Extension of escape rooms with roleplays: promoting a sense of belonging and fostering communication skills among first-year university students

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Abstract

When designing learning scenarios for first-semester university students, instructional developers should not only impart knowledge and skills but also support transition to university, for example by providing opportunities to build a sense of belonging. In our case study, we illustrate how we addressed these goals by creating a motivating student-centred learning scenario incorporating gamification elements. We developed this scenario during the Covid-19 pandemic based on an existing escape room. A collaboration script guides small groups of students towards reciprocal, positive, and goal-oriented interactions. During the scenario, students get in touch with each other and pay attention to specific requirements for counselling communication. In our paper, we introduce a sophisticated sequence of gaming and counselling phases including elaborate roleplays. Results from a mixed-methods evaluation are not only used to improve the scenario but also show that students build positive relationships and perceive the scenario positively. These points are especially important due to the large proportion of non-traditional students in our sample. We finally report how we adapted the scenario to a variety of learning contexts including hybrid and face-to-face settings. For instructional developers, the current approach highlights the role of instructional scripts in computer-supported collaborative learning environments, resulting in a highly flexible learning scenario. By

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shifting the focus from communication skills to other higher-order skills (for example, problem-solving abilities), instructors may adapt the script to a wide range of instructional goals.

Keywords: escape rooms; communication skills; sense of belonging; gamification; roleplay.

Introduction

In introductory courses for first year university students, instructors usually address multiple requirements such as supporting students in building relationships with their new peers in addition to content-related learning goals (Trautwein and Bosse, 2017). This is especially important for students from non-traditional backgrounds who are frequently struggling to develop a sense of belonging to university (Thies, Heise and Bormann, 2021; Gravett and Ajjawi, 2022), or when adverse conditions such as the necessity of distance teaching apply. Our case study documents adapting a course on counselling skills for Childhood Education students in a small university in the south of Germany during the Covid-19 pandemic. Many participants in the course were non-traditional students (Thies, Heise and Bormann, 2021). Students were challenged with the transition to university during contact restrictions and distance teaching. In addition to providing training on counselling skills, we aimed at fostering belongingness by creating a safe and interactive environment. Due to a tight budget and limited time for preparations, we built our scenario upon an existing commercial online escape room (https://www.escape-game.org/home/home/locked_bremen/ein_magischer_fall/696/).

Belongingness

In recent years, belongingness has gained attention in instructional settings. Belongingness addresses different aspects of students' lives at university, such as motivation, enjoyment, and achievement (Ahn and Davis, 2020; Pedler, Willis and Niewoudt, 2022). Gravrett and Ajjawi (2022) characterise belongingness as a practice varying due to student characteristics and teaching practices. For example, non-traditional students may struggle to build a sense of belongingness in academia (Gravett and Ajjawi,

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2022; Pedler, Willis and Niewoudt, 2022) and distance teaching may affect building attachment to university.

Concerning instructional practices, Masika and Jones (2016) highlight the importance of an ongoing interaction between students as well as building relationships with teachers for creating a sense of belonging. Similarly, Cooke et al. (2024) reported several case studies on how meaningful interaction with authentic tasks and adequate course design fosters belongingness in addition to professional competencies.

Counselling communication

University students need to acquire professional competencies such as social and communication skills. In social and health care, the curriculum usually includes theory, practice, and reflection of communication skills in a safe environment like roleplays (Maguire, 2002; Lane and Rollnick, 2007; Deveugele, 2015). Training refers to specific communication types, for example, exploration or goal setting, and attitudes that underly non-directive communication (Maguire, 2002). Non-directive communication means that the counsellor should not provide direct advice but rather support help-seeking clients to help themselves, for example by developing coping strategies. Thus, the counsellor supports problem solving instead of solving the problems directly, as a more sustainable and empowering approach. Although proven effective (Carta et al. 2012), these skills require targeted instruction including the aforementioned roleplays and observation exercises (Widulle, 2020).

In distance teaching, teachers and students often experience technology as a barrier to communication and the acquisition of communication skills (Carrillo and Flores, 2020; Yeung and Yau, 2022). However, technology can also support acquisition of communication skills (Flogie, Aberšek and Pesek, 2019). We showcase this with the following learning scenario in which an escape room serves as a playground for practising counselling skills.

