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Development of a digital training for social and emotional competences for medical assistants in vocational education and training in Germany

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Abstract

This paper describes a digital training for social and emotional competences for prospective medical assistants (MAs) in Germany. Social and emotional competences (SEC) are necessary for the collaboration with colleagues as well as for the contact with clients, patients or customers. The German dual system of vocational education and training (VET) therefore considers them as essential parts of the profile of most training occupations. Nevertheless, few materials exist so far for the systematic training of these competences. In former studies three social and emotional competences have been identified as essential for MAs: emotion regulation, perspective coordination and communication strategies. At the same time development needs have been identified for all of them. To address these needs the three hours online training programme SECOTrain (Social and Emotional Competence Training) has been developed, which offers separate training sessions for all three competences. The aim of the paper is to depict how the fostering of social and emotional competences can be approached via a digital training, report our experiences with this endeavour and to discuss associated advantages as well as challenges and ways to deal with them. Digital formats offer new possibilities and chances for education and training, as they facilitate access to the content in a standardized and efficient way. An independent processing of trainings is made possible, regardless of time and teacher. At the same time, this comes along with a risk of overtraining some learners, as problems of understanding or motivation may occur. SECOTrain transfers pedagogical ideas into the context of digital learning to reduce these risks as much as possible. Each of the three training sessions follows the principles of the Cognitive Apprenticeship approach and is inspired by existing theories and trainings. Video sequences of typical critical interaction situations serve as material for explanation, application and reflection to support a strong practical orientation. Effects of the training will be evaluated in a pretest–posttest–follow-up experimental design. The paper presents goals and content as well as methods, pedagogical principles and theoretical foundation of SECOTrain. Furthermore, results of a small pilot study are presented and discussed with regard to further adjusting the training to the needs of the target group. At the end, an outline of the planned evaluation is given.

Keywords: Social competences, Emotional competences, Vocational education and training, Digital training, Medical assistants, Emotion regulation, Perspective taking, Communication

Introduction

Social and emotional competences (SEC) play an important role in many occupations, especially in those with collaboration in teams or close contact with clients, patients or customers. This is particularly true for medical assistants (MAs), who are confronted with a variety of demanding interaction situations in everyday working life (Dietzen et al. 2015; Vu-Eickmann et al. 2018). They are usually the first contact person in a doctor's office and take on many different activities on the patient, which is why they play an important role in patient contact (Tschöpe and Monnier 2016).

The vocational education programme to become an MA in Germany is a 3-year dual apprenticeship. The training regulation, dating from April 2006, enumerates various tasks in patient care and consultation, for example, taking care of patients in a manner appropriate to the situation and taking their expectations into consideration. Furthermore, apprentices should learn to inform and instruct patients and to respond to complaints (Verordnung über die Berufsausbildung zum Medizinischen Fachangestellten/zur Medizinischen Fachangestellten 2006). Establishing a long-term bond of trust between practice team and patients is another learning goal for MAs (Kultusministerkonferenz 2005). In addition, communication and coordination within the team are essential in order to function under conditions of close collaboration, time pressure and simultaneously arising tasks. So, alongside healthcare and business competences, SEC are fundamental to the occupational profile of MAs (Dietzen et al. 2016a).

SEC have been shown to influence job and customer/patient satisfaction, team productivity and the quality of relationships at work (Faix and Laier 1991; Kanning et al. 2009; Kanning 2015; Walter and Kanning 2003). Conversely, low levels of these competences come along with low levels of productivity and satisfaction as well as health risks for the employees (Giardini and Frese 2006; Nielsen et al. 2015; Parker et al. 2008; Parker and Axtell 2001). Despite these findings, too little attention is still paid to the training of SEC in vocational education and training (VET) in general and in the training of MAs in particular (Sauli et al. 2022; Seeber and Wittmann 2017; Tschöpe and Monnier 2016). Existing programmes often focus on clinical groups and behavioural problems like aggression, depression, hyperactivity or social withdrawal (Hillier et al. 2011; Maag 2006; Merrill et al. 2017), or address children in schools or preschools (Cohen 1999, 2001, 2006; Drössler et al. 2007; Jerusalem and Klein-Heßling 2002; Moltrecht et al. 2021; Nielsen et al. 2015; Topping et al. 2000; Weissberg et al. 2015).

Nonetheless, in the last decade some occupation specific programmes for the training of SEC have been developed and have turned out to be successful in terms of enhanced competences (e.g., Güzel et al. 2016 for service technicians; Gartmeier et al. 2015 for teachers and medical students; Geßler et al. 2019 for managers) and improvements in occupational stress, resilience, job satisfaction, and psychological well-being (e.g., Chitra and Karunanidhi 2021 for female police officers, Hurley et al. 2020 and Kharatzadeh et al. 2020 for nurses; Jennings et al. 2019 for school teachers;

Wacker and Dziobek 2018 for health professionals; for an overview on emotional intelligence and competences see e.g., Kotsou et al. 2019; Sauli et al. 2022).

In the same period, the field of technology-based learning and testing environments in VET has substantially grown and has stimulated multiple research activities on occupational competences in Germany. Progress has been made concerning the empirical foundation for occupation-related competence models, and tests and trainings have been developed for many different competences and occupations (for an overview see e.g., Beck et al. 2016; Rüschoff 2022; Velten and Schratz 2020).

In the course of these activities the project *Competence Measurement based on Simulations and adaptive Testing in Medical Settings* (CoSMed) developed a model of SEC of MAs (Dietzen et al. 2016a; Monnier et al. 2016; Tschöpe and Monnier 2016). The model is based on Hargie's (2011) definition of social competences, who describes them as the ability to react wisely to differing and changing requirements in social interactions and thereby fulfilling one's own interests while respecting those of others. To move on from this general definition to a concrete model of SEC of MAs two further assumptions were made. Firstly, in line with Hartig (2008), social competences were seen as multi-dimensional and domain-specific with different forms and compositions of required competences for different domains. Secondly, drawing on Weinert's understanding of competences as a dynamic (trainable) cognitive concept that represents an essential prerequisite to competent behaviour (Weinert 2001), social competences were defined as intellectual skills that can be learned and fostered.

Based on the definition and the two assumptions a requirements analysis for social interaction situations in the domain of MAs was carried out (Srbeny et al. 2015). First of all, relevant documents like vocational curricula, training material and job advertisements were scanned. All hints on interaction situations as well as corresponding actions and abilities in everyday working life of MAs were collected.

In the next step, great emphasis was put on including the view of the practice, i.e. trainers, doctors and above all trained MAs and apprentices. This was done by means of several group discussions and interviews in which the Critical Incidents Technique (Flanagan 1954) was used to determine success-critical situations in everyday work of MAs. The aim was to identify challenging situations that are suitable to bring to light differences between MAs competent in SEC and less competent individuals.

Results of the requirements analysis were complemented by scientific-theoretical work. On this base an occupation-specific model of SEC of MAs was derived, which is shown in Fig. 1. It includes emotion regulation, perspective coordination and communication as the most relevant SEC of MAs.

These competences were chosen, as they form a basis for reacting adequately in different social situations. Rather than following if-then rules for certain situations, MAs should be able to choose wise actions and reactions according to different kinds of situational requirements. The model also considers different types of situations that influence requirements in social interactions of MAs. Firstly, communication with patients differs from that with team members, because relationships are characterised by different roles, duration, closeness or consequences of mistakes, for example. Secondly, situations may differ according to the kind of conflict. Whereas

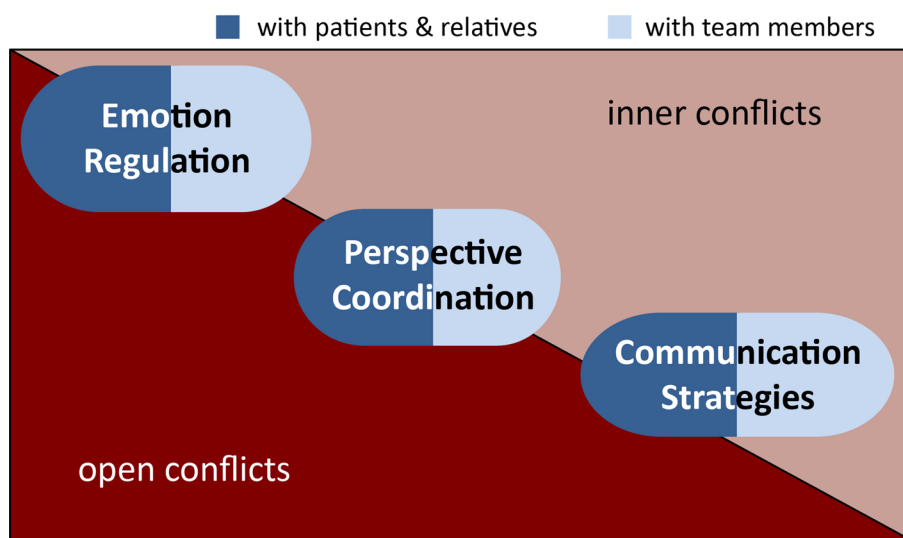


Fig. 1 Model of social and emotional competences of MAs (Source: own illustration)

external conflicts represent forms of openly communicated differing views and interests, internal conflicts take place inside a person with conflicting values, interests or self-images.

