rotation with Kaiser normalisation) was conducted.

It must be noted that a three-factorial factor solution determined this way separates the ability concepts of the social competence class from those of the methodical competence class and the personal competence class (see the factor loading matrix in **Table 11**).

The ability concepts *Social responsibility*, *Ability to cooperate*, *Ability to communicate* and *Situation-appropriate behaviour* continuously load very high on the first factor “Social competency” with values between .762 and .885. The ability concepts of *Ability to deal with conflict* and *Leadership ability* have loadings of .651 and .499 and are thus of less importance for the first factor. The second factor, “Methodical competence”, is characterised by high loadings of the two ability concepts of *Ability to analyse* (.997) and *Reflectiveness* (.851). The ability concepts of *Working technique* (.653), *Target-oriented behaviour* (.626) and *Flexibility* (.457) load a little weaker. The ability concepts *Helpfulness and empathy*, *Composure and patience*, *Sense of duty*, *Love of freedom*, and *Curiosity* load on the third factor “Personal competence”.

The three-factorial rotated solution solves a total of 65.1% of the observed variance, where 49.9% of the variance are allotted to the first factor “Social competence”. The second factor “methodical competence”, solves a further 8.2%, and the third factor “Personal competence”, solves 6.9% of the variance.

4.9. Differential Validity

The differential validity refers to the question as to which degree a measuring method differentiates between different subgroups. Female and male trainees are compared for this purpose.

The following differences could be observed in the gender comparison using t tests; here, ability concepts at the 5% level ($p < .05$) show significant mean value differences (see **Table 12**).

In the social competences *Ability to cooperate* ($M_f = 5.04$; $M_m = 4.88$; $F = 1.14$; $p = .00$), *Social responsibility* ($M_f = 4.94$; $M_m = 4.72$; $F = 1.71$; $p = .00$), *Ability to communicate* ($M_f = 4.85$; $M_m = 4.71$; $F = 3.37$; $p = .00$), and *Situation-appropriate behaviour* ($M_f = 5.08$; $M_m = 4.84$; $F = 4.07$; $p = .00$) as well as the personal

Table 11. Factor loading matrix of a superordinate principal component analysis with oblimin rotation (Factor loadings < .376 are not included; eigenvalue of the first factor = 8.5; eigenvalue of the second factor = 1.4, eigenvalue of the third factor = 1.2, three-factorial solution forced).

	Factor		
	Social competence	Methodical competence	Personal competence
SV	.793		
KO	.759		
KF	.651		
KM	.771		
FÜ	.499		
SA	.795		
SE		-.618	
ANA		-.856	
FLE		-.688	
ZIE		-.757	
ARB		-.846	
REF		-.707	
HE			.608
GG			.703
PFB			.392
FRL			.693
NEU			.433

competences *Helpfulness and empathy* ($M_f = 5.38$; $M_m = 5.15$; $F = 3.11$; $p = .00$) and *Sense of duty* ($M_f = 5.13$; $M_m = 4.91$; $F = .05$; $p = .00$), a significant difference in favour of the female respondents could be observed.

However, there was a significant difference in the methodical competence *Ability to analyse* ($M_m = 4.44$; $M_f = 4.49$; $F = .24$; $p = .05$) and the personal competence *Love of freedom* ($M_m = 5.18$; $M_f = 5.04$; $F = .00$; $p = .00$) in favour of male respondents.

The following social/methodical and personal competences however, did not show a significant gender-specific difference: *Ability to deal with conflict*, *Leadership ability*, *Autonomy*, *Reflectiveness*, *Flexibility*, *Target-oriented behaviour*, *Working techniques*, *Composure and patience*, and *Curiosity*.

4.10. Criterion Validity

The analyses are extended to include correlative external criteria using criterion validity. To this end, a comparison between the ability concepts of the SMP-C assessment sheet on the one side and the tendency to dropout of training on the other side is calculated. **Table 13** shows the result.

Table 12. SMP-C in a gender comparison; f = female, m = male.

Ability concepts of the social competence class	M_f	SD_f	M_m	SD_m	F	p
Social responsibility	4.94	.49	4.72	.55	1.71	.00
Ability to cooperate	5.04	.47	4.88	.52	1.14	.00
Ability to deal with conflict	4.63	.58	4.57	.58	0.00	.27
Ability to communicate	4.85	.44	4.71	.51	3.37	.00
Leadership skills	4.59	.53	4.54	.55	0.50	.24
Situation-appropriate behaviour	5.08	.44	4.84	.53	4.07	.00
Ability concepts of the methodical competence class	M_f	SD_f	M_m	SD_m	F	p
Ability to analyse	4.49	.60	4.44	.57	.24	.05
Flexibility	4.59	.50	4.51	.57	2.26	.07
Target-oriented behaviour	4.74	.54	4.76	.55	.38	.76
Working techniques	4.61	.54	4.68	.53	.00	.08
Reflectiveness	4.66	.65	4.58	.64	.08	.10
Autonomy	4.66	.59	4.68	.59	.22	.61
Ability concepts of the personal competence class	M_f	SD_f	M_m	SD_m	F	p
Love of freedom	5.04	.61	5.18	.63	.00	.00
Composure and patience	5.05	.60	4.97	.61	.00	.10
Helpfulness and empathy	5.38	.45	5.15	.49	3.11	.00
Curiosity	4.61	.68	4.62	.70	.11	.88
Sense of duty	5.13	.60	4.91	.61	.05	.00

