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Creating authentic and effective practice scenarios for digital simulation-based conversation training

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Abstract

In this article, we describe and illustrate a five-step process model for designing practice scenarios for digital simulation-based conversation training, in which learners practice challenging conversations with a virtual character. To maximize the likelihood of a successful learning experience, it is important that these practice scenarios are perceived as authentic by learners, and that they are based on relevant theory and validated expertise from experienced professionals. Our process model describes the steps that developers can take to (1) uncover implicit expertise concerning professional conversations, (2) build a validated conversation model including feasible response options and (3) optimize the play experience so that learners feel sufficiently immersed and engaged while using the simulation-based training. The design process, which is cyclical in nature, is illustrated by means of a case study in which we developed a training for cross-cultural job interviews. Furthermore, we provide practical templates and examples of questions that can be asked to experts and learners during preliminary testing of the scenario. By doing so, we aim to make the process of designing training scenarios more transparent and duplicable, and help developers to avoid pitfalls and tackle conceptual and practical challenges that arise during the design process.

Keywords: Simulation-based training, Conversation skills, Scenario design, Authenticity, Cross-cultural job interviews

Introduction

The popularity of simulation-based training (SBT) has increased considerably in recent years, both in the training of professionals (Gegenfurtner et al., 2014) and in higher education (Chernikova et al., 2020; De Smale et al., 2016). Given that practicing complex skills is not always possible in real-life settings, SBT has the advantage that it provides learners with the opportunity to gain experience with professional tasks in a safe practice

environment focused specifically on learning (De Jong & Van Joolingen, 1998; Grossman et al., 2014). The use of digital technology (e.g., VR or conversational AI) can make SBT more immersive and engaging, which is believed to have a positive effect on the learning outcomes achieved by its users (Gegenfurtner et al., 2014).

Traditionally, SBT was mainly used to train motor and technical skills, such as flying an airplane or performing a medical operation (Baarspul, 1990; Cook, 2014). Nowadays, it is increasingly common to also use SBT for practicing professional tasks in which problem-solving, communication and cooperation with others play an important role (e.g., Chernikova et al., 2020; Kotlyar & Krasman, 2022).

An example of such a task is conducting professional conversations. Although conversation skills are of great importance in almost every professional context, they traditionally receive little attention in university curricula (Hulsbergen et al., 2023). Moreover, they are often taught in a passive way; learners are provided with information about the characteristics of successful professional conversations, but have little opportunity to apply that knowledge in a realistic practice setting (Konopka et al., 2015). When practice opportunities are provided, it is mainly in the form of role-playing exercises with fellow learners or training actors (Kron et al., 2017).

Because organizing role plays with training actors is costly and sometimes impractical, digital SBT can offer a solution. During such trainings, learners do not engage in a conversation with a human interlocutor, but with a virtual character. A recent literature review in the field of medical communication skills (Battegazzorre et al., 2020) shows that there are several systems available that enable learners to practice conversations with virtual patients, some of which are also used for SBT in other professional domains (e.g., Jeuring et al., 2015). When it comes to the effectiveness of such systems, Lee et al. (2020) point out that only 4 of the 8 comparative studies included in their literature review found significant increases in attitudes or skills for learners who engaged in practice conversations with virtual characters. Several possible explanations are offered for these mixed results, including differences in instructional design, feedback and debriefing, and the quality of the practice scenarios (cf. Gegenfurtner et al., 2014).

To maximize the likelihood of a successful learning experience, it is important that the practice scenario underlying the SBT is experienced as authentic (Chernikova et al., 2020). For simulation-based conversation training, this means that the conversation should resemble a real-world conversation and the communicative behavior of the virtual character should be perceived as realistic in that particular context (Hulsbergen et al., 2023; Lee et al., 2020). A question that has only been addressed to a limited extent in previous research, however, is how one can ensure that a practice scenario for simulation-based conversation training meets this requirement. Which steps must be taken to design an authentic training scenario for simulation-based conversation training, which, in

combination with a solid pedagogical underpinning in terms of instruction, feedback and scaffolding, leads to a maximum learning effect? Earlier studies have highlighted important features of scenario design (e.g., Dai et al., 2023) or compared a number of templates that developers can use to build effective SBTs (e.g., Benishek et al., 2015), but, to the best of our knowledge, a comprehensive description of the process by which developers can create authentic training scenarios is currently lacking from the literature.

In this article, we describe a step-by-step approach to scenario design developed by DialogueTrainer, a Dutch provider of SBT for conversation skills. This approach assumes that any professional conversation can be modelled as a series of steps to get from a conversational goal to a desired outcome via a structured exchange of information. We will describe the design process and illustrate its application by means of a case study from Dutch higher education: the development of a SBT for cross-cultural job interviews. First, however, we will review the scientific literature on design attributes for SBT and on digital SBT for conversation skills.

Literature review

Key design attributes for SBT

The scientific literature on SBT discusses several design attributes that can potentially affect learner experiences and learning outcomes. One of the most prominent features is the authenticity of the simulation, which can be defined as "the degree of resemblance or correspondence between the characteristics of the learning environment and the characteristics of the actual task in higher education and professional life" (Hamstra et al., 2014 as cited by Chernikova et al., 2023, p. 2). Because simulations are by definition approximations of practice (Grossmann et al., 2014), the degree to which a situation created in a simulation environment corresponds to reality can vary. This is also referred to as the realism or fidelity of the simulation (Chernikova et al., 2023).

When assessing the authenticity of a simulation, a distinction can be made between *physical* correspondence and *psychological* or *functional* correspondence (Chernikova et al., 2023; Straus et al., 2019). Physical correspondence refers to the degree to which the visual, haptic, or other sensory properties of the simulation environment correspond to reality, while psychological correspondence refers to the simulation's ability to elicit the cognitive, behavioral, and affective responses that characterize the situation in reality (Sanchez et al., 2023; Straus et al., 2019). According to Gilbert (2016), the degree of physical correspondence is mainly influenced by the characteristics of the technology used, while psychological correspondence depends on the extent to which the content of the simulation meets the expectations of the learner. This suggests that SBT designers need to

pay sufficient attention to both form and content if they want to increase the authenticity of their training products.