The structure of the model was checked with a computer based Situational Judgment Test (SJT) with implemented video sequences. The results of the test indicated that training of these competences could be beneficial, as many participants only reached medium or even low levels of emotion regulation, perspective coordination and communication strategies (Monnier et al. 2016; Tschöpe and Monnier 2016).

The aim of this paper is to depict an approach to design an online training that targets all three competences of the CoSMed model and at the same time acknowledges the limited time budgets and other restrictions of formal learning contexts. The paper outlines why digital learning formats are suitable for this goal and how challenges of the format can be addressed to make SEC content accessible for all MA apprentices regardless of their VET situation. For this purpose, after a presentation of the goals and prerequisites of the training, we introduce the contents and the didactic implementation of the three training modules.

Goal and prerequisites of the training

The goal of the training is to provide MAs with options to cope with typical and demanding interaction situations in their everyday working life. Competence shows itself in selecting suitable behaviours in accordance with a situation's requirements. Participants therefore should not acquire rigid rules for social behaviour, but learn to use the knowledge conveyed in the training to build a repertoire of cognitive, emotional and behavioural options. The training enables competence development by providing participants with flexible practical knowledge. It furthermore illustrates how to use this knowledge adapted to situational demands through exercises situated in different contexts along the situational dimensions described above.

To achieve this goal the general conditions for the implementation of such a training had to be taken into account. Primarily, it should be integrable into the formal training of MAs. We therefore had to balance different requirements concerning duration and application of the training. Curricula for schools and enterprises within VET are already tight, so that time-consuming new learning units would be difficult to integrate. At the same time, existing training programmes for SEC often take many hours or even several days. Furthermore, traditional training formats imply the presence of teachers or trainers, which requires training them in the first place. Both seemed too big a burden on schools and training companies for the first trial to integrate more SEC contents into the formal training programme of MAs. Even though research findings indicate that fostering SEC is more successful in longer trainings with diverse methods (Beelmann and Lösel 2006; Lösel and Beelmann 2003), SECOTrain is therefore designed as web-based individual learning modules and reduces the time of training as much as possible. The possibility of independently processing the training, regardless of time and teacher, allows a wider audience to be reached in a more efficient way. Accordingly, the training consists of three online modules on the different competences, with each module addressing one competence in approximately 1 h.

Of course, opportunities for practicing the new skills with real-life interaction partners would surely aid in learning the training contents. However, also due to restricted time resources such practical exercises cannot be implemented into our training design. We nevertheless see an extension of the training in this direction as a desirable next step to achieve greater impact. For the time being, the training modules can perhaps rather be seen as an introduction into the topic. After taking part in the modules, learning could then be intensified in classroom sessions on the targeted competences.

When designing training material, also the characteristics of the target group need to be taken into account. MA was the dual training occupation with the highest number of newly concluded training contracts for women in Germany in 2022 (Bundesinstitut für Berufsbildung 2022b). Due to this popularity, the apprentices within this occupation form a very heterogeneous group, if not with regard to gender, then in terms of prior school education. While approximately half of all new apprentices have obtained an intermediate school-leaving certificate, the rest is roughly equally divided between individuals with a lower school-leaving certificate and persons with a higher education entrance certificate (Bundesinstitut für Berufsbildung 2022a). A training for such a heterogeneous group has to take into account differences in participants' ease and speed of understanding as well as their experience in self-directed learning. Therefore, training content should be reduced in its complexity as much as possible. Repetitions and options of listening to longer passages instead of reading them could offer additional support.

Learning goals and content of the training

For generating the goals and content of the training, we first of all referred to the CoS-Med model of MAs' SEC and its theoretical foundations. Additionally, we consulted existing trainings on the three competences and their approaches to foster SEC. The following section describes goals and content for each of the three training modules.

Training module on emotion regulation

Emotion regulation is the first competence which is trained in SECOTrain. In accordance with the competence model of CoSMed (see Fig. 1) and the literature on emotion regulation (McRae and Gross 2020; Webb et al. 2012), successful emotion regulation is defined as the ability to internally alter one's own emotions, or cope with them in a healthy way to be able to adjust one's external emotional reaction adequately in a given situation.

The requirements analysis of the project CoSMed showed that MAs need to deal with emotionally challenging situations every day (e.g., demanding or anxious patients, time pressure and team conflicts). The training module therefore focuses on the regulation of negative emotions like anger, insecurity or overpowering pity. Its content was partly inspired by former trainings on emotion regulation (e.g., Berking 2010; Geßler et al. 2019).

The overall goal of this module is to encourage learners to move from maladaptive emotion regulation (e.g., suppression) to healthy strategies like cognitive change (e.g., positive reappraisal) in order to cope with negative emotions at work. To reach this, three sub-goals have been formulated:

Comprehension of emotions and their generation

Drawing on the cascading model of emotion regulation (Joseph and Newman 2010), the first goal of the module is to raise MAs' comprehension of the manifoldness of emotions themselves and their generation and purpose (Ekman and Cordaro 2011; Geßler et al. 2019). Among medical and service staff surface acting is common (e.g. suppressing anger and acting happy to prevent upsetting a patient who criticizes the waiting time) (Zapf et al. 2021). Therefore, MAs should understand that negative emotions are nothing bad that needs to be suppressed but rather a valuable source of information that can be dealt with in a constructive way.

Knowledge on different adaptive strategies of emotion regulation

The second goal is to improve MAs' knowledge on healthy regulation strategies, for which the module draws on the well-established model of emotion regulation by Gross (McRae and Gross 2020). Because of its vividness, it should be easy to understand for the heterogeneous target group. As interaction situations in the medical context often call for immediate reactions (e.g., complaints, emergencies, patient breaks out into tears), the module focuses on strategies of cognitive change that can be applied within the ongoing situation (compared to e.g., situation selection; McRae and Gross 2020; Webb et al. 2012). For example, being confronted with an angry patient who criticises the waiting time, instead of suppressing one's anger, MAs could use perspective taking to understand the patient's behaviour to a certain degree and thus reduce their own anger.

Competence to apply adaptive strategies of emotion regulation in different contexts

MAs are confronted with many different kinds of social situations that request different strategies of regulating one's emotions. Furthermore, there are individual differences concerning what people find applicable and helpful for themselves in these situations. Thus, the third goal of this module is to improve MAs' application of adaptive emotion

regulation strategies in different MA-specific situations. SECOTrain provides learners with a toolbox of strategies from which they can choose. The presented strategies are selected from McRae et al. (2012) according to their general adaptability to social interaction situations in this domain.

Training module on perspective coordination

Perspective coordination is the second competence which is trained in SECOTrain. Drawing on the theory of Selman and colleagues (Schultz et al. 1988; Selman et al. 1986; Yeates et al. 1991), successful perspective coordination means to bring together different perspectives on a situation in a solution-oriented way. The theory postulates four functional components of perspective coordination in problematic social situations, from *definition of problem* to *action taken* to *justification of strategy* to *complexity of feelings*. Due to the brevity of the training, SECOTrain mainly focuses on the first step *definition of problem* as it is the crucial starting point for the following steps (e.g., solution-oriented communication, see third module of SECOTrain). The requirements analysis of the project CoSMed showed that MAs are frequently confronted with social problems, where they have to coordinate the different needs of stakeholders (e.g., patient, relative, physician, MA). Thus, the overall goal of the module is to encourage learners to move on from perceiving social situations mainly from an egocentric or superficial perspective to more profound, multilateral representations. To reach this, three sub-goals have been formulated:

Knowledge of how we perceive other people and why people behave the way they do

The first goal of the module is to increase participants' understanding of how human perception and behaviour work. To achieve this, basic psychological concepts and heuristics are explained to sensitize learners to not rely on their automatic thinking (i.e., automatic judgments), but to actively think about different possible reasons for people's behaviour. For example, the fundamental attribution error (Ross 1977) is introduced and subsequently learners are invited to consider situational factors like current pain, fear or insecurity as causes for demanding behavior of a patient instead of attributing it to his personality. Further heuristics and theories taught include, for example, implicit personality theories and the frustration-aggression-hypothesis (Dollard et al. 1939). Finally, drawing on the theory of mind (Carlson et al. 2013), participants are taught that MA and patient may have different knowledge about the practice's procedures.

Understanding one's own perspective and the relevance of one's own needs

MAs perceive high stress at work, often because they are afraid of letting patients down (Dreher et al. 2021). Thus, to prevent participants from neglecting their own well-being, the used theories also encourage to think about the reasons for one's own behaviour and to give a name to one's own needs. For example, knowing the frustration-aggression connection, an MA-apprentice may understand her own aggression better, as she realizes it being caused by her frustration not gaining a patient's trust. In addition, drawing on the concepts of social roles (Merton 1957) and needs (Maslow 1958) participants are made aware of the different—sometimes conflicting—roles and needs of MAs (e.g., colleague, apprentice, friend).