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An extended escape room

Escape rooms and gamification

Escape rooms started as computer-based adventure games with players solving puzzles to escape from a locked room. Taraldsen et al. (2022) describe different learning goals of escape rooms like development of (1) domain knowledge (Borrego et al., 2017; Gill-Simmen, 2021; Licchelli and Barnett, 2023), (2) cooperation skills (Pan, Lo and Neustaedter, 2017), or (3) cross-sectional skills (Whitton, 2018; Donaghy, Gillies and McCann, 2023). Further differences concern the design (specific software developments vs. generic tools for content creation) and implementation (physical room vs. online setting). As a gamification approach, escape rooms promise high student engagement, learning achievements, and interaction between students (Sailer and Homner, 2020; Zainuddin et al., 2020). This may be why teaching staff turned existing physical games into digital versions or designed new escape rooms during the Covid-19 pandemic (Ang, Ng and Liew, 2020; Gill-Simmen, 2021; Offord et al., 2022), creating a virtual space for interaction (Gravett and Ajjawi, 2022). We took a slightly different approach by not creating the room itself but by providing instructions to use an existing room in a specific manner. This draws from Computer-Supported Collaborative Learning (CSCL, Sung, Yang and Lee, 2017; Vogel et al., 2017), where the implementation of the learning scenario and so-called collaboration scripts play a central role (Fischer et al., 2013; Means et al., 2013; Sung, Yang and Lee, 2017).

Developing our instruction

The major goals of our learning scenario were (1) building relationships between students to establish belongingness (Masika and Jones, 2016) and (2) developing professional communication skills. We built our learning scenario upon an existing, professionally designed online escape room to decrease (1) costs, (2) the burden of software development, and (3) frustration of participants due to technical problems (Yeung and Yau, 2022). This escape room was based on PDF files, short audio files or simple interactive tasks that were easily accessible even with limited hardware equipment.

To support students' motivation, this escape room was centred on a story similar to Harry Potter and information was gradually made accessible to students by solving puzzles at

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different levels of difficulty. In addition to the escape room, students used videoconferencing tools.

To structure student interaction, we modified the script for the Jigsaw technique. This technique consists of a predefined sequence of learning tasks in different group constellations (Aronson, 1978). Usually serving as a student-centred scenario fostering knowledge acquisition (see Bok Center, 2024, for an introduction and applications in different disciplines, and Nalls and Wickerd, 2023, for a guide to implementing this approach), current reviews highlight the relevance of this technique for learning cross-sectional skills and developing belongingness in a sense of social coherence (Nalls and Wickerd, 2023; Solissa et al., 2023), leveraging the idea that interaction between individuals helps overcoming barriers between them (Aronson, 1978). We formed groups working at different tasks (counselling and gaming/observation) to strengthen belongingness through the ongoing interaction. More specifically, each student oscillated between (1) membership in a coaching team in the counselling phases, and (2) membership in a group of players or observing coaches in the game phases, respectively. We consider escape rooms especially suited for an introduction course on counselling, as interaction between players forms the basis for the counselling roleplay. The riddles were separated from potential individual problems, had clearly defined solutions and provided a safe learning environment. Solving the riddles requires cooperation between players introducing conflicts similar to social processes in real settings.

Implementation

Counselling communication was implemented by adding roles of players and coaches. These were associated with different tasks during different phases.

In the starting phase, students were randomly paired up in teams of players and coaches. In game phases, the players were asked to engage as a team solving the riddles of the escape room and the coaches observed the cooperative behaviour of their assigned players while ignoring the riddle itself as far as possible. During the consultation phases, coaches were expected to offer counselling to their player within the respective coach/player teams. Coaches were given specific tasks according to different consultation phases, and players provided feedback to their coaches on the consultation itself.

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In the first implementation of the scenario in 2020, we divided the students into groups of approximately 15 students taking part in game sessions lasting three hours, respectively.

The instructional script proceeded along seven phases (see Figure 1 below):