Although previous research has shown that the authenticity of SBT is positively associated with learning outcomes (e.g., Chernikova et al., 2020; Chernikova et al., 2023), the literature does not provide a clear view of the minimum level of authenticity required for SBT to be effective (Bell et al., 2008). This is understandable, as the required authenticity may depend on the specific skill that the SBT aims to develop (Straus et al., 2019; Gilbert, 2016), as well as personal characteristics of the learner, such as prior knowledge (Chernikova et al., 2023). What many authors do agree on, however, is that the psychological dimension of authenticity is likely to have a greater impact on the learner experience than the physical dimension (Hamstra et al., 2014), particularly when the training focuses on the development of cognitive rather than motor skills (Straus et al., 2019) and the prior knowledge of learners is limited (Chernikova et al., 2023).

Authenticity is crucial for SBT, as it enhances the likelihood that learners suspend their disbelief (Dieckmann et al., 2007) and feel mentally immersed in the simulation environment (Badiee & Kaufman, 2015; Bell et al., 2008). Mental immersion can be defined as "the subjective experience of being in one place or environment, even when one is physically situated in another" (Stevens & Kincaid, 2015, p. 42). Learners who are mentally immersed during SBT experience a sense of presence, engage with the simulation environment as if it is real and feel personal responsibility to improve their performance (Dede et al., 2009 as cited by Badiee & Kaufman, 2015).

The sense of presence and personal responsibility can be enhanced further by incorporating a narrative into the SBT (Bell et al., 2008). Such a narrative not only allows designers to share contextual and task-related information with learners, but it also increases learner motivation by emphasizing the relevance and challenging nature of the task to be performed in the SBT. In addition, it is important that learners experience a certain degree of control while engaging with the SBT (Sanchez et al., 2023). They must be able to choose between different strategies and experience the effects of those strategies. Dieker et al. (2014) describe this design principle as a cyclical process of action, feedback and debriefing, and modified action.

The ultimate objective of applying these design attributes in SBT is to increase learner engagement (Huang et al., 2023). A higher degree of learner engagement, which can be defined as "meaningful involvement in learning through interactive and worthwhile tasks" (Fulton & Fulton, 2020, p. 79), can in turn lead to better learning outcomes (Huang et al., 2023).

Digital SBT for conversation skills

As stated in the introduction, there are several digital applications available that enable learners to practice conversation skills by interacting with simulated conversation partners. However, previous research on the effectiveness of digital SBT for conversation skills shows mixed results. In some studies, learners who had completed a simulation performed better during a subsequent simulation (Hulsbergen et al., 2023) or another test on similar content (Kron et al., 2017) than learners in a control group, while in other studies no significant differences were found between SBT and the teaching method used in the control group (e.g., Quail et al., 2016). According to Lee et al. (2020), these differences in observed learning effects are more likely to be caused by differences in the pedagogical underpinnings of the simulations than by differences in the technology used.

This resonates with the outcomes of previous literature reviews and meta-analyses on SBT in general. These studies also show that the didactical context in which SBT is deployed, and the instructional support offered before, during and after the simulation co-determine its success. For example, De Smale et al. (2016) emphasize the importance of teacher support and proper integration of the simulation into the rest of the course, while Chernikova et al. (2020) focus on the added value of different types of scaffolding, such as showing examples and prompts or building in reflection moments. In addition, the characteristics of the scenario that learners go through during SBT can influence its effectiveness (Gegenfurtner et al., 2014).

In the context of digital SBT for conversation skills, a scenario is defined as the combination of a setting and a sequence of conversational turns that alternate between the learner and the virtual character (Lala et al., 2017). The setting, which is often presented in the form of a narrative, determines the learner's conversational goal and the difficulty of the conversation. The sequence of conversational turns follows a protocol appropriate to the type of conversation the learner wants to practice (e.g., a bad news conversation or a negotiation). In most simulation environments, the practice conversation unfolds according to a predetermined script: in each turn, the learner chooses one utterance from a limited number of options, and the response of the virtual character depends on the option chosen by the leaner (Battegazzorre et al., 2020). The fact that the communicative behavior of the virtual character is delineated by the use of a script is generally seen as an advantage by instructors and learners who use SBT for conversation training, as it makes the behavior of the simulated conversation partner more predictable, understandable and explainable (Lala et al., 2017).

To develop an effective scenario in the context of digital SBT for conversation skills, it is pivotal that all elements of that scenario (the narrative describing the context, the conversational structure, the verbal and non-verbal behavior of the virtual character, and the response options offered to learners) are perceived as authentic. In addition, the

feedback that learners receive afterwards must be substantiated by theory and preferably refer to a validated best practice, and ideally encourages learners to further develop their skills, for example by going through the simulation again. In the next section, we describe a process model that has been validated in practice and can help designers achieve these goals.

Designing training scenarios: methodological applications

In this section, we describe a five-step process that can be followed to develop authentic and effective practice scenarios for digital simulation-based conversation training. For each process step, we explain how it contributes to the quality of the scenario and how the necessary information can be obtained. To illustrate the design procedure, we also show how it was applied in the development of two scenarios by which students at a Dutch university of applied sciences can practice cross-cultural job interviews with a virtual character. These simulations have been implemented in the authoring software described by Jeuring et al. (2015), which is described in more detail below.

The DialogueTrainer platform

The DialogueTrainer platform was originally developed at Utrecht University to train large groups of medical students in verbal communication skills. The platform comprises a front end in which learners can interact with virtual characters and a back end in which authors can build and adapt simulation scenarios without prior programming experience. The scenario editor has a number of standard features, which have previously been described by Lala et al. (2017). Most importantly, scenarios are developed in the form of a directed acyclic graph: a finite set of nodes and edges between nodes, with no cycles. The nodes represent conversational turns from either a learner or a virtual character, while the edges connect learner turns to virtual character turns and as such, determine the flow of the conversation. The author determines how the learner nodes connect to the virtual character nodes and which response options learners can choose from during each conversational turn. These choices are also linked to scores on certain parameters, which are derived from theoretical constructs that have been deemed relevant for the type of conversation that is practiced.