Ability to recognise different perspectives on a situation and to grasp them in a solution-oriented way

The third goal aims to improve the ability to recognise different perspectives in a specific situation and to grasp them in a way that enables solving the respective problem. To achieve this, according to former trainings (Güzel et al. 2016; Mischo 2004, 2005) the confrontation with others' views on a situation is crucial. Therefore, by presenting different ways of interpreting the various situations, participants shall understand how differing perspectives result in different problem definitions and actions. To give a vivid idea of these actions, they are portrayed by positive models (i.e., model learning; Bandura 1979). For example, coordinating one's own and one's colleagues' perspective results in a better understanding of a conflict's core than only insisting on one's own perspective, and thus leads to a better solution for all parties involved.

Training module on communication strategies

In the previous modules, participants were taught how to manage their own emotions and thoughts in a way that facilitates further interpersonal problem-solving. Thus, the last SECOTrain-module deals with communication. In line with the competence model from CoSMed and relevant theories (Rosenberg 2012; Schulz von Thun 2011) successful communication is defined as the ability to contribute to mutual good solutions in difficult situations, meaning that both sides should feel comfortable and understood. The requirements analysis of the project CoSMed showed that MAs are frequently challenged by situations where not only empathic reaction is needed but one also has to communicate one's own—often restricted—possibilities of action as an MA. Thus, the module focuses on expressing one's own concerns in an appreciative manner. The training was partly inspired by former communication trainings (e.g., Holler 2016; Schulz von Thun 2011). The overall goal of the module is to encourage learners to move on from offensive or avoiding behaviour to communicating in an open and solution-oriented way. To reach this, three sub-goals have been formulated:

Becoming aware of the different levels of a message

During a working day, MAs are confronted with various requests of patients, colleagues and supervisors, not seldom at short intervals. Before learning how to react to those requests, it is crucial to first understand that the opposite's message could have been sent with different intentions. By illustrating the four-sides model of Schulz von Thun (2004), participants are encouraged to reflect one's own preferred "ear" when interpreting messages and they are taught how conflicts can arise due to different ears of sender and receiver. For example, when communicating with an upset patient, MAs should focus rather on a factual level than on a relationship level to prevent the patient and oneself from getting offensive.

Knowledge of how to communicate one's own concerns in an appreciative manner

The second goal of the module is to teach participants how to communicate in a way that makes both parties feel understood and taken seriously. MAs are frequently confronted with already tense situations (e.g., patient feeling pain, time pressure). Therefore, participants are introduced to the four steps of *Nonviolent Communication* (NVC; Rosenberg

2012; Rosenberg and Chopra 2015), which are well-known to be successful for communicating one's own concerns in an appreciative manner. For example, MAs are encouraged to not start a communication with an evaluation (e.g., "You complain every time") but with an observation (e.g. "I see that you saw the doctor two times last week").

Ability of successful communication in different workplace situations

As mentioned in the introduction, MAs are confronted with varying kinds of social situations that request different reactions of the MA. With regard to the fourth step of NVC, for example, when responding to a patient's unfeasible demand, it might be more helpful to focus on offering him a solution than to immediately formulate an own request. However, when the MA, for example, feels unfairly treated by a colleague, formulating a clear but empathic request might be exactly the right thing. Furthermore, as people are different, participants are made aware to consider one's own personal limits in communication (e.g., talking about one's own feelings in front of patients or not). Thus, the third goal is to internalize that the four NVC steps should and can be used flexible to a certain degree.

Technical implementation of the training

After determining the goal of the training and deriving the contents most relevant for improving MAs' SEC the next step was to identify a suitable framework for transferring the training contents. In consideration of the organizational and target group specific prerequisites described above a digital format was chosen. As will be shown in this section, it allows to address these prerequisites most adequately.

SECOTrain can best be described as a compilation of individual learning modules. According to Kerres (2018), these are characterized by the following points, among others: (a) they are self-contained and should be able to stand on their own, (b) learning outcomes are stated that learners should have achieved after processing, (c) they are located between several learning modules of similar duration and have corresponding predecessor and follow-up modules. This variant of learning modules is particularly suitable if there are only a few learning units and the content area is clearly defined. Technically, the modules could also be seen as learning programmes in the format of online computer-based training or web-based training, as they are self-contained, interactive, and can be carried out asynchronously, allowing the learner to choose their own processing speed (Bedwell and Salas 2010; Kerres 2018; Lowenthal et al. 2009). That is why this form is often used in corporate learning, where flexibility is of particular importance. However, for reasons of feasibility, the definitional feature of full learner autonomy is missing in the context of this study, at least insofar as the time frame and location are given. On the other hand, other characteristic features of web-based trainings such as lack of collaboration with fellow learners and interaction with an instructor (Lowenthal et al. 2009) apply to the conditions of the study. Accordingly, the learners interact only with the computer.

The training modules are implemented in the Learning Management System (LMS) Ilias, which guides learners through the three modules. The LMS does not include any further interaction options. In summary, the modules fully meet the criteria of individual learning modules in the context of the study, while the temporal and spatial autonomy is

missing for the classification as a web-based training. In order to measure the effects of the training under controlled conditions these restrictions are necessary during the evaluation of the training. However, in a later release for use in MA VET programmes, these restrictions will be removed, making them available as a web-based training. For this purpose, complete autonomy should be the goal, also in terms of place and time of processing.

The implementation of a SEC training in such a way not only has advantages, but also disadvantages or risks. Most importantly learners have to deal with the material on their own. This not only presupposes a higher degree of self-direction and self-motivation when engaging with the material (Kerres 2018). It also means that learners do not have a contact person in case of difficulties in understanding. We counter this potential disadvantage with a strongly structured setup and close guidance within the training, including an avatar that takes learners by the hand. The avatar is also intended to at least mitigate the second problem through help functions on many pages.

An additional possible drawback is that learners do not have the opportunity to practically apply and practice what they have learned during the training which would certainly bring advantages regarding a competence such as communication strategies (Berkhof et al. 2011). To achieve this purpose nevertheless in the digital training, we implemented many different tasks the participants have to work on, including those in which they have to demonstrate the behaviour at least in written form.

After all, classical in person settings also have their drawbacks. First, two of the competences in this training do have a rather cognitive than behavioural nature. Thus, it is not implausible to think that a digital training which has been professionally designed for the specific purpose is more fruitful than a teacher not trained in this specific field. Second, to work on the training on one's own is not just a possible drawback, but it also gives every learner the opportunity to work at their own pace and take the time they need for processing the material thoroughly. Third, shy persons might find it stressful to participate in activities like role-play in front of other training participants and would also profit from working on training material on their own. Fourth, there is evidence indicating a huge effect of a training in case of high similarity between learning context and transfer context (Blume et al. 2010). The presentation of a realistic conflict situation as a starting point strongly supports the experience of this similarity and can be better provided within a digital training through the use of videos. Altogether, the digital format offers several advantages, which we will further elaborate on in the next chapter on didactical principles and methods used to convey the training contents.

Didactical principles of the training

The key elements of the training are knowledge transfer—or psychoeducation—and exercises or interactive tasks, combining cognitivist and constructivist approaches. In this way, abstract, generalizable knowledge (e.g., the communication square according to Schulz von Thun 2004) is provided on the one hand, but on the other hand, learners are encouraged to practice this knowledge in different, authentic application contexts, which should enable the development of knowledge structures through own construction (Kerres 2018). The development of self-constructed and flexible knowledge structures as a basis of competence development is supported by the following principles.

Integration of authentic situations in form of videos

The use of multimedia technology has been shown to enable situated learning by integrating authentic situations from everyday working life as video examples, which creates a high degree of realism (Mandl et al. 1995). In order to be able to offer these application contexts, SECOTrain uses realistic scenarios from everyday work that were gathered in the requirements analysis of the project CoSMed. As mentioned above, situations were collected using the Critical Incident Technique (Flanagan 1954) in interviews and workshops with apprentices, practitioners and experts. The CoSMed model of SEC of MAs differentiates situations according to interaction partners and types of conflict. For SECOTrain, further characteristics of situations were analysed to enlarge diversity of possible situational requirements within the training as much as possible. For each competence and learning goal the most suitable scenarios were chosen, so that situations with patients and colleagues, with inner and outer conflicts and with different emotions like anger or compassion are included. Furthermore, situations are chosen that are most suitable to demonstrate certain aspects of the competence to be trained. For example, for emotion regulation, a situation with a confrontative behaviour of a patient questioning the MAs competence is shown, as the requirements analysis showed that this kind of situation typically triggers strong emotions.

To ensure the most realistic experience possible when working on the exercises attached to these scenarios, these are presented to the learners in the form of videos. Embedding learning in an environment that shows learners the ways in which they can apply what they have learned is also proposed under the term situated learning in the Cognitive Apprenticeship approach (CAA; Collins et al. 1991). In addition to stimulating the abstraction of one's own knowledge structures, this has two further advantages: first, it allows learners to understand what the purpose of the training is, and second, it allows training participants to learn under what conditions the learned skills can be applied.