1. Organisation phase:
   - Determine a group speaker (manage the solutions, screen sharing).
   - Introduction of roles.
   - Form tandems (player and coach; breakout rooms for each tandem).
2. Preparation phase in tandems (breakout rooms):
   - Discussion of how a player could contribute best to a group.
   - Setting personal goals for the interaction in the next game phase.
3. Game phase:
   - Players actively engaged in the game.
   - Coaches observing (cameras and microphones muted).
4. Consultation phase in tandems (breakout rooms):
   - Evaluation of progress with the individual goals.
   - Discussion on better goal achievement.
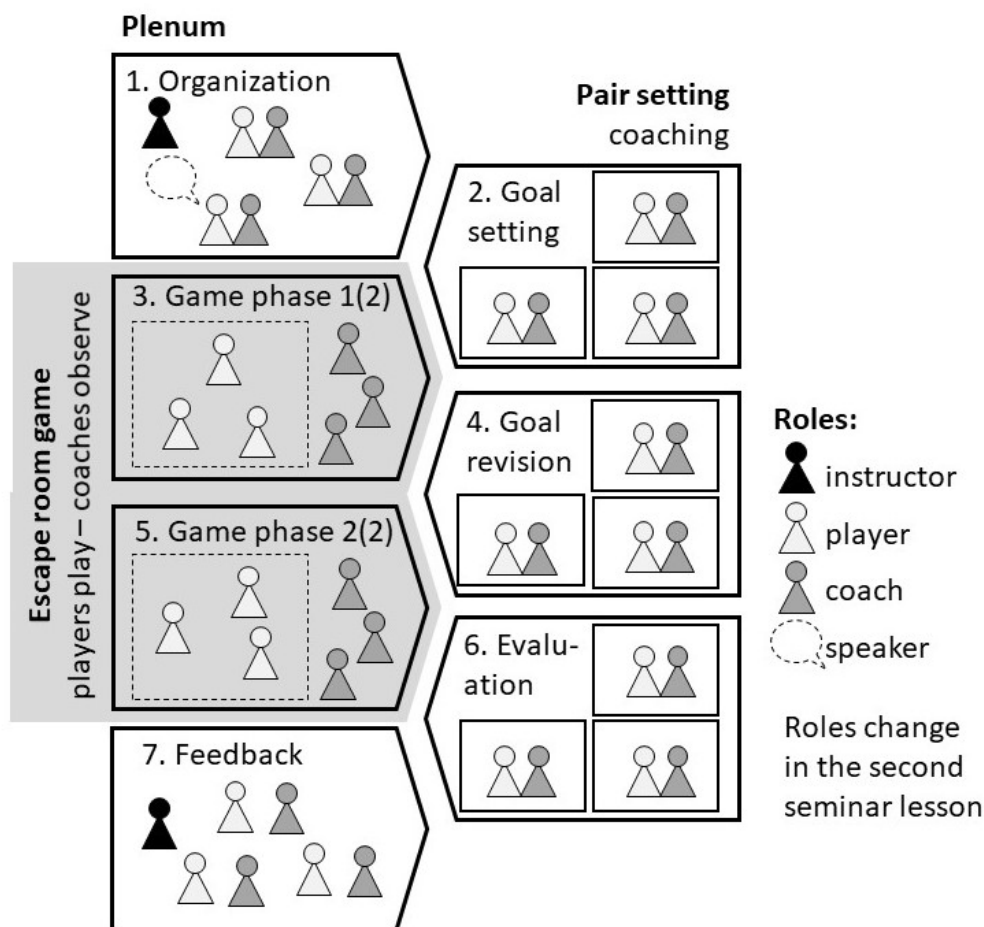5. Game phase (see step 3).
6. Evaluation phase in tandems (breakout rooms):
   - Discuss progress concerning the players' individual goals.
7. Feedback phase:
   - Feedback to the whole group (peer and teacher feedback).

Two weeks later the game was resumed with reversed roles of players and coaches.

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Figure 1. Simplified procedure of the escape room intervention.

Evaluation

Methodology

Along with the implementation of the escape room-based counselling training, we conducted a mixed methods evaluation of the learning scenario with the major aims to assess its quality with regard to the onboarding process and to improve the scenario itself. Both aims were addressed with a questionnaire at midterm of the first semester, when half the students had completed the intervention, while the other half formed a waiting control group. As we expected the intervention to affect perceived social support and other facets of belongingness, we used closed questions from established scales capturing related constructs including study self-efficacy and satisfaction (Masika and Jones, 2016; Pan, Lo and Neustaedter, 2017; Ahn and Davis, 2020, Cooke et al., 2024; see Appendix A and below). To receive broader feedback, we used open-ended questions (Appendix B and below) addressing the students' perception of the intervention and the learning process

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(Nalls and Wickerd, 2023). Additional questions addressed demographic information. By asking all questions in one questionnaire, we applied a minimalist parallel mixed method design (Tashakkori, Johnson and Teddlie, 2021).

Procedure, questionnaire, and analysis

The course was an online seminar on counselling in a bachelors' programme on Childhood Education run in October 2020 to March 2021 with 126 first semester students. The second and the fourth author of this article were the lecturers responsible for this course. Most students did not know each other in advance.