In practice, this means that learners can choose from different options during each conversational turn and receive feedback on their choices both during and after the conversation. During the conversation, this feedback is reflected in the verbal and non-verbal behavior of the virtual character the learner is talking to. Whenever a learner selects a suboptimal response option during a particular turn, the virtual character will show a negative verbal and / or non-verbal reaction. This stimulates learners to reconsider their choices and adjust their course of action. Generally speaking, the scenario will offer

learners the opportunity to bring the conversation back on track by responding to the next conversational turn in a more appropriate way, so that they can still achieve the conversational goal. After the conversation has been completed, textual as well as numerical feedback is provided about the extent to which the learner's choices corresponded with the predetermined learning objectives. How this feedback is generated and presented to learners will be described when we delve deeper into step 3 of the design process.

An overview of the design process

As has been documented for other writing processes (cf. Scardamalia & Bereiter, 1987), writing a scenario for simulation-based conversation training often leads to new insights and models. Developing effective simulations requires that assumptions about the cause-and-effect relationships underlying professional conversations are formalized. As best practices and pitfalls are explored, the designers continuously gain new knowledge about how successful professionals act and how learning professionals learn. As a consequence, the first three steps in the design process are mainly focused on creating an increasingly detailed description of what happens in challenging professional conversations, based on interviews with experts and learners and relevant concepts from the scientific literature. The fourth and fifth step involve revisiting this model after testing the SBT with new experts and learners. This implies that the process does not follow a linear path but includes feedback cycles within and between different steps. This is illustrated in Figure 1.

Step 1: Align and strategize: Determining the learning objective

The purpose of SBT is to immerse learners in a challenging situation from professional practice, in a safe environment that allows them to explore cause-and-effect relationships.

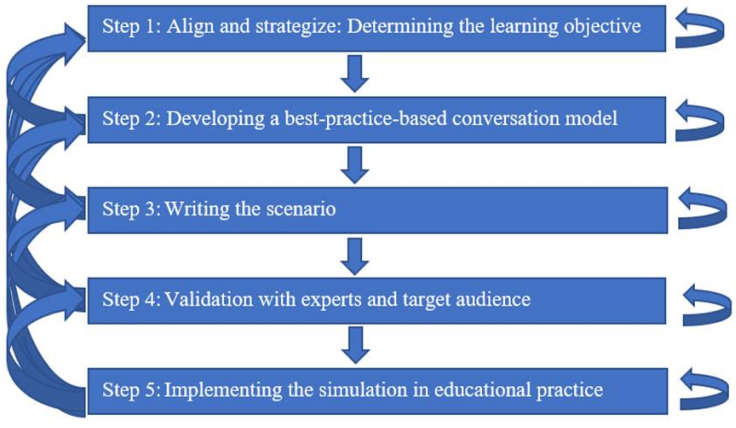

Fig. 1 Visualization of the design process

To create a practice scenario that is perceived as both valid and relevant, it is necessary to (1) identify a situation which professionals consider challenging, (2) clarify which outcome in that situation is considered successful and (3) ascertain whether a specific approach or method increases the likelihood of achieving this outcome.

On the basis of this information, the main learning objective for the SBT can be specified: in situation X, the learner must learn to achieve outcome Y by following approach Z. Z, which represents a validated best practice, is further specified and refined during step 2 and 3 of the process. At this stage, developers mainly need to ensure that the situation represents a recognizable professional challenge, that there is consensus on the desired outcome and that professionals or learners are actually able to influence the course of events by displaying certain behaviors. This is the expertise that is central to our design.

In a traditional educational setting, the learning objectives for the SBT should match or advance an existing curriculum. In a corporate setting, it can be helpful if learning objectives are formulated in such a way that they can be linked to business outcomes. Examples include, but are not limited to, improvements in the value provided to customers (e.g., customer service conversations), work coordination (e.g., delegating work), work atmosphere (e.g., feedback and addressing behavior), individual performance (e.g., feedback and coaching), business revenue (e.g., negotiating) and employees taking care of themselves (e.g., setting boundaries).

Application

We developed two scenarios for practicing cross-cultural job interview skills for students of a BA programme in European Studies at a Dutch University of Applied Sciences. Some students of this programme have an ambition to do their graduation internship at an organization located in the Central and Eastern European (CEE) region. In order to fulfil this ambition, they need to successfully navigate an application procedure and conduct a job interview with an interviewer from the professional field.

Performing well during a job interview with an interviewer from the CEE region has proven to be challenging for students, particularly if they have a Western European background. Despite the attention that is given in the curriculum to the impact of culture on communication style in professional settings, students have indicated that they did not feel psychologically ready for the cross-cultural job interview and were uncertain about the communicative choices they made while interacting with interviewers from the CEE region. This is understandable, as conventions surrounding job interviews and the desired communicative behavior of job candidates differ greatly between cultures (Sandal et al., 2014; Paulhus et al., 2013).

To support students in preparing for this challenging situation, we decided to develop a SBT that allowed them to practice a cross-cultural job interview with a virtual character

Fig. 2 Screenshot of the virtual character acting as interviewer

who was playing the role of an interviewer from the CEE region (see Figure 2 for an impression of one of the virtual characters). The initial learning objective was formulated as follows: in a cross-cultural job interview with an interviewer from the CEE region (*situation*), the learner must learn to create a favorable impression of him- or herself (*desired outcome*) by displaying culturally appropriate communicative behavior (*approach*). The descriptions of the desired outcome and the approach were derived from the competency profile of the European Studies programme, which states that graduates have to be able to establish professional relationships and collaborations in an intercultural and interdisciplinary environment.

Step 2: Developing a best-practice-based conversation model

At the core of every SBT lies validated practical expertise. This is essential for two reasons. First, because the objective of the training is to help learners solve an actual practical problem. Second, because a credible experience of relevant cause-and-effect relationships enhances learner engagement. This implies that the scenario should reflect knowledge about the objective and relevance of the task (in this case, a conversation), the mechanism by which the best practice enhances the likelihood of success, and the suboptimal or undesirable effects of alternative approaches.

The objective of any professional conversation is to achieve a goal. In most professional conversations, this requires a degree of collaboration between two conversation partners, who work through a process towards agreement and commitment. Generally, this process involves intermediate steps with subgoals, such as creating circumstances to exchange information, clarifying challenges, finding common ground, exploring solutions and

consecutive challenges, and bringing the conversation to a conclusion. In this context, expertise consists of validated assumptions about which steps need to be taken and which communicative behaviors enhance the likelihood of achieving the subgoals associated with each step.