General structure of the learning modules

Structure and elements of the training partly follow pedagogical principles of the CAA (Collins et al. 1991), which is an adaptation of a traditional apprenticeship (e.g. in crafts) to the learning of cognitive skills. The main point of this approach is to make the thought process of an expert solving a task accessible to the learners, so that they are enabled to later perform the tasks against the background of this thought process. This should be embedded in contexts that are as authentic and diverse as possible to highlight the importance of the competence in question as well as to facilitate transfer to different situations. To this end, the CAA summarizes four principles (*content, method, sequencing, sociology*) for building learning environments. For the sake of brevity, only the principles of *method* and *sequencing* are presented in more detail, because they strongly influenced the construction of SECOTrain. In addition to the principles of method and sequencing, situated learning from the sociology principle has found its way into the training.

First, here is a brief overview of the *methods* adopted from the CAA implemented in various forms in the training (see below for the specific implementation in our training):

Modelling Expert performs a task and externalizes implicit processes

Coaching Expert provides learners with cues, reminders, feedback and directs focus

Scaffolding Expert takes over parts of the task that the learners have not yet mastered

Articulation Learners are encouraged to articulate their knowledge, thoughts, etc.

Reflection Learners are encouraged to compare their thoughts and solutions with the externalized processes and solutions of others (experts, other learners)

Exploration Learners should apply what they have learned. To do this, the expert sets them broad goals against which they can prove themselves on their own. Second, here are the points from the principle of *sequencing* which we took up in the training:

Global before local skills The goal is for learners to develop a conceptual model of the target skill first so that individual sub-skills taught later make sense to them.

Increasing complexity Tasks that learners are confronted with should require more and more of the skills taught.

Increasing diversity This aspect describes the necessity of increasingly embedding tasks in different contexts, so that on the one hand different skills are required of the learner and on the other hand knowledge can be built up about which skills can be used appropriately under which conditions.

Referring specifically to the context of acquiring social-communicative competences, Euler (2001) has formulated various important learning steps. According to this, the first step is the confrontation with a problematic situation, which emphasizes the importance of the competence in question. In a next step, the learner focuses his attention on the behaviour of models who are in the problematic situation and evaluates the specific actions of the model. The planning of own actions is followed by testing own actions, after which gathering of feedback, the evaluation of the own experience and the comparison with other models takes place. Finally, the action patterns are practiced and transferred to other situations.

In order to implement the demonstrated learning process of social-communicative competencies in a digital format, the learning steps of Euler were connected with the principles of the CAA mentioned above. Combining both approaches led to the following general training sequence with five elements—even if the training modules differ slightly from each other in a few aspects: (1) raising awareness, (2) knowledge transfer, (3) scaffolding/fading, (4) reflection, (5) articulation. In the following sections the elements are described in general and some examples for their implementation in the training modules are mentioned. Additional information is presented in Appendix: Table 2, which gives an overview over all components of the training modules sorted by element.

Implementation of the element “raising awareness” in the training modules

After illustrating the relevance of the respective competence for MAs' everyday work, in accordance with Euler's learning-steps learners are made aware of problematic behaviour in the context of the respective competence. To do so, each session starts with a short video-based sequence. Subsequently, learners should answer multiple choice (MC) questions in order to reflect on the appropriateness of the shown behaviour. In the emotion regulation session, for example, short video-based sequences show an MA being treated unfairly by a colleague and afterwards either acting out her anger or suppressing

it. By means of a MC format, learners then have to detect possible negative consequences of acting out or suppressing anger.

Afterwards, a concise definition of the respective competence is given. In the session on emotion regulation, for example, the problematic regulation strategies seen in the video are contrasted with a definition of successful emotion regulation. In order to connect the definition to their personal experience, learners are invited to remember a challenging situation at work from the near past and to write down how they reacted in that situation.

Implementation of the element “knowledge transfer” in the training modules

Competence-specific psychoeducational content is taught here, in combination with the presentation of positive and negative video examples. In a sense, this section implements the modelling part from the CAA, although the functions of the expert are kind of split up here. Positive models are presented in video format, which corresponds to the demonstration of a skill by the expert in the sense of the CAA and also serves the second step from Euler’s learning model in which positive model behaviour is to be evaluated. The knowledge content accompanying the examples, on the other hand, represents the explication of the implicit process knowledge as proposed in the CAA. Furthermore, this section represents an implementation of the sequence aspect that a conceptual representation of the global skill should be acquired first. It does so by giving a holistic positive model behaviour at the beginning.

The relevant knowledge and theories of the modules are brought closer to the learners in different ways. Mostly visual models of the theories emerge stepwise accompanied by audio explaining the respective part of the model that emerges. These models often include examples from MAs’ practice, to foster learning transfer. In the perspective coordination module for example, a model of the antecedents of human perception and behaviour is explained. During the presentation, possible influence factors (e.g., stressful working day, patients being irritable because of pain) emerge and fade step by step (see Fig. 2).

Implementation of the elements “scaffolding/fading” in the training modules

No new content is being taught now. Instead, building on the modelled behaviour, the competence is to be strengthened by exercises forcing the participants to apply what they have learned. In the sense of scaffolding, assistance is initially provided—implemented through closed formats such as assignment tasks. Following the method of fading, the formats then become more and more open, until finally open questions have to be answered. Since it is not possible to present increasingly complex social situations—and thus more complex tasks—only in this way the requirement of increasing complexity from the sequencing principle can be addressed.

Several exercises are included to internalize and apply the learned knowledge. All modules first use tasks in which learners get a certain amount of guidance such as single choice (SC) and MC questions, drag & drop-assignment and prioritizing tasks. For example, in the communication strategies module, participants have to choose one option out of four that best describes an unbiased/open introduction into a dialogue. Furthermore, in the emotion regulation module, using a drag & drop-design,

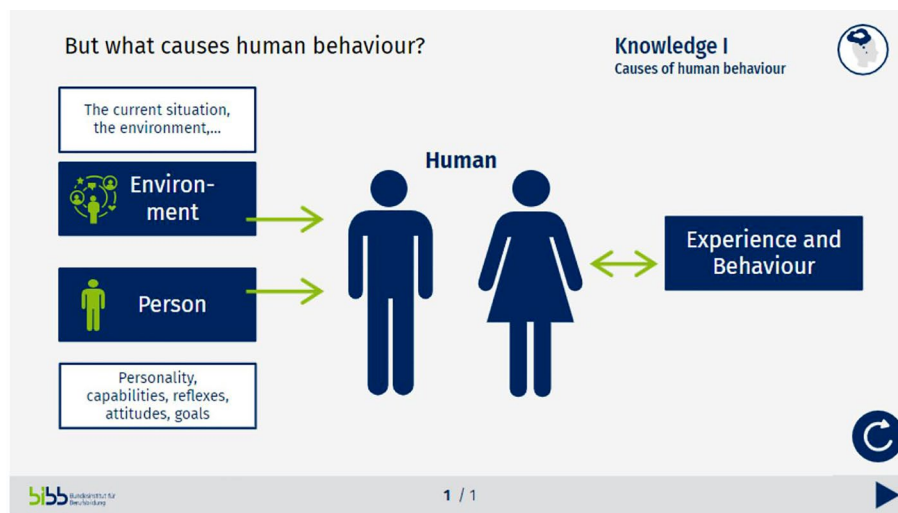


Fig. 2 Audio-visual presentation of the basic model of behaviour explanation (Source: SECOTrain, own illustration)

Fig. 3 Drag & drop exercise, assigning emotion regulation strategies to their respective examples (Source: SECOTrain, own illustration)

learners have to assign emotion regulation strategies (e.g., perspective taking) to compatible thoughts (e.g., “From the patient’s perspective, it really looks like the practice team made a mistake”) (see Fig. 3). Moreover, in the perspective coordination module, for example, a prioritizing task is implemented where MAs are asked to sort possible actions according to how well they represent different perspectives in the given situation.

Stepwise, tasks become more difficult until open answer formats are integrated. An avatar assists with the respective exercises, more at the beginning than later. Optional help and clues to solve a task can be used across all modules to avoid frustration and to increase positive learning experiences (e.g., see Fig. 3; here, the question mark of the cloud in the lower right corner has been activated). After all exercises, learners

receive feedback, explanations and repetition in order to consolidate the central content. In the perspective coordination module, for example, participants get elaborated feedback on why their selected action option is more or less advantageous.

Furthermore, in the communication strategies module, a video example of good communication based on the initial situation of the training module is integrated. The situation consisted of a colleague stressing her right to priority in the practice’s vacation planning in a reproachful manner. In the response of the apprentice shown here, the apprentice reacts calmly and sympathetic and makes a proposal for a mutually satisfying solution. The video of her response is accompanied by concise explanations of the words chosen in the video.