Four seminar subgroups of approximately 31 students were formed. The escape room was implemented in two subgroups (intervention group), whereas the other two subgroups were taught as regular classes with conventional counselling roleplay (waiting control group). At midterm, students answered the evaluation voluntarily and without any compensation.

The questionnaire assessed demographic information (gender, age, migration and educational background, and professional commitment before and during studies). Quantitative scales captured study self-efficacy, study satisfaction, and study support (Westermann et al., 1996; Westermann, Heise and Spies 2018; Schmidt et al., 2019; Petri, 2020; see Appendix A). We transformed the raw values of each scale to a common metric (percentage of possible points on the respective scale) and calculated means and confidence intervals for each scale in each group. Finally, open-ended feedback questions (see Appendix B) were analysed using qualitative content analysis (Kuckartz, 2018).

Sample

Out of 126 students enrolled in the course, $N = 47$ students volunteered to participate in the online survey, 44 of them identified as women and three as men. No student indicated a non-binary gender. Age ranged from 18 to 47 years with a median at 20. Many students can be regarded non-traditional students, as only 36% reported at least one parent/caregiver with a college degree (Thies, Heise and Bormann, 2021). Furthermore, 26% of the participants reported having completed an apprenticeship or working on a

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regular basis before starting studies, and 13% reported taking care of children or family members.

Results

In quantitative group comparisons (Figure 2), students participating in the escape room felt slightly more supported by other students and lecturers and reported slightly higher values concerning their study self-efficacy and higher satisfaction with their studies. They also perceived their studies to be more demanding and offering more freedom. However, none of these differences were statistically significant.

Figure 2. Quantitative results for different scales ($N_{Escape\ room}$ = 28; $N_{Control}$ = 19).
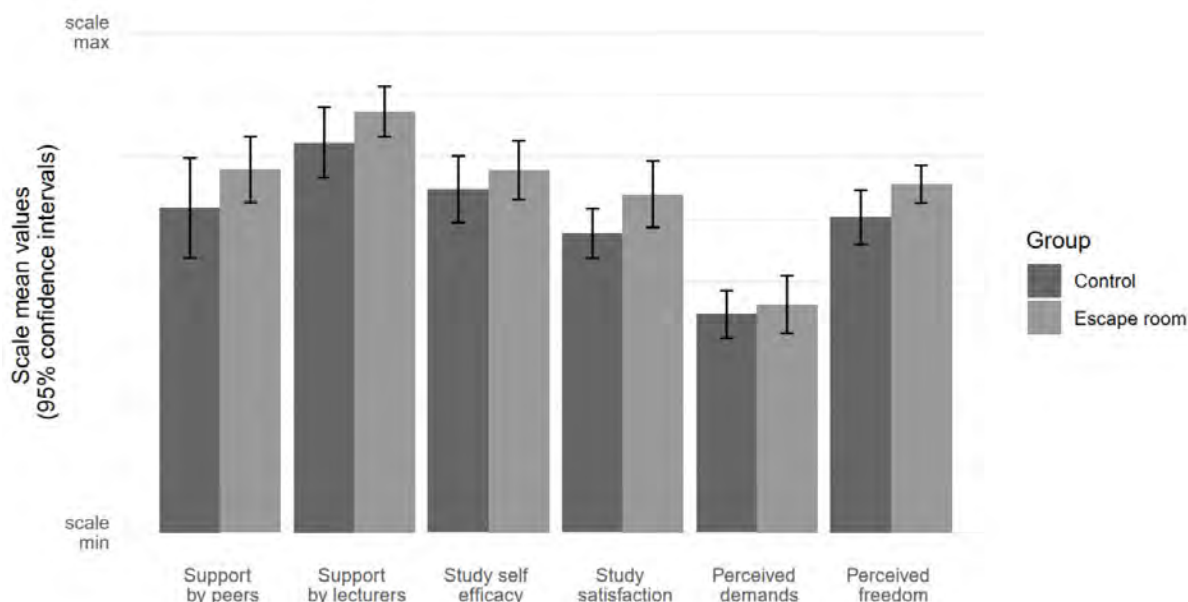
In the open-ended questions, positive feedback centred on the social aspects of the seminar (ten coded segments, see Appendix C), Participants appreciated the contact with other students, social interaction in general, and working together in small groups. Further important categories of positive feedback concerned the instructional units (9) and the contents of the course (8).