To gather this information and build a theoretic framework, we combine insights from scientific literature with the outcomes of expert interviews. During the expert interviews, the following questions are addressed:

1. What do you see as at stake in this conversation and what are you working towards?
2. Which steps do you take towards this goal, with which subgoals?
3. How do you recognize that a step has been completed successfully?
4. What is at stake for the other person both initially and eventually?
5. How is this reflected in their response, which informs advancement towards conversational goals?

Subsequently, the model is further enriched by including prevalent learner pitfalls. To identify these pitfalls, we first ask the experts what they learned through experience by asking the following questions:

6. What other challenges do you see which can create pitfalls?
7. Which insights or strategies have helped you overcome these challenges?

It should be acknowledged, however, that experienced professionals might be unable to reconstruct their learning process or recall their previous mistakes and misconceptions. Therefore, we also involve learners or instructors who can provide relevant insight into mistakes learners make and the misassumptions on which these mistakes are based.

The end result of step 2 is a conversation model in the form of a ‘do’s and don’ts table’ including phases, subgoals, interventions per phase, and common errors. This model describes relevant cause-and-effect relationships that learners can explore during the simulation. Subsequently, we define parameters in order to make the effects of certain communicative behaviors measurable based on theory. Within the DialogueTrainer platform, learners can receive scores for parameters related to (1) the achievement of subgoals in different phases of the conversation, (2) the use of generically effective communicative behaviors (e.g., asking questions, reflecting, summarizing, showing empathy), and (3) the achievement of desirable effects in the context of the conversational goal (e.g., clarity, engagement). These scores are used to direct the attention of learners towards important success factors and to inform learners and instructors about performance and progress.

Application

By means of literature review, we first identified a number of key concepts that might influence the course of job interviews between Western European candidates and interviewers from the CEE region. According to Paulhus et al. (2013), two impression management tactics should be taken into consideration: self-promotion and ingratiation. The goal of self-promotion is to impress an interviewer with one's competence, while ingratiation is aimed at creating liking. Ingratiation tactics include opinion conformity or flattery (Ellis et al., 2002), the use of humor (Cooper, 2005), and tactical modesty, which involves downplaying one's assets instead of promoting them (Paulhus et al., 2013). These two key concepts are referred to as 'making positive contact' and 'suitable presentation' in the *Parameters* section in the Appendix.

Delving further into the scientific literature on the above-mentioned concepts, we identified four potential causes (parameters) of cultural misunderstandings in job interviews between Western European candidates and interviewers from the CEE region:

1. assertiveness (e.g., is it appropriate to take initiative during the interview?)
2. the use of inappropriate humor
3. the lack of formality (e.g., is it appropriate to smile during the interview?)
4. the lack of tactical modesty

These four causes for misunderstandings were incorporated in a draft scenario that was discussed with experts. The experts were selected on the basis of relevant knowledge and prior experience with (1) working in Western as well as Central or Eastern Europe, (2) interviewing a candidate during a cross-cultural job interview, and (3) being interviewed as a candidate during a cross-cultural job interview. On the basis of their professional experience, the experts were able to validate the practical relevance of the parameters mentioned above and provide insights into the possible effects of displaying culturally inappropriate behavior in relation to these parameters. Their input helped us to create the do's and don'ts table, which is displayed in the Appendix. The suggested structure of the job interview is in line with the most common job interview scheme as described by Scheuer (2001).

Step 3: Writing the scenario

Writing a scenario is an analytical as well as a creative process. The analytical aspect relates to the development of a conversation model with validated assumptions about goals, subgoals and effective interventions as described in step 2, which forms the backbone of the instructional event as described by Schreiber and Berge (1998). Turning the instructional event into a meaningful learning experience requires combining the learning objective described in step 1 with an engaging story. This is the creative part of the design process: to transform the instructive component into an engaging learning experience.

From a practical point of view, creating an interactive scenario for simulation-based conversation training is a matter of connecting choices or response options for the learner to verbal and non-verbal responses of the virtual character. As explained earlier, the DialogueTrainer editor allows authors to create a graph structure which represents multiple realizations of the same professional conversation. To ensure continuous learner engagement, we limit the number of choices in the scenario to between 12 and 24. Central to the graph structure is the best-practice model identified in step 2. To illustrate the dynamics of the conversation and to challenge learners, we create attractive response options in line with the learning objectives as described in the do's and don'ts table.

To be able to provide learners with feedback after finishing the SBT, all response options are coupled with written feedback as well as scores for one or more of the parameters defined in step 2. The combination of numerical and textual feedback should focus learners' attention, while the storyline and the virtual character's verbal and non-verbal reactions increase immersion and engagement.

In order to calculate the scores, each response option is weighted in terms of its differentiation on the predefined parameters. The objective here is twofold: 1) to advance learners' understanding of the theoretical constructs by relating these constructs to practical choices within the scenario, and 2) to add measurement to the play experience, allowing instructors to monitor learners' progress and identify if and where guidance is needed. To ensure validity, the scores associated with each response option are determined by two expert authors and initial tests are done to check whether the scores that learners achieve correspond with their skill levels at face value. After the SBT has been implemented, the validity of scores can be improved further by analyzing the performance statistics of large numbers of learners.

Application

At the start of the writing process, we created a list of common interview questions with the help of instructors who were practicing job interviews by means of role plays in their language classes. The role plays also helped us identify common phrasal expressions used in job interviews. The most important decision we made during this step, however, was to develop two separate scenarios, each of which covered two of the four potential causes of cultural misunderstandings (see step 2). While scripting the dialogues, we discovered that lack of tactical modesty could naturally be connected to assertiveness, while lack of formality could easily be combined with the use of inappropriate humor.

To enhance learner engagement, we implemented a variety of facial expressions and gestures in the non-verbal responses of the two virtual characters. These facial expressions and gestures are a standard feature of the DialogueTrainer platform, but they may have different meanings in different cultural contexts. We also ensured that the characters were

dressed in a culturally appropriate way and spoke with a recognizable but realistic Eastern European accent. To this end, we consulted with professionals from the region and asked two of them to lend their voices to our characters.