Implementation of the element “reflection” in the training modules

According to the method of reflection, learners should be encouraged to compare their own results and thoughts with those of others. In the context of our training, a comparison of the participants’ open answers is enabled by providing answers that could be described as beneficial from a theoretical point of view. This is also in line with Euler’s steps of testing own actions, followed by gathering feedback and comparing own actions with those of others.

In the *communication strategies module*, for example, learners react to critical situations. In particular, a video sequence of a patient questioning the apprentice’s competence is presented and learners are then asked to type into an open text field how they would answer. Subsequently a positive video example of an MA reacting in this situation is presented and, on its basis, individual aspects are explained in detail, for example a single step of NVC. Finally, learners compare the answer they typed in at the beginning with the answer given by the MA in the video (see Fig. 4). Learners are instructed to actively compare both answers and to think about what could be changed in their original answer. Overall, this process is repeated with three different situations and associated video sequences.

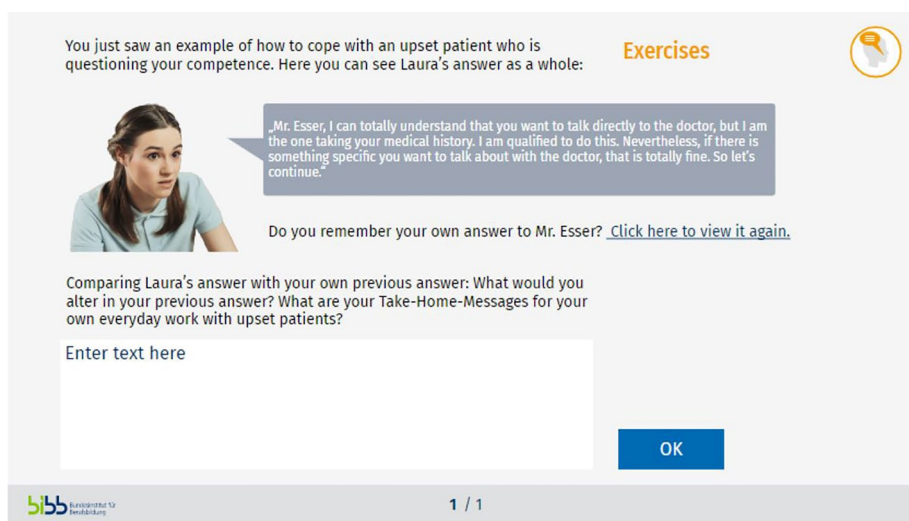


Fig. 4 Comparison of the learner’s response with MA’s response (Source: SECOTrain, own illustration)

Implementation of the element “articulation” in the training modules

Finally, learners are asked to explain positive and negative aspects of behavioural examples themselves, demonstrating that they can explain what they have learned from a higher-level perspective.

In the perspective coordination module, for example, a new situation is introduced one last time. This time learners see a situation in which they are harshly chided by a colleague for leaving a mess in the treatment room. After being confronted with a positive and a negative reaction of the MA, learners are subsequently asked to write down what the MA did well or not so well in the two different reactions. By this means they are encouraged to put into their own words what they have learned.

Additionally, learners are asked to articulate which learning contents they found most helpful for their own work as MA. Furthermore, they can take a second look at the difficult situation from their own experience which they wrote down at the beginning of the module. They are encouraged to describe what they would possibly do differently now to make themselves aware of the new ways to deal with social situations they have learned.

This structured approach, in which learners are intensively guided, is primarily intended to address the problem of the increased need for self-direction due to the digital format of the training. In addition, the coaching method described next is intended to compensate for the lack of contact persons or teachers.

Specific elements of the training

Throughout the training, methods from the context of coaching are taken up. An avatar provides learners with assistance, feedback, hints and reminders. The avatar serves three main functions. Firstly, it guides learners through the training by giving outlooks, summarizing what has been learned after each chapter and explaining the next steps. Secondly, the avatar gives feedback following exercises (see Fig. 5). Thirdly, the avatar

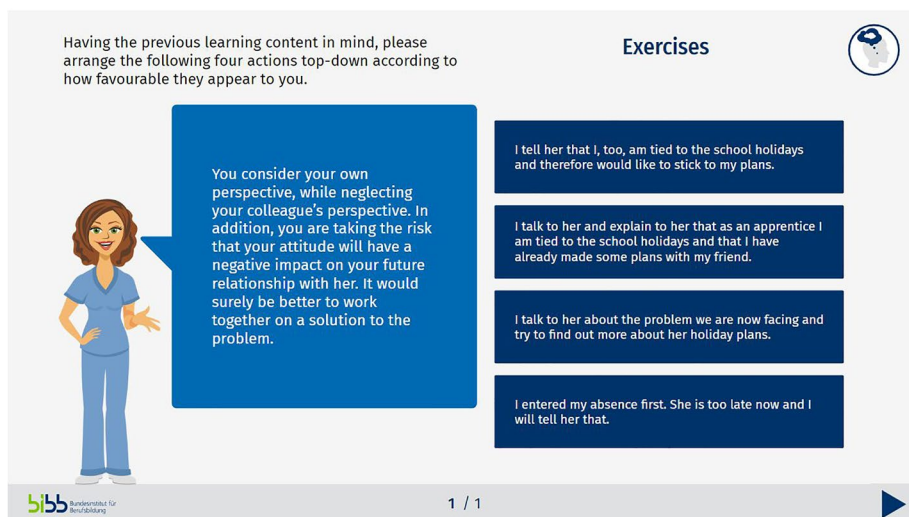


Fig. 5 Elaborated feedback given by the avatar following the sorting of various action options (Source: SECOTrain, own illustration)

provides additional information on complex contents or optional assistance, such as reminders.

The feedback learners receive on their answers in the closed task formats tends to be rather elaborated and as specific as possible (see again Fig. 5). This means that learners receive an explanation of why their answers are correct or incorrect, rather than simply being informed about their correctness. This is in line with Shute's (2008) recommendations on how to formulate feedback to enhance learning. Furthermore, according to recent meta-analyses, the more information feedback contains, the more effective it is (Wisniewski et al. 2019). And also, for computer-based learning environments it seems to be the case that detailed feedback is better than purely corrective feedback, especially in the area of higher order learning outcomes, such as problem-solving skills (van der Kleij et al. 2015). Finally, this type of feedback is more in line with the coaching method.

Videos also bring some advantages in this kind of training and are therefore used throughout the training. For example, they allow a close approximation to a situated learning context, as they offer a "vivid secondhand experience" (Kleinknecht and Schneider 2013, p. 14). Furthermore, learners are not distracted by the necessity to react immediately and are able to retrace the behaviour shown in the video in manageable sequences. Furthermore, working with videos in an e-learning setting offers the possibility of systematically contrasting positive and negative social behaviour, whereby in the area of communication higher effects can be achieved than through classic role plays (Gartmeier et al. 2015).

Both positive and negative models are presented in the sample videos. According to a meta-analysis, this contributes to a higher transfer to the work context than presenting positive examples alone (Taylor et al. 2005). In addition, there is evidence that mixed models increase generalization of learned knowledge (Baldwin 1992). This is assumed to be caused by the fact that the stimuli relevant for learning are identified more easily in this way. Taylor et al. (2005) further emphasize that the use of mixed models may increase motivation by showing training participants that effective behaviour results in desirable consequences, whereas ineffective behaviour results in negative consequences.

A short pilot study

After we had constructed the web-based training, all three modules underwent a short pilot study. This pilot had an optimizing function (Döring and Bortz 2016) aiming to improve the training before the evaluation study in terms of comprehensibility, user experience, appeal to the target group and technical feasibility (Thabane et al. 2010). Furthermore, as apprentices form a relatively heterogeneous group regarding native language as well as level of school qualification we wanted to test if the training is perceived equally by all MAs. Native German speakers and those with a higher school qualification should be more experienced in processing complex material in German. Thus, we assumed that these subgroups would evaluate the training more positively (e.g., easier, more fun) than non-native speakers and participants with a lower school qualification. Furthermore, as the training includes examples especially from general practitioners'

practices but MAs also work in specialists' practices like pediatrics or orthopedics, we tested if the training evaluation differs regarding the medical field participants work in.

Method

In the pilot study, data collection was conducted in two ways. First, in order to examine comprehensibility on a detailed basis, we interviewed apprentices individually (i.e., one-to-one interviews) while they were testing one of the modules. Second, to test general comprehensibility as well as technical and organizational feasibility, we conducted a class-based testing of the training in vocational schools. By applying a convergent Mixed-Methods-design (Creswell and Plano Clark 2017), we collected qualitative and quantitative data to gather a comprehensive insight into the participants' perceptions.

Instruments and variables

In the one-to-one interviews, we asked prepared as well as spontaneous questions regarding on the one hand comprehensibility and appropriateness of content (e.g., "Are the examples in this task relatable for you as an MA?"), on the other hand technical functioning (e.g., "How could we make the avatar more salient?").