The most important categories of negative feedback referred to uncertainties or unclear aspects of the course (10) and the design of the collaborative setting or roleplays (11). Some participants perceived the structure of the course as overly complex or had

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problems understanding the tasks. During cooperation phases and roleplays, some participants felt overwhelmed by the social interaction with unknown persons in an online setting. Moreover, some participants expressed a need for more feedback and information by the teachers regarding the counselling roleplays.

Concerning the escape rooms, most participants described them as interesting and fun (12) and appreciated social and collaborative aspects (14). Only a few participants did not find the escape rooms interesting or did not see a learning effect (5). Many participants discussed the role of the coaches in the escape rooms (13), mostly in a critical manner. Participants reported uncertainties about how to act in this position, lacking information on counselling and opportunities to get involved, or being bored.

Discussion

Concerning belongingness, high values on the scales on study satisfaction, study self-efficacy, and social support by lecturers and other students suggest that students made some progress in their transition to university. Even though the slight differences between the escape room group and the control group were statistically not significant, they still indicate possible effects of the escape room intervention. Additionally, qualitative results reveal that most students interacted intensively and enjoyed the escape room. Interaction and positive experiences are two major sources of belongingness (Masika and Jones, 2016; Ahn and Davis, 2020). This is especially important as background information revealed that many non-traditional students participated in the course (Thies, Heise and Bormann, 2021), who may benefit from support (Gravett and Ajjawi, 2022; Pedler, Willis and Nieuwoudt, 2022).

Concerning communication skills, answers to open-ended questions suggest that students reflected challenges of the counselling role. These comments show that awareness of the specifics of counselling communication was raised (Prochaska and DiClemente, 1983). From an instructional point of view, adding more guidance on the counselling role might scaffold and improve the students' learning process. Very scarce complaints about technical problems further promoted the use of an established escape room (Yeung and Yau, 2022).

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Limitations of the current study concern the small sample size and the active control group. The study could be improved by a more rigorous design (for example, including a pre-test, or assessing communication skills directly). Further research might compare traditional and non-traditional students.

Conclusion

By adding an instructional script to an existing professionally designed escape room, we fostered relationships between students as a precursor of belongingness to university (Gravett and Ajjawi, 2022) while providing training on specific communication skills (Maguire, 2002). The presented scenario initiated interaction between students (Aronson, 1978; Masika and Jones, 2016; Ahn and Davis, 2020) and incorporated central features for effective learning in gamification approaches (adequate challenge, structured interaction between players and coaches, opportunity to provide feedback (Doney, 2019)). While Cooke et al. (2024) recommend authentic tasks for advanced students, we provide a safe environment to first year students fostering skill acquisition, which may be especially important for non-traditional students.

Based on the feedback and following reduced contact restrictions, we developed different versions of the training (see Appendix D for details). We improved the material by clarifying roles and providing points of reflection and the scenario itself by allowing for more exchange between students themselves and the instructors. We also adapted the scenario to different learning contexts. For example, in hybrid settings, the players interacted in one room while the counsellors attended online, and in face-to-face settings, a camera acted like a one-way mirror during the game phases. These implementations illustrate how our scenario can be adapted to different circumstances and students' needs. This flexibility results from adding an instructional script to an existing escape room, which disentangles software development from instructional implementation. In a similar manner, the approach may also be adapted to different instructional goals and higher-order skills (for example, fostering problem solving or creative thinking; practising collaboration skills or facilitating group building) by altering the script to shift the focus of the students' activities (for example, introducing strategies and methods for problem solving or creativity while solving the riddles of the escape room; asking questions to guide and reflect group

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building processes). Thus, our case study provides a blueprint for developing learning scenarios strengthening both competencies and belongingness among students while being motivating and engaging.

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psychology, she implemented cooperative learning scenarios in her university teaching when all courses switched to distance teaching during the Covid-19 pandemic. She is committed to support mixed methods empirical research in the discipline of Psychology.

Appendix A: quantitative scales

Table 1. Description of quantitative scales.