Using t tests, the following differences referring to the competence assessment could be observed in the comparison of the mean values of the tendencies to dropout of training; here, ability concepts at the 5% level ($p < .05$) show significant mean value differences (see **Table 13**).

Respondents with a tendency to dropout of training assess themselves significantly worse in the social competences *Social responsibility* ($M_{\text{AAT}} = 4.52$; $M_{\text{OAAAT}} = 4.78$; $F = .01$; $p = .01$), *Ability to deal with conflict* ($M_{\text{AAT}} = 4.37$; $M_{\text{OAAAT}} = 4.59$; $F = .00$; $p = .03$), *Situation-appropriate behaviour* ($M_{\text{AAT}} = 4.60$; $M_{\text{OAAAT}} = 4.91$; $F = 1.23$; $p = .01$), and *Ability to communicate* ($M_{\text{AAT}} = 4.54$; $M_{\text{OAAAT}} = 4.75$; $F = .75$; $p = .04$) as well as in the methodical competence *Flexibility* ($M_{\text{AAT}} = 4.29$; $M_{\text{OAAAT}} = 4.54$; $F = .03$; $p = .01$) and the personal competences *Composure and patience* ($M_{\text{AAT}} = 4.76$; $M_{\text{OAAAT}} = 5.00$; $F = .03$; $p = .03$) and *Love of freedom* ($M_{\text{AAT}} = 4.90$; $M_{\text{OAAAT}} = 5.16$; $F = .76$; $p = .05$) than respondents without a tendency to dropout of training.

However, no significant differences regarding the tendency to dropout of training could be observed in the following ability concepts of the social, methodical, and personal competence classes: *Ability to cooperate*, *Leadership*

Table 13. Mean values of the SMP-C ability concepts compared to the tendency to dropout of training; AAT = tendency to dropout of training, OAAT = no tendency to dropout of training.

Ability concepts	M_{AAT}	SD_{AAT}	M_{OAAT}	SD_{OAAT}	F	<i>p</i>
Social responsibility	4.52	.54	4.78	.54	.01	.01
Ability to cooperate	4.73	.59	4.92	.51	.71	.08
Ability to deal with conflict	4.37	.58	4.59	.58	.00	.03
Ability to communicate	4.54	.55	4.75	.50	.75	.04
Leadership skills	4.42	.55	4.56	.55	.08	.16
Situation-appropriate behaviour	4.60	.58	4.91	.52	1.23	.01
Ability to analyse	4.41	.63	4.42	.57	.08	.90
Flexibility	4.29	.61	4.54	.55	.03	.01
Target-oriented behaviour	4.57	.58	4.76	.55	.01	.06
Working techniques	4.53	.65	4.67	.52	2.10	.23
Reflectiveness	4.66	.68	4.60	.64	.15	.60
Autonomy	4.55	.64	4.68	.59	.67	.25
Love of freedom	4.90	.72	5.16	.62	.76	.05
Composure and patience	4.76	.69	5.00	.61	.03	.03
Helpfulness and empathy	5.10	.60	5.20	.49	1.91	.15
Curiosity	4.68	.74	4.61	.70	.02	.57
Sense of duty	4.81	.72	4.96	.61	.98	.24

ability, Autonomy, reflectiveness, Ability to analyse, Target-oriented behaviour, Working techniques, Helpfulness and empathy, Sense of duty, and Curiosity.

5. Summary of the Results and Outlook

The objective of the analysis described here was to discuss the question as to what extent subjective ideas of trainees from different occupational fields about their competences compiled using the SMP-C are reliable and valid media to survey social, methodical, and personal ability concepts. This entailed an examination as to whether the current version of the SMP-C competence assessment sheet features satisfactory psychometric characteristics, on how the formed ability concepts behave towards each other and other constructs, and which competence values can be diagnosed. The 937 trainees were asked about their competences and tendencies to dropout of vocational training in order to examine these questions. Respondents were between 15 and 30 years of age, with the majority being between 16 and 19 years old. 735 trainees were male and 202 trainees were female.

5.1. Competence Values of the Trainees

The mean values of the social, methodical, and personal competence assign-

ments of all trainees prove that overall they assign themselves positive competence values. The competence assessed highest in the ability concept is *Helpfulness and empathy*, the competence assessed lowest in the ability concept is the *Ability to analyse*. This result indicates that there are specific behavioural dispositions which trainees can apply and implement more easily than others.