In the textual feedback, we provided learners with relevant theoretical insights (e.g., the distinction between high- and low-context cultures) and instructions on how to communicate more effectively in future interviews. Figure 3 shows how learners are informed about the suboptimal nature of the response option "Connecting the Dutch and Romanian culture sounds like an interesting challenge to me". In this example, the suboptimality is reflected in the score of 28.6% on the parameter tactical modesty, as well as the textual explanation about the inappropriateness of putting your self-interest central in high-context cultures. The purpose of this feedback is to stimulate learners to adjust their communication style to the cultural norms and conventions that are prevalent in the CEE region. More specifically, learners should understand that in a high-context culture an unequal distribution of power and resources is seen as legitimate, and that talking about yourself can be considered inappropriate if explicit permission to do so has not been given.

In addition to feedback about the (sub)optimality of particular response options, learners also receive an overview of their overall performance during the practice run. An example of such an overview is shown in Figure 4.

Fig. 3 Screenshot of the feedback provided to the learner in the dashboard

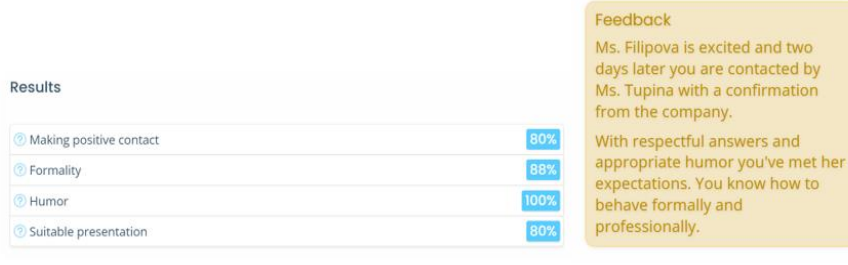

Fig. 4 The learner's overview of their overall performance

As you can see, this learner has achieved a score of 80% on the parameter ‘making positive contact’, which suggests that the response options he or she chose were largely in line with the expectations of the interviewer. Furthermore, the learner has been able to avoid obstacles related to the companies’ corporate culture, which is reflected in a score of 88% on the parameter ‘formality’. As for the factor ‘humor’, the learner scores 100%, meaning that he or she avoided misplaced humor in a formal dialogue because it might be perceived as rude and unprofessional. Although it is acceptable to make a joke, the humor should focus on the learner’s personal qualities only. The learner succeeded in applying cultural norms and practices appropriately and showed sufficient understanding of cultural differences by using correct communicative conventions in order to build a personal relationship with an interviewer. Finally, this learner scores 80% on the parameter ‘suitable presentation’. He or she came across as a motivated candidate and showed interest in the organization without putting too much focus on his or her personal interests.

Step 4: Validation with experts and target audience

The quality of a scenario for SBT depends on its validity as an instructive tool and on the extent to which it elicits learner engagement. When testing the scenario, we specifically look at three aspects:

1. The engagement of learners in consecutive practice runs of the same scenario;
2. The distribution of scores in groups of learners;
3. The structural integrity and effects of the feedback as evidenced by increasing scores for consecutive practice runs.

Testing is done in two rounds. The first round involves observing a number of test participants including at least one expert who was not involved in the earlier stages of the design. The primary objective is to see whether learners and experts can easily find response options in line with their intentions. We assess the validity of answer options by evaluating scores but also by observing facial expressions and the time it takes to choose a particular option. If a participant pauses, this is not necessarily problematic if they appear to be weighing options. When a participant takes a longer pause or appears distracted, we might ask: “What would you say?” to see whether they are contemplating existing response options or would prefer to respond in a different way. If the latter is the case, the DialogueTrainer editor allows us to change or add response options on the spot.

After the first practice run is finished, we observe the effects of scores and feedback. Again, we monitor what participants do in terms of reading and subsequent activity. Often, after reading some of the feedback, participants pause and turn to the tester to share their initial thoughts and evaluations. Then, the tester can ask the participant what they feel inclined to do now, to which we expect them to answer: “try again.” This answer informs us about their engagement and the perceived value of the SBT. If a participant is not

engaged, this is most often due to a lack of understanding of the scenario, difficulties in solving the challenges that the scenario conjures up or interactions that are experienced as uninteresting or unnatural.

In most cases, this first round of testing leads to minor changes in the scenario, which are mainly related to possible response options that were overlooked. Structural changes to the conversation model are seldom necessary.

The second round of testing involves analyzing practice runs from about 30 members of the target audience and analyzing their scores and play experience, utilizing a combination of information sources:

1. Dashboard metrics such as the number of practice runs, the distribution of scores and the development of scores over consecutive practice runs;
2. An in-depth analysis of individual practice runs as well as analyses at the group level;
3. Player suggestions provided via the editor;
4. Metrics that provide insight into the reflective experience and value, such as appreciation, believability and recognizability, learner conclusions, and Net Promoter Scores;
5. Observations of group discussions led by instructors.

From the dashboard, we can also identify learner profiles. Generally, we see a distinction between:

1. Learners who advance quickly, which indicates effective development;
2. Learners who advance slowly, which might indicate effective development but still requires attention from the instructor;
3. Learners who quit before they are successful, which indicates that the SBT falls short for this learner;
4. Learners who quit quickly, which might either indicate low commitment or shortcomings in the play experience, such as learners not finding their preferred response options.

If the majority of learners belong to profiles 1 or 2, this can be considered as a validation of the quality of the scenario. If, on the other hand, we see a lot of learners who belong to profiles 3 or 4, improvements in the scenario or the way in which it is implemented in teaching practice may be necessary.

Application

To ensure the quality of our scenarios, we conducted two rounds of testing as suggested above. For the first round of testing, we invited two professionals from the CEE working field and one bachelor student to engage with the simulation. One professional had

experience in conducting cross-cultural interviews with an interviewer from Eastern Europe, whereas the other one had limited experience with this type of conversation. The experienced professional obtained higher scores in the first practice run than both the inexperienced professional and the student. As expected, we found that the inexperienced professional and the student were able to improve their performance after practicing the cross-cultural job interview several times. Furthermore, we observed how easily and quickly the participants were able to choose an answer. It came to our attention that some of the response options were experienced as too long. We collected and discussed all suggestions made by the three test participants and adjusted the response options in our scenarios where necessary.