In the class-based testing, to assess participants' appraisals in the sense of the first level of evaluation by Kirkpatrick and Kirkpatrick (2006), we compiled a short rating sheet with the help of different evaluation instruments (Kramer 2002; Prenzel et al. 1996; Schrepp et al. 2017). In sum, we selected and constructed eight items to assess different aspects like the intrinsic motivation during the training and the perceived difficulty. After finishing the training module, participants rated the items on a scale from 1 ("not at all") to 7 ("very") with a midpoint of 4 ("reasonably"), or with a semantic differential (e.g., from "far too short" to "far too long" with a midpoint of "just right"). After the items, an open-format question ("How would you modify the training?") encouraged participants to suggest improvements for the modules. In addition, they could note problems that came up during the training on a separate sheet. Moreover, we collected observational data as well as answers to specific questions we asked at the end of class-based piloting. Besides, demographic information on the participants was assessed, on the one hand to get an overview of the composition of our target group for the planned main evaluation, on the other hand to test our assumptions regarding the differing perceptions of the modules dependent on sample subgroups.

Procedure and sample

We collected data primarily from the target group of our training, MA apprentices in their second year of VET. However, as recruitment of this group is difficult (e.g., due to restricted time capacities of MAs and VET-schools), for the one-to-one interviews, we included Dental Assistants (DAs) in training as well. Their social-emotional demands at work overlap highly with those of MAs. The interviews were conducted with finally $N=9$ MAs/DAs either in a vocational school or via a video conference tool.

The class-based testing took place in October and November 2022 in three different MA-classes from the same vocational school, with all apprentices in one class (i.e., $n=21-23$) testing the same module. Every participant used his/her own computer

including headphones to ensure concentration. In each class, two researchers introduced the project and the procedure and monitored the process to address questions or technical problems. All participants finished the respective module within about 30 to 75 min. Overall $N=67$ apprentices participated in the class-based testing. All were in their second year of training and thus, 89% had been at least 10 months in their respective training company (43% general practitioner, 57% specific medical field). 88% were between 16 and 24 years old and 27% stated that German was not among their native languages, whereas 39% stated that they had at least one other native language next to German. Regarding participants' educational background, the majority had acquired an intermediate school-leaving certificate (54%; vs. 13% with lower school-leaving certificate and 31% with higher school-leaving certificate).

Statistical analyses and results

Fifty-one participants answered the questionnaire regarding their perception of the module. They form the basis for further statistical analyses. First, we report descriptive results for the eight evaluation items. Second, we present differences in ratings (i.e., ANOVA, t-Test) of the eight items depending on native language, level of schooling and medical field. Due to the small sample size, we raised the p-value threshold up to $p < 0.10$ and gave special attention to effect sizes. Finally, we summarize the main results of the analysis of the qualitative data.

Descriptive results of the eight evaluation items

While the statements about curiosity during the training ($M = 3.73$, $SD = 1.40$) and experienced fun with the training ($M = 3.84$, $SD = 1.50$) were rated on average slightly below the theoretical mean of 4 (“reasonably”), interest in the content of the training showed a slight upward tendency ($M = 4.26$, $SD = 1.65$). Moreover, participants indicated on average that the time had passed reasonably quickly ($M = 4.22$, $SD = 1.94$). Finally, participants do not seem to have had much trouble focusing on the training. Thus, they found

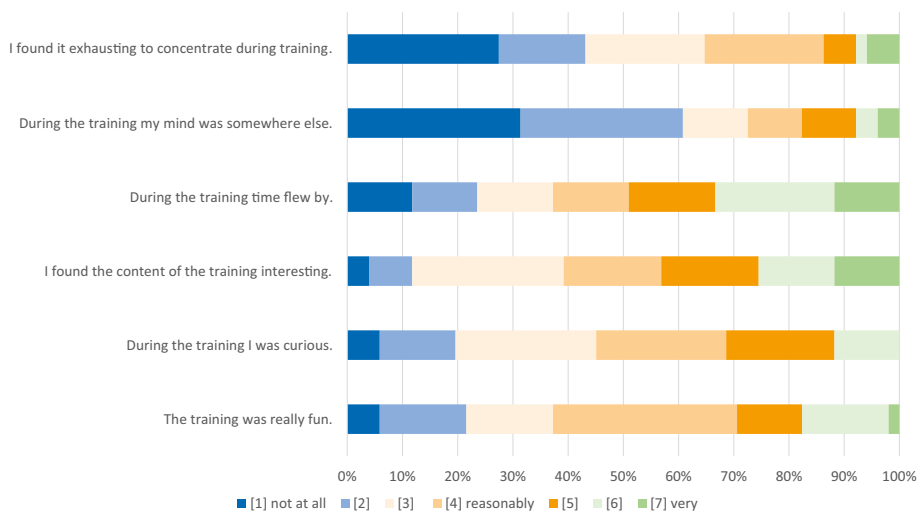


Fig. 6 Distribution of answers to the evaluation items asking for experience during training ($N=51$)

it rather less strenuous to concentrate on the training ($M=2.92$, $SD=1.70$) and also rather did not drift off in their thoughts ($M=2.65$, $SD=1.72$). The exact distribution of the answers given can be seen in Fig. 6.

Regarding the item assessing the *perceived difficulty*, results show that on average the training was neither experienced as too easy nor as too difficult ($M=3.83$, $SD=1.03$), with a share of participants rating it as a bit too easy. Finally, the ratings on *perceived duration* indicate that on average participants experienced the training as slightly too long ($M=4.88$, $SD=1.24$). As can be seen in Fig. 7 the experience of duration was relatively equally distributed.

Testing differences in the evaluation items between subgroups

Regarding participants’ native language(s), most evaluation items did not show significant differences between those with and without German as a native language (t-tests, $p>0.10$). However, regarding some items, the absolute differences as well as effect sizes were still fairly high. The difference in the *perceived difficulty* between those who reported German as at least one of several native languages ($M=3.69$, $SD=0.81$) and those who did not (i.e. non-native speakers; $M=4.56$, $SD=1.59$) had a large effect, $t(8.91)=1.59$, $p=0.147$, $d=0.88$. As expected, this indicates that the group of non-native speakers tended to find the training more difficult. Similarly, the same group perceived the training to be too long ($M=5.67$, $SD=1.32$) to a significantly greater extent than the group of native speakers ($M=4.71$, $SD=1.17$), $t(49)=2.16$, $p<0.05$, $d=0.79$ (see Appendix: Table 3 for all results).

To test evaluation differences among the different levels of school qualification (i.e., highest school-leaving certificate), we conducted ANOVAs. As can be seen in Table 1, the directions of the differences in evaluation are as expected, while the differences between the groups reach statistical significance ($p<0.05$) only for *perceived difficulty*, $F(2,47)=5.87$, $p<0.01$, and *perceived duration*, $F(2,47)=4.77$, $p<0.05$. Also, we found a marginally significant difference for the experienced fun, $F(2,47)=3.02$, $p<0.10$.

As expected, for *perceived difficulty* a Tukey post-hoc analysis revealed a significant difference between participants with *no/lower school-leaving certificate* and those with *intermediate school-leaving certificate* ($p<0.05$) as well as between those with *no/lower school-leaving certificate* and those with *higher school-leaving certificate* ($p<0.01$). This indicates that participants with at most a lower school-leaving certificate perceived the training as more difficult. Regarding *perceived duration* there was a significant difference

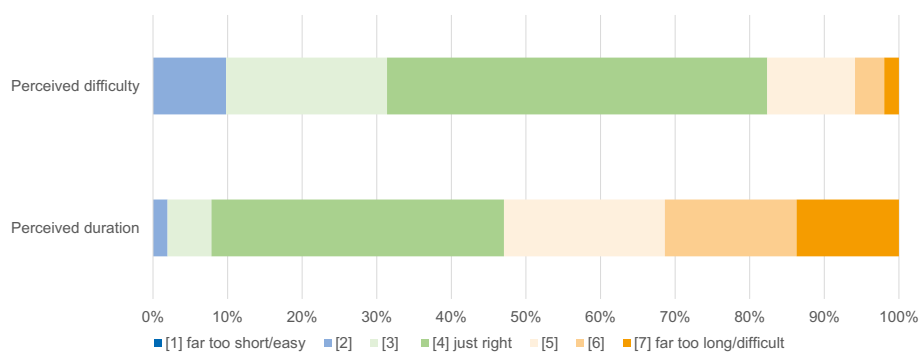


Fig. 7 Distribution of the evaluation items asking for perception of the training (N = 51)

Table 1 Means, standard deviations and ANOVA on evaluation items for different levels of school qualification

	Highest school-leaving certificate						F (2,47)	p	ω ²
	No/lower ^a		Intermediate ^b		Higher ^c				
	M	SD	M	SD	M	SD			
Perceived difficulty	5.00	1.41	3.77	0.76	3.50	0.99	5.87**	<0.01	0.16
Perceived duration	6.00	1.55	4.46	1.10	5.11	1.13	4.77*	<0.05	0.13
Interest in content	3.50	1.39	4.12	1.56	4.78	1.80	1.65	0.20	0.03
Fun with training	2.50	1.22	4.00	1.55	4.11	1.37	3.02	0.06	0.07
Curiosity during training	2.83	1.17	3.73	1.46	4.06	1.35	1.74	0.19	0.03
Time flew by	3.83	2.32	4.46	2.12	4.00	1.65	0.42	0.66	0.00
Mind wandering	2.83	1.33	2.46	1.79	2.89	1.81	0.35	0.71	0.00
Concentration problems	2.50	1.38	3.08	1.90	2.94	1.51	0.27	0.76	0.00

For all items: scale from 1 to 7, however for first two items, 4 was labeled “just right” vs. for rest of items, 4 was labeled “reasonably”

**p < 0.01, *p < 0.05

^a n = 6; ^b n = 26; ^c n = 18

between the groups *no-/lower school-leaving certificate* and *intermediate school-leaving certificate* (p < 0.05), once more indicating a more negative (i.e., training is too long) perception by the group with at most a lower school-leaving certificate. Regarding the fun experienced during the training, again, those with *no-/lower school-leaving certificate* reported a less positive experience than the other groups (p < 0.10).

