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# Can university teachers escape curriculum planning? Reflections on building and experiencing an educational escape room in university pedagogy training

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## ABSTRACT

Due to their interactive and engaging nature, escape rooms have increasingly been used not only for recreational purposes but also in various educational contexts. This study explores the design and implementation of an educational escape room in university pedagogy, a discipline lacking prior studies on utilising escape rooms. The escape room focused on curriculum planning and employed the principles of constructive alignment. Feedback from university teachers and doctoral students ( $N=25$ ) was collected via a questionnaire and analysed using data-driven content analysis. Results indicate high engagement and perceived educational value in terms of revision, with recommendations for future applications targeting basic-level studies and including smaller groups sizes and more homogenous groups.

## KEYWORDS


Escape room; university pedagogy training; higher education; university teachers; doctoral students

## Introduction

From the early 2010s, recreational escape rooms began to rapidly gain popularity around the world (Nicholson, 2015), a phenomenon that has inspired innovative teachers to apply escape rooms with pedagogical purposes to the degree that even systematic reviews concerning the use of escape rooms in education have recently been published (e.g. Lathwesen & Belova, 2021; Quek et al., 2024; Taraldsen et al., 2022; Veldkamp et al., 2020). Although not much has been reported concerning escape rooms' theoretical foundation in educational science, the most obvious theoretical connection comes from game-based learning (GBL), as escape rooms are intrinsically game-like activities (Veldkamp et al., 2020). Thus, they have the potential for creating immersive learning experiences that may contribute to 21st century skills, such as cooperation and problem-solving (Taraldsen et al., 2022).

An escape room is a live-action game in which a team of players discovers clues, solves puzzles and accomplishes tasks to reach a goal within a specific time limit (Nicholson, 2015). Puzzle pathways may be organised into different structures: for example, in an

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open path, puzzles can be solved in any order, whereas in a sequential organisation, the completion of a puzzle provides a clue to the subsequent puzzles (Veldkamp et al., 2020). Often, information from previous puzzles is needed to solve the overall puzzle in the game, the so-called meta-puzzle (Reuter et al., 2020). Puzzles may be physical in nature, requiring the participants to manipulate real-world objects; more often, they are the kind that tap into players' cognitive skills (Veldkamp et al., 2020). While the goal was originally to 'escape' from a room, other scenarios and solutions, such as locked boxes, may be utilised (Brown et al., 2019; Rouse, 2017). Due to the resource-intensiveness of escape rooms and following the COVID-19 pandemic, solutions for screen-based or virtual escape rooms have also been increasingly utilised (Dittman et al., 2021; Quek et al., 2024).

Previous studies have reported multiple benefits, such as the promotion of learning outcomes, student engagement, cooperation and content mastery (e.g. Morrell & Ball, 2020; Nicholson, 2015; Veldkamp et al., 2020). Sometimes, however, negative effects may arise, such as negative feelings and stress (e.g. González-Yubero et al., 2023). Further, although significant improvement of learning is often reported, there is no conclusive evidence that educational escape rooms are more effective than conventional learning strategies (Quek et al., 2024).

Educational escape rooms have been applied to different levels of education, most focusing on higher education and especially the fields of health care or science, technology, engineering and mathematics (STEM; Taraldsen et al., 2022; Veldkamp et al., 2020). Additionally, Mills and King (2019) explored the use of an escape room as a part of a professional development programme for new academics in higher education. However, to our knowledge, no other studies concerning the use of educational escape rooms within the field of university pedagogy (i.e. the discipline exploring learning and teaching in the university context and offering pedagogical training for university teachers) have been reported (see e.g. Taraldsen et al., 2022; Veldkamp et al., 2020). Therefore, despite the growing popularity of escape rooms as educational tools, their application in university pedagogy remains underexplored.

This study aims to bridge the aforementioned research gap by designing an escape room focused on curriculum planning according to the principles of constructive alignment, one of the core components of university pedagogy. Constructive alignment refers to the combination of the constructivist learning theory guiding instructional decision-making and the alignment between the components of teaching: the intended learning outcomes (ILOs), teaching methods and learning activities, and assessment (Biggs, 1996; Biggs & Tang, 2011). By analysing participant feedback, this study provides insights into the educational value and practical considerations for implementing escape rooms in the context of university pedagogy training.

## Materials and methods

### *Design process*

The authors designed the escape room following the escapED framework, which comprises six design steps (Clarke et al., 2017). They aimed for a conventional structure that included a story with a clear goal (meta-puzzle), multiple engaging activities such as discovering clues, solving puzzles and completing tasks that lead to the main goal, solving

the meta-puzzle and escaping from the room under a specific time limit. The authors decided that the escape room tasks and instructions would be in English so that they would be accessible to most university staff members.

Based on the