In the second round of testing, we involved 48 participants, collecting information about their performance and play experience. Figure 5 shows the test participants' activities in the DialogueTrainer platform. Although all participants activated their account, 4 of them (8.3%) didn't actually practice with the scenarios. 32 participants (66.7%) played the scenarios multiple times, while 12 participants (25%) completed only a single practice run.

Interestingly, the test participants appeared to have most difficulties with the parameter 'tactical modesty'. Not only did they express a lack of knowledge concerning this theoretical construct, but, as can be seen in Figure 6, the scores received for this parameter were generally lower than for other parameters. This was not only true for the first score, but also for the highest score that participants achieved.

Furthermore, we monitored the development of the test participants' scores over consecutive practice runs (see Figure 7). The data show that generally speaking, participants who completed multiple practice runs managed to improve their scores from

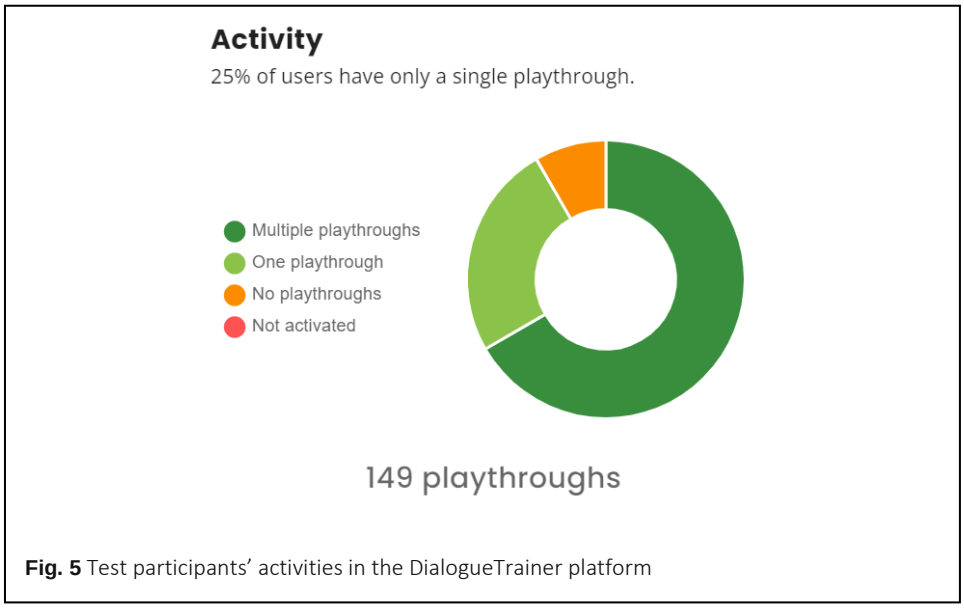

Fig. 5 Test participants' activities in the DialogueTrainer platform

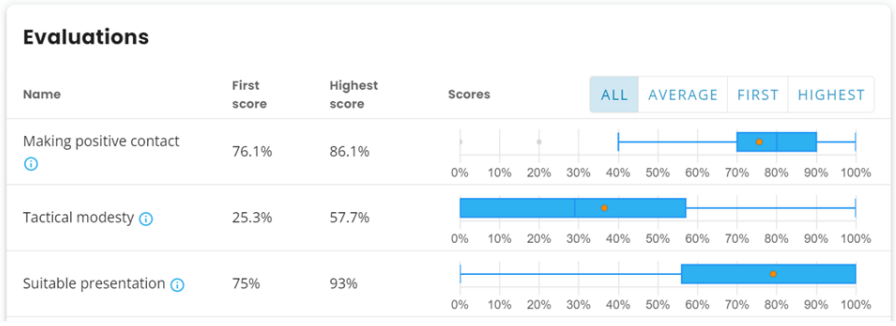

Fig. 6 An overview of the parameters and their respective distributions of scores for test participants

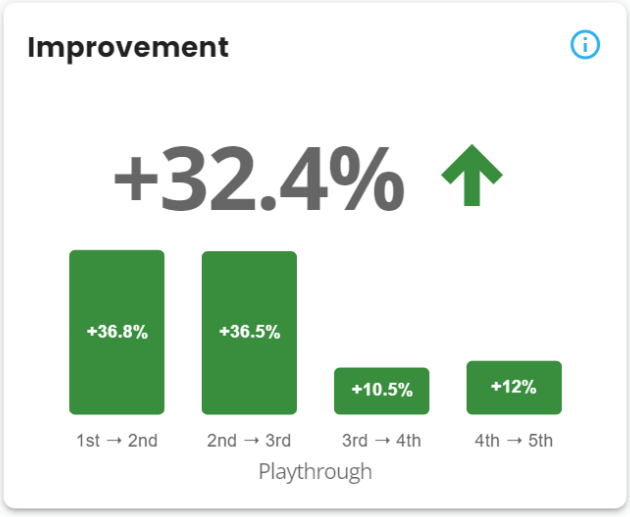

Fig. 7 Test participants' performance improvements across practice runs

the first to the second practice run (36.8%), as well as from the second to the third practice run (36.5%). The average improvement between the third and fourth practice run was only 10.5%, which is quite similar to the 12% improvement observed between the fourth and fifth practice run. The average improvement across all test participants was 32.4%.

In line with the numerical evidence, the test participants also expressed being more certain about how to behave during the interview. Finally, they indicated being less anxious and more psychologically ready to conduct a job interview with an interviewer from the CEE region.

Step 5: Implementation in educational practice

After testing and final modifications, the SBT is ready to be implemented in educational or organizational practice. Although the scenario has been designed in such a way that

learners can freely explore different approaches to improve their score, a certain degree of structure will help learners make the most of the experience. After all, learning does not only take place during the simulation itself, but also when learners reflect on the experience, discuss it with others or decide to consult additional information sources to deepen their understanding of the underlying theoretical constructs.