There are no significant differences between participants from general practitioners’ practices and from specialists’ practices regarding the evaluation items (see Appendix: Table 4 for detailed results). Thus, the assumption that the training was suitable for all kinds of practices can be confirmed. However, there is a marginally significant difference regarding *perceived difficulty* of training, $t(49) = 1.72, p < 0.10, d = 0.49$. Participants from general practitioners’ practices perceived it as somewhat more difficult, indicated by a small to medium effect size.

Results of qualitative data regarding training perception

For the qualitative analysis we bundled data from the one-to-one interviews (MAs and DAs) and the class-based testing (e.g., open-format questions at the end of the questionnaire) (only MAs). Applying a reduced version of qualitative-content analysis by Schreier (2012), we extracted the most frequent (i.e., n > 10) and the most relevant (e.g., technical problems that constrained the training process) themes that occurred in the data.

The two most frequent topics were *module is too long* and correspondingly *too much text* (e.g., “sentences too long”; “at some point I lost focus”). Furthermore, the two topics *content incomprehensible* and *unclear instruction* occurred often as well. However, those comments refer to specific pages or contents in the modules (e.g., “Fundamental Attribution error”—please explain word more clearly”, “please give clearer instruction on which situation we shall describe”). In addition, several participants also gave positive feedback, either unspecific (e.g., “good training”) or specific (e.g., “interesting, as you get insights on how to improve one’s behaviour in working life”). Moreover, we noted some

observations during the class-based testing and the interviews (e.g., high share of people not clicking on the avatar; problems with the navigation in the LMS).

Discussion and implications of pilot study results

Overall, the results indicate that participants experienced the training as reasonably positive. Participants reported “reasonable” fun, curiosity and interest, while having only few problems to concentrate during the training. Accordingly, the open responses show a couple of positive feedbacks with some participants saying that they would alter “nothing” in the training. Although higher means on the evaluation items would of course be preferable, we did not expect means of 6–7 as item wording was partly extreme (e.g., “The training was really fun”) and also the training is still a learning module and not a form of game-based learning (Fischer and Reichmuth 2020).

Regarding subgroup differences in evaluation, most differences were non-significant, suggesting that the training is similarly appropriate for different subgroups. However, although we raised the p-value threshold, the partly relatively small subgroups sizes (e.g., $n=6$ for lower school qualification level) may still have caused non-significant results. The medium and high effect sizes of some non-significant differences support this, like for the difference in perceived difficulty between native and non-native speakers.

However, the main goal of the pilot study was to examine potential problems of the training and in what way the training could be optimized to address apprentices, especially regarding their different backgrounds (Döring and Bortz 2016). As such, the items as well as the qualitative responses regarding the topics *training duration* and *content difficulty* showed significant improvement potential. First, the duration of the training was perceived as too long by all participants, but especially by non-native German speakers as well as apprentices with a lower school-leaving certificate. Therefore, we decided to prune the three modules in various ways, while keeping the relevant learning content. We particularly consolidated long text passages, deleted tasks or pages with little incremental value and offered more optional audio for longer texts to address different learning types.

Second, although on average being evaluated as “just right”, the difficulty of the training was perceived differently among groups. While participants with higher levels of school qualification as well as native German speakers tendentially found the training a bit too easy, those with a lower school-leaving qualification and non-native German speakers found it a bit too difficult. However, considering the frequent topics *content incomprehensible* and *unclear instruction* in the qualitative data, we infer that not the contents themselves but rather the way they are presented in the training might be the problem. Thus, to accommodate the weaker groups and at the same time prevent losing the stronger groups, we did not change contents but simplified their explanation and depiction, for example by simplifying terms and syntaxes or making instructions clearer. As the perceived difficulty of a training may also influence the affective experience during the training (e.g., perceived valence and engagement; Mills et al. 2013), we expect that optimizing the training’s comprehensibility will enhance experienced fun and curiosity during the training as well. This would be especially relevant for those with at most a lower school-leaving certificate, who reported rather high difficulty and low fun at the same time.

Finally, participants from general practitioners’ practices and from specialists’ practices evaluating the training similarly suggests that its contents are similarly suitable for

different medical fields and that training adaptations in the sense of, for example, videos of situations in specialists' practices are not needed. This is also supported by the one-to-one interviews with DAs, whose feedbacks were similar to the MAs' feedbacks.

Outlook to evaluation study

After having revised the training modules, the extent to which the training achieves effects in the three areas of competence will be examined in an intervention study with 200 prospective MAs in their second year of training in autumn 2023. An experimental group will undergo a pretest before participating in the training and a posttest after completion of the final training module. A control group will undergo the pretest and posttest within a similar interval, but with no intervention whatsoever in between. Both groups will then undergo a third test after an additional 2 to 3 months as a follow-up test.

The tests used will be revisions of a video-based SJT (cf. Dietzen et al. 2016b; Monnier et al. 2016) with questions on all three competences that the training targets. In order to measure effects of the training three parallel versions of the test for the pre-, post- and follow-up measurement were developed. Each test version consists of twelve videos picturing the opening of critical interaction situations with patients, colleagues and the doctor, filmed from the perspective of an MA in training (first-person perspective). The test-takers are requested to name their emotion and emotion regulation strategy when faced with the situation, to describe the problem underlying the situation and to propose a short answer they would give in the situation. Participants' answers will be rated in accordance with theoretically founded evaluation grids.

In addition to the measurement of training effects with these tests, the group receiving the training will answer questions on user experience to evaluate if the training content is comprehensible, relevant and interesting. For this, we will use the same items we used in the pilot study and complement them with further questions concerning the training's applicability for participants' everyday work. We thereby follow the suggestions by Kirkpatrick (1970) to take into consideration different levels when evaluating educational programmes. We will ask for the learners' opinion of the training (reaction), but also measure change in the targeted competences (learning). We will also ask if the learners have been able to implement what they have learned into their daily working life and so increasingly master relevant interaction situations at work (behaviour).

As we expect differential training effects according to individual and institutional characteristics, we will also assess, for example, prior knowledge, language skills and characteristics of the respective practice where the in-company-training takes place. With regard to the latter we will especially analyse if the working environment is supportive for increasing SEC. For this, we will ask about the working atmosphere and culture regarding the handling of social interactions as well as the availability of opportunities for practising SEC at work. A supportive environment in this respect is crucial for establishing routines in using SEC, without which long-term competence development is difficult. These facets of the work environment could thus moderate the effect that taking part in the training has on competence scores in the follow-up test. Moderating effects on the immediate gains in SEC might also occur, because participants would be better able to relate to the training contents due to their experiences at the workplace. We will therefore also ask participants specifically about the frequency with which they have had

opportunities to use their new skills at the follow-up measurement to gauge the effect of practicing in real working situations on competence development.

Discussion

The online training programme SECOTrain targets essential SEC which are to date not sufficiently addressed in the professional training of MAs. Nevertheless, we are aware that a purely digital training entails some challenges. Some of these can be addressed by tools as described in the section on didactical principles of the training. What remains is the underlying difficulty that taking part in such a training requires minimum levels of language skills and digital literacy. Apart from refraining from complex wording and explaining the functions necessary for navigating the training, this cannot be helped in our training design. However, in our evaluation study of the training we will assess language skills, if German is the participants' native language, participants' appraisal of the comprehensibility of the training material and the ease of handling the modules, so that we can control for the influence of these aspects on training success.

We are aware that the little existing research on the impact of specific conditions of trainings points to the fact that a longer training duration and the use of different formats would promise stronger training effects. However, the design we chose was the only realistic way to integrate the SEC contents into MA training at all in a first step. If the training proves effective in the evaluation study and is positively received by the VET practice, we are confident that it will be possible to successively establish additional tools for further practicing and training the contents conveyed in the modules. To identify the conditions under which such an extension would be possible, we will accompany the evaluation study by workshops to ask training personnel and teachers for MAs about the measures of support they would need to use the training modules in their training routines and teaching.