When comparing the mean values of female trainees to those of male trainees in a next step, there are significant mean value differences for 8 of the 17 ability concepts. Female trainees assign themselves better competence values than their male colleagues in the following ability concepts: *Ability to cooperate*, *Social responsibility*, *Ability to communicate*, and *Situation-appropriate behaviour* (i.e. ability concepts in the social competence class) as well as in the ability concepts *Helpfulness and empathy* and *Sense of duty*. Male trainees however, rate themselves higher in the ability concepts *Ability to analyse* and *Love of freedom*. This result confirms the everyday theory that women consider themselves socially more competent than men.

5.2. Test Quality Criteria

The reliabilities (Cronbach's α) are intended to provide information regarding the reliability of the SMP-C. For the ability concepts of the social competence class, they are between $\alpha = .63$ and $\alpha = .76$, for the ability concepts of the methodical competence class, they are between $\alpha = .70$ and $\alpha = .81$, and for the ability concepts of the personal competence class, they are between $\alpha = .73$ and $\alpha = .78$. The coefficients thus indicate a satisfactory to good degree of internal consistency of the individual ability concepts. When considering the superordinate classes of social competence, methodical competence, and personal competence, there are very good reliability coefficients with an α of .90 and .79.

The content validity was determined through 15 assessment experts. The result of the consultation substantiated that the ability concepts cover the field of social, methodical, and personal competence classes and that the respective statements are important competence indicators that can be summarised into ability concepts.

Structural validity examines the statistical structure of a measuring method. In all cases, an intercorrelating connection could be observed for the ability concepts of the social competence class. The highest connection exists between *Ability to cooperate* and *Social responsibility*, the lowest between *Ability to cooperate* and *Ability to deal with conflict*, between *Ability to deal with conflict* and *Situation-appropriate behaviours* as well as between *Leadership ability* and *Situation-appropriate behaviour*. A highly intercorrelating relationship could also be calculated for all ability concepts of the methodical competence class. The highest connection exists between *Ability to analyse* and *Working techniques*, the lowest between *Reflectiveness* and *Autonomy*. A highly intercorrelating connection could also be calculated for all ability concepts of the personal competence class. The highest connection exists between *Helpfulness and empathy* and

Composure and patience, the lowest connection exists between *Love of freedom* and *Sense of duty*. When including all ability concepts in a correlation calculation in a further step, it becomes apparent that all ability concepts are interconnected. The highest connection exists between *Ability to analyse* and *Leadership ability*, between *Helpfulness and empathy* and *Social responsibility*, and between *Ability to analyse* and *Curiosity*; the lowest connection exists between *Reflectiveness* and *Ability to cooperate*, *Love of freedom* and *Situation-appropriate behaviour*, and between *Reflectiveness* and *Love of freedom*. These results confirm the assumption that social, methodical, and personal ability concepts are no isolated constructs but form an interactive network.

Subsequently, more structural dependencies were determined using factor analysis. According to the intercorrelations of the ability concepts, a skewed factor analysis of the third order was conducted. Pursuant to the theoretical expectations, the ability concepts *Social responsibility*, *Ability to cooperate*, *Ability to deal with conflict*, *Ability to communicate*, *Leadership skills*, and *Situation-appropriate behaviour* load on the first factor “Social competence”. The second factor “Methodical competence”, is ruled by the ability concepts *Ability to analyse*, *Flexibility*, *Target-oriented behaviour*, *Working techniques*, *Reflectiveness*, and *Autonomy*. The third factor “Personal competence”, loads the ability concepts *Love of freedom*, *Composure and patience*, *Helpfulness and empathy*, *Curiosity*, and *Sense of duty*. These results prove that the three superordinate competence factors can be defined very well by their ability concepts. At the same time, this analysis also confirms the judgement of the assessment experts.

Criterion validity extends the results to correlative external connections. For this purpose, the mean values of the ability concepts of the SMP-C assessment sheet of all respondents were compared referring to their existing tendencies to dropout of training.

The respondents with a tendency to dropout of training assessed themselves significantly worse in the following ability concepts than respondents with no such tendency: “Social responsibility”, “Ability to deal with conflict”, “Situation-appropriate behaviour”, “Ability to communicate”, “Flexibility”, “Composure and patience”, and “Love of freedom”.

This seems to indicate that a stronger manifestation of specific social, methodical, and personal competences reduces the tendency to dropout of vocational training. Targeted training of these competence areas might be a way to reduce the number of premature terminations of vocational training contracts. This assumption however, will have to be investigated in further studies.

The analysis results of the SMP-C assessment sheet for social, methodical, and personal competences presented here, attest the test procedure overall satisfactory to good characteristics, which speaks in favour of surveying social, methodical, and personal ability concepts using the subjective ideas of trainees regarding the application of competences. However, additional analyses on more test quality criteria still have to be made.

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