When implementing simulation-based conversation training in an educational context, we distinguish between two types of implementations:

1. The simulation is introduced 'on the spot' to add experiential learning to a traditional classroom setting;
2. The simulation is integrated in a blended or online learning trajectory.

The first type of integration mainly requires an inspired instructor and a motivated classroom. The play experience, either individually or collectively, adds an interactive learning activity to a lecture or workshop and stimulates discussion between learners. In addition, individual play experiences allow for individual learning and use of the dashboard to compare scores. The second type of 'asynchronous' or 'blended' implementation requires more planning and a well-considered instructional design to optimize the learning trajectory. The success of the intervention then depends on the context in which use of the SBT is prescribed or encouraged, as well as the qualities of the instructor.

When developing simulation-based conversation training for an organizational context, the implementation approach usually depends on a business case including perceived learning urgency. For example, SBTs can be used in pre- and onboarding to provide new team members with a clear view of which conversations matter and which behavior is expected. For more experienced team members, SBTs can be used to train effective responses to a current challenge, or as part of purposeful professional development, focused either on individuals or on teams. In our experience, many professionals are self-motivated to learn, but still external prioritization and sufficient time to train are essential. This underlines the important role for L&D, HR and management, who can be given access to the dashboard to monitor the development of team members, and, if possible, relate it to progress on organizational KPIs.

The final step is to incrementally improve the scenarios and the underlying conversation models through implementation in practice, during which we continuously (1) collect learner input and (2) analyze practice runs. Learner input can take a variety of forms. For example, learners can suggest missing response options that represent alternative courses of action. If the decision is made to add such a response option to the scenario, the graph is adjusted so that it represents a more complete and more valid model of the conversation at hand. Learners can also be asked to provide their opinion on the usefulness of the training scenario via an evaluation form or via classroom discussions in which the transfer of learning to real-life situations is discussed.

For instructors, the DialogueTrainer platform provides a dashboard that enables them to monitor three aspects of learners' experience during consecutive practice runs: engagement, differentiation, and score development. Engagement can be recognized from a learner playing multiple sessions, which indicates a deliberate attempt to solve the puzzle. Differentiation of scores indicates that learners may vary in skill levels. However, if learners manage to advance their scores during consecutive practice runs, this suggests that the challenge in the SBT is solvable by gaining the insights that are emphasized in the feedback that learners receive. As such, this observation is also a validation of the quality of the feedback.

For developers and scholars, it can also be interesting to assess test-theoretical aspects such as item differentiation and correlations between response options. Such an analysis can advance our understanding of persistent biases displayed by learners, which in turn give insight into the human traits, reflexes and prejudices that make professional conversations challenging.

Application

When we first implemented our SBT in an educational setting, we focused on adding experiential learning to classroom training. A group of 2nd year bachelor students, who were working on a project in which they developed an NGO campaign for the CEE region, were given the opportunity to practice a cross-cultural job interview using the SBT during a regular class. In the discussions that followed the play experience, instructors devoted special attention to the scores and the feedback received by individual students. Furthermore, the instructors noticed that students compared their scores with interest, and that they valued the opportunity to listen to the instructor's insights 'on the spot.' In a subsequent class, instructors worked with students on assignments covering the theoretical constructs of high- and low-context cultures, the four main causes for misunderstandings presented earlier in this paper, hierarchical structures within organizations, and communication styles in the CEE region. In the third class, students were instructed to practice a job interview for the second time. When discussing the individual scores, it came to students' attention that they had improved considerably. As can be seen in Figure 8, the students had largely succeeded to meet the expectations of the interviewer by achieving a score of 90% on the parameter 'making positive contact'. Furthermore, they showed understanding of the appropriate use of assertiveness and improved their scores on the parameter 'tactical modesty' from 22.9% to 61.4%. Finally, the highest score on the parameter 'suitable presentation' was 96.2%. The improved performance was accompanied by an overall higher satisfaction with the SBT as expressed by the students during classroom discussions.

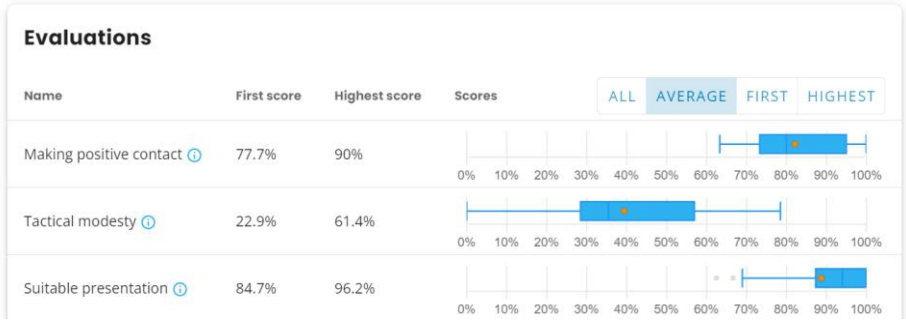

Fig. 8 An overview of the parameters and their respective distributions of scores for 2nd year students using the SBT

A few months later, we also created a so-called Modlet for 4th year students participating in the Central and Eastern Europe minor (see Figure 9). The Modlet is a digital environment that introduces the most important theoretical concepts in the context of a cross-cultural job interview and explains to learners how the simulations work and which feedback and scores they can expect. Then, they can start practicing with the two scenarios. This can be seen as an example of an integrated blended learning trajectory.