Scale	Subscales (number of items)	Reliabilities	Source
Self-efficacy at transition to higher education *Skala zur Erfassung der Studieneinstiegs-selbstwirksamkeit, SESW*	Global scale (13 items)	α > .88	(Petri, 2020)
Short questionnaire on study satisfaction *Kurzfragebogen zur Erfassung der Studienzufriedenheit, FB-SZ-K*	Satisfaction with… study content (3 items) study conditions (3 items) coping with study burdens (3 items)	α = .87 α = .71 α = .71	(Westermann et al., 1996; Westermann, Heise and Spies 2018)
Questionnaire on structural strains and resources *Fragebogen zu strukturellen Belastungen und Ressourcen, StrukStud*	Psychological strains (7 items) Decisional Freedom (8 items) Support by lecturers (5 Items) Support by fellow students (5 Items)	α = .80 –.86 α = .67 –.84 α = .76–.83 α = .74–.84	(Schmidt et al., 2019)

Note: All questionnaires use Likert-type answer scales as in the original publications of the questionnaire, with 5 (SESW), 11 (FB-SZ-K) and 4 (StrukStud) levels, respectively.

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Appendix B: formulation of open-ended questions

Positive feedback

What did you generally like about the course so far/what should be maintained?

Was hat Ihnen an der Veranstaltung bisher allgemein gefallen/was sollte beibehalten werden?

Negative feedback

What did you generally NOT like about the course so far/what should be changed?

Was hat Ihnen an der Veranstaltung bisher allgemein NICHT gefallen/was sollte geändert werden?

Specific feedback on escape rooms

(only students taking part in the escape room at that time point)**:**
In the escape rooms, you should solve tasks together and also practice consulting.
We would appreciate brief feedback on this part of the course!
How did you feel about this task? What was good? What could be improved?

In den Escape rooms sollten Sie gemeinsam Aufgaben lösen und auch Beratung üben.
Wir würden uns über kurzes Feedback zu diesem Teil der Veranstaltung freuen!
Wie ging es Ihnen mit dieser Aufgabe? Was war gut? Was könnte verbessert werden?

Appendix C: relevant feedback categories

List of the most coded categories with reference to the course structure and escape room intervention with examples.

Positive course feedback

- Social aspects (10: 'It was a good opportunity to get to know each other and work together as a group').

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- Adequate instructional units (9: 'I think the model of alternating between asynchronous lectures and live meetings is very good, it doesn't get boring').

- Content (8: 'Furthermore, the inputs were always very comprehensible and interesting').

Negative course feedback

- Uncertainties/unclear aspects (10: 'Sometimes I was a bit confused about the subgroups and didn't know what applied to me and what didn't').

- Design of collaborative setting or roleplays (11: 'Doing the roleplay online was very stiff at the beginning and I found it difficult to get into it as I would have done on site').

Specific feedback on escape rooms

- Interesting/fun (12: 'In general, the escape room was fun!').

- Social/collaborative aspects (14: 'I liked the fact that as a player you really interacted with other people and then came to a conclusion').

- Role of coaches (13: 'As a counsellor, you didn't have much to do and it was a bit difficult at first because you didn't know exactly how best to support your partner').

- Not interesting/no learning benefit (5: '*Learning success not really*').

Appendix D: different implementations of the scenario

Hybrid setting: In October 2021, Covid-19-related restrictions allowed for a hybrid setting with the players sitting in one room while the coaches observed the game online. The screen of the group speaker was projected against a wall, and counselling took place during the game via chat messages and phone calls. Further, based on the results of the evaluations, the duration of each session was reduced to 90 minutes and a professor or tutor provided direct support in case of ambiguities. We added more hints for a better structure (for example, setting specific goals) and provided time for consultation before and after the gaming phase.

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Face-to-face: In October 2022, we implemented the game in a face-to-face setting with two major changes to the original online setting: most interactions took place in one room, but during the gaming phases, the players stayed in one room and the coaches moved to another room with a screen displaying the online escape room as well as the interaction between players. In accordance with the need for support in role finding indicated by the evaluation, coaches were provided a worksheet with different questions to guide observations.

Table D1: Overview of the changes and adjustments to the different settings.

Central elements	Online	Hybrid	Face-to-face
Game	– – – Online escape room – – –		
Tasks			
- players	– – – Collaborate with each other, solve the puzzle – – –		
- coaches	Observe and advise player online in between the game sessions	Observe and advise player online whenever needed via chat or phone calls	Observe and advise player in presence in between the game sessions. Fill in worksheet
Instructions	– – – Oral – – –		Written (worksheet)
Location for			
- Consultation (Tandems)	– – – Online – – –		In presence
- Playing (Players)	Online	– – – In presence – – –	
- Observing (Coaches)	– – – Online – – – (no exchange during the game)		Second room (can talk to each other)

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