Furthermore, a sustainable development of competences requires that the learners make use of the learning contents in everyday working life. Taking part in the training modules hopefully results in motivating participants to do so, to reconsider their behaviour in accordance with the training contents and to sharpen their awareness for opportunities to make use of them. Also, the training might contribute to increasing participants' self-efficacy expectations with regard to mastering challenging interaction situations, which in turn should facilitate the use of the skills learned.

As many occupations entail dealing with patients, clients or customers, the training contents are in principle also relevant for a variety of professions and also across different countries. It could be fruitful to transfer the contents accordingly by adapting them to the respective types of situational requirements and occupational or cultural behavioural norms with regard to social interactions in certain contexts. Findings on the effects of SEC on success, health and well-being suggest that training them in vocational contexts should benefit all sides—patients/customers as well as companies, colleagues and employees themselves.

Appendix

See Tables 2, 3 and 4.

Table 2 Structure of the three modules based on CAA and Euler's learning steps

	Emotion regulation	Perspective coordination	Communication strategies
Main learning goal	<ul style="list-style-type: none"> Encourage learners to move from maladaptive emotion regulation to healthy reappraisal to decrease or cope with negative emotions at work 	<ul style="list-style-type: none"> Encourage learners to move from superficial perspectives on a situation to bringing together different perspectives in a solution-oriented way 	<ul style="list-style-type: none"> Encourage learners to move from offensive or avoiding behaviour to communicating in an appreciative manner to contribute to a mutual good solution in a difficult situation
Introduction	<p>Introduction into ...:</p> <ol style="list-style-type: none"> the three competences and why training them is worth it the respective module's learning goals and schedule the training's technical functions and the fictional practice team providing the sample videos 		
Raising awareness	<p>Presenting a video of a problematic behaviour with regard to the respective competence (i.e., acting out of anger; inadequate perspective coordination, avoiding a confrontation with a colleague). In an MC-format, learners have to detect possible negative consequences of the respective behaviour</p> <p>Anchor-task Pt. 1: thinking about a critical situation at work in the last 2 weeks and writing down how one coped with this situation</p>		
Knowledge transfer	<ul style="list-style-type: none"> Audio synchronous animated explanations of the functions of emotions and the emotion generation process Self-directed exploration of different emotion regulation strategies (esp. reappraisal) by clicking on boxes and thus activating respective auditory explanations All contents incl. examples with reference to a video-sample-situation 	<p>Short recap of the contents of the respective previous modules (e.g., by means of MC tasks)</p> <ul style="list-style-type: none"> Audio synchronous animated explanations of human perception and behaviour (e.g., biases, needs, roles, see Fig. 2) with reference to video-sample-situation As a contrast to the "negative" reaction of the apprentice in the video, a positive model is shown, framed by questions on how to react as well as possible Overview of what constitutes good perspective coordination and example of a high-quality problem definition of the example situation 	<ul style="list-style-type: none"> Self-directed exploration of the four levels of a message by clicking on boxes and thus activating respective auditory explanations Audio synchronous animated explanations of the origin and the four steps of nonviolent communication (NVC)
Scaffolding/fading	<ol style="list-style-type: none"> Internalize the link between emotion and cognition by assigning emotions to compatible thoughts referring to a conflict situation with a patient (closed-format) Practicing reappraisal strategies by assigning strategy names to compatible thoughts in a conflict situation with a patient (closed-format, see Fig. 3) Applying strategies by generating and writing down possible reappraisals to deal with a specific emotion (e.g., anger) in a specific situation (e.g., conflict with a colleague) (open-format) 	<ol style="list-style-type: none"> Along a sample situation with a colleague, participants work through a very detailed perspective coordination: <ol style="list-style-type: none"> Detecting individual perspectives (e.g., of MA vs. patient) on the situation in MC-format (closed-format) Detecting an optimal overall description of the problem in an MC-format (closed-format) Sorting possible courses of action in the situation and afterwards watching a possible beneficial response in form of a video (closed-format) Same procedure (1. individual perspectives; 2. overall perspective; 3. behaviour) in an open-format (i.e., text field) 	<ol style="list-style-type: none"> Practicing the four levels of a message by assigning each of the levels to a corresponding statement (closed-format) Internalizing the NVC by means of one short exercise per level (closed-format, e.g., labeling a statement as "observation" vs. "evaluation") Internalizing contents by means of a step-by-step explanation (i.e., video snippets) of a positive communication with a colleague (closed-format) Applying NVC by generating and writing down one's spoken answers to three different video-situations (e.g., conflict with colleague; shocked patient with severe diagnosis; open-format)
	<p>All exercises in all modules include feedback and theory-based sample solutions and participants are repeatedly motivated to transfer the training content to their own routines at work</p>		

Table 2 (continued)

	Emotion regulation	Perspective coordination	Communication strategies
Reflection	<ul style="list-style-type: none"> • Comparing one's self-generated reappraisals with theory-based sample reappraisals to evaluate one's own strengths and improvement potentials 	<ul style="list-style-type: none"> • Comparing one's self-generated thoughts regarding different perspectives and beneficial behaviours in a situation with theory-based answers 	<ul style="list-style-type: none"> • Comparing one's self-generated spoken answers with beneficial theory-based answers (i.e., with the help of step by step explanations of video-snippets) and thinking about what could be changed in one's original answer (see Fig. 4)
Articulation	<ul style="list-style-type: none"> • Writing down in own words why regulating one's emotions by reappraising a situation might be better than suppressing one's emotions <p>Lessons learned: by reflecting the whole module, participants articulate what they have learned, what parts of the learned content could be especially helpful for their own work with patients and colleagues</p> <p>Anchor-task Pt.2: by reflecting on how one coped with one's anchor situation before the training, participants articulate how they would cope with the situation NOW by applying the respective competence</p>	<ul style="list-style-type: none"> • Regarding a new situation, participants see both a positive and a negative response and are given the opportunity to verbalize what was good or bad and again compare these responses to the authors' suggestion 	<ul style="list-style-type: none"> • No further articulation task needed

Table 3 Means, standard deviations and t-tests on evaluation items for different native languages

	Language				t (49)	p	Cohen's d
	Native speaker ^a		Non-native speaker ^b				
	M	SD	M	SD			
Perceived difficulty	3.69	0.81	4.56	1.59	1.59 ^c	0.15	0.88
Perceived duration	4.71	1.17	5.67	1.32	2.16	0.04	0.79
Interest in content	4.19	1.61	4.56	1.88	0.60	0.55	0.22
Fun with training	3.79	1.54	4.11	1.36	0.59	0.56	0.22
Curiosity during training	3.76	1.34	3.56	1.74	0.40	0.69	0.15
Time flew by	4.38	1.91	3.44	2.01	1.32	0.19	0.49
Mind wandering	2.81	1.71	1.89	1.62	1.48	0.15	0.54
Concentration problems	2.95	1.61	2.78	2.17	0.28	0.78	0.10

For all items: scale from 1 to 7, however for first two items, 4 was labeled "just right" vs. for rest of items, 4 was labeled "reasonably"

^a n = 42; ^b n = 9; ^c due to a lack of variance homogeneity, Welch's t-test with df = 8.92 was conducted for this item

Table 4 Means, standard deviations and t-tests on evaluation items for different types of practice

	Employer				t (49)	p	Cohen's d
	General practice ^a		Specialists' practice ^b				
	M	SD	M	SD			
Perceived difficulty	4.16	0.96	3.66	1.04	1.72	0.09	0.49
Perceived duration	5.00	1.25	4.81	1.26	0.52	0.61	0.15
Interest in content	4.47	1.65	4.13	1.66	0.73	0.47	0.21
Fun with training	4.05	1.58	3.72	1.46	0.77	0.45	0.22
Curiosity during training	3.95	1.39	3.59	1.41	0.87	0.39	0.26
Time flew by	4.32	1.77	4.16	2.07	0.28	0.78	0.08
Mind wandering	2.68	1.95	2.63	1.60	0.12	0.91	0.03
Concentration problems	3.05	1.72	2.84	1.71	0.42	0.68	0.12

For all items: scale from 1 to 7, however for first two items, 4 was labeled "just right" vs. for rest of items, 4 was labeled "reasonably"

^a n = 19; ^b n = 32

Abbreviations

- CAA Cognitive Apprenticeship approach
- CoSMed Competence Measurement based on Simulations and adaptive Testing in Medical Settings
- DAs Dental Assistants
- LMS Learning Management System
- MAs Medical Assistants
- MC Multiple choice
- NVC Nonviolent Communication
- SC Single choice
- SEC Social and emotional competences
- SECOTrain Social and Emotional Competence Training
- SJT Situational Judgement Test
- VET Vocational Education and Training

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Author contributions

MP developed the training module on perspective coordination. He contributed content for this part of the paper and on the didactical principles of the training. TT developed the concept of the study and drafted the manuscript. SK developed the training module on communication strategies and contributed content for this part of the paper. JR developed the training module on emotion regulation and contributed content for this part of the paper. AS wrote the conclusions. MP and JR wrote the chapter on the pilot study. All authors read and approved the final manuscript.

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