Since the 4th year students had already studied abroad for a semester prior to their involvement in the minor, they seemed to be more interested in cultural differences in communication style and perceived the topic as more relevant due to their personal experiences. As a result, they were also more open to classroom discussions in which they shared their personal examples with peers. Furthermore, the 4th year students showed an increased awareness of appropriate and inappropriate communicative behaviors in cross-cultural job interviews, as evidenced by the following statements taken from interviews:

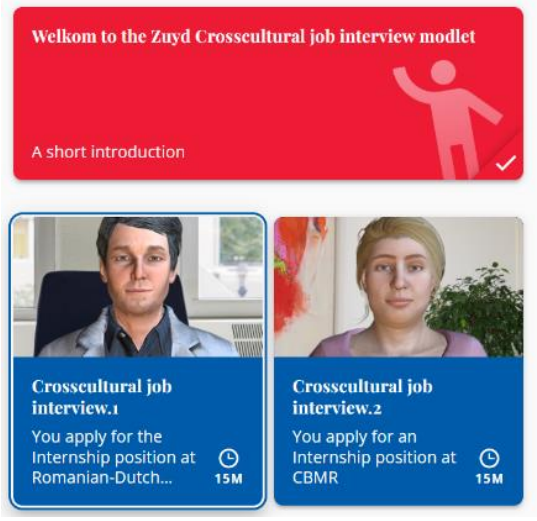

Fig. 9 The Modlet created for students of the CEE minor

- *"I noticed it is better not to take initiative while doing a job interview. It is not appreciated in the CEE region. On top of that, I was not aware of the [importance of the] company's hierarchy in the Central and Eastern European region."* (female student)
- *"I have to remain modest. I was quite surprised about their expectations. Thus, I decided to read more about what tactical modesty entails."* (male student)

Another important factor was the instructor's interest in cross-cultural job interviews, which further enhanced students' motivation to learn.

Conclusion and discussion

In this article, we have described and illustrated a five-step process model for designing practice scenarios for digital simulation-based conversation training. In the scientific literature, considerable attention has been devoted to the requirements that such scenarios should meet to ensure immersion, engagement, and learning on behalf of their users. To the best of our knowledge, however, a comprehensive description of the design process and the steps that can be taken to enhance the authenticity and effectiveness of practice scenarios has been lacking.

In the description of our process model, we have included theoretical insights as well as practical suggestions based on extensive experience with the creation of digital SBT for conversation skills. Furthermore, we have provided templates (e.g., the do's and don'ts table in the Appendix) and examples of questions that can be asked to experts and learners during preliminary testing of the scenario. By doing so, we aim to make the process of designing scenarios for digital SBT more transparent and duplicable.

When looking in more detail at the design process, two essential features stand out. First of all, the creation of authentic practice scenarios revolves around uncovering the expertise of experienced professionals. This can be challenging if the knowledge that experts possess is implicit, as is often the case for conversation skills. Secondly, the process is not linear but cyclical, as it involves several rounds of testing with experts and members of the target group to fine-tune the underlying conversation model, the response options from which learners can choose and other aspects that may affect the play experience and eventual effectiveness of the SBT. We hope that formalizing these steps helps developers of SBT avoid common pitfalls and tackle conceptual as well as practical challenges that inevitably arise during the design process.

Of course, the approach outlined in the current paper also has its drawbacks. First of all, it is relatively time-consuming and requires access to and cooperation from experts and a considerable number of test participants. Second, it departs from the assumption that it is possible to create a complete and valid conversation model, which might not be the case

for every professional conversation that can be addressed in a simulation-based training. Similarly, it presupposes the existence of a validated best practice that can be generalized across different cultural and professional contexts. Finally, the structure of the process model is also influenced by the technical possibilities and impossibilities of the software platform that is being used. If learners were given the possibility to freely determine their input instead of choosing from a limited number of response options, for example, or to respond by speaking rather than clicking on a button with text, this would also require adjustments to the process model.

In future research, it would therefore be interesting to assess the generalizability of our process model to the design of SBTs that (1) are developed within different software platforms and (2) address complex cognitive skills which are more difficult to model than conversations. Furthermore, it could be worthwhile to explore additional metrics that can be used to gain insight into the quality of the scenario during preliminary testing. Finally, the advent of conversational AI (e.g., ChatGPT) may offer opportunities for quickly generating multiple variants of the same practice scenario; this could provide a boost to the efficiency and quality of the design process that warrants further investigation.

Appendix: The do's and don'ts table for cross-cultural job interviews

The job interview structure		
Phase	**Do's**	**Don'ts**
1. Introduction Goal: The applicants briefly introduce themselves Parameters: • Formality • Making positive contact • Assertiveness • Tactical modesty	• Remain formal and use a formal communication style • Apologize to make positive contact • Keep the conversation positive • Ask permission to share information about yourself	• Don't take the initiative to present yourself • Don't blame another person when you occupy a lower hierarchical position • Never defend yourself
2. General information Goal: Information about the company and various essential company procedures Parameters: • Tactical modesty • Suitable presentation	• Show your knowledge of the company • Stress your personal motivation for the job on offer • Explain your potential contribution to the company	• Don't emphasize your personal interest to develop your professional skills
3. Asking questions Goal: The interviewer asks questions Parameters: • Assertiveness • Suitable presentation • Making positive contact • Use of humor	• Focus on how you might contribute to the organization • Sound prepared • Quote other people's opinions about your knowledge and skills • Be honest as part of building a long-term relationship • Give clarifications and explain your behavior if you feel uncomfortable or nervous • Respect cultural differences • Respect the company hierarchy • Make only jokes about yourself and focus on your own qualities	• Don't present yourself as being "the best" • Don't show how smart you are during the conversation, this will not impress the interviewer • Don't stress your personal goals which are not of organizational interest • Don't ask many questions. Let the interviewer lead the interview and ask you questions first
4. Detailed information Goal: The information of an administrative nature Parameters: • Assertiveness • Suitable presentation • Making positive contact • Formality	• Mention the skills which you acquired during your study programme • Explain your previous work experience in a systematic and structural way • Elaborate on your academic achievements • Express high motivation to work and flexibility with respect to working hours • State clearly which competences you would like to improve	• Don't ask questions about salary • Don't focus on extra-professional activities and hobbies • Avoid personal topics
5. Ending Goal: Wrap up. The applicant left the room Parameters: • Formality • Assertiveness • Use of humor	• Remain formal	• Be careful with jokes • Watch out for misplaced humor in a formal dialogue. It might be perceived as rude and unprofessional.

Abbreviations
AI: Artificial Intelligence; BA: Bachelor of Arts; CEE: Central and Eastern Europe; HR: Human Resources; KPIs: Key Performance Indicators; L&D: Learning & Development; NGO: Non-Governmental Organization; SBT: Simulation-Based Training; VR: Virtual Reality.

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Authors' contributions
All authors were involved in the design of the study and the writing of the original manuscript. Furthermore, all authors discussed, agreed, and rechecked the paper at the first place before submitting it.

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Declarations

Competing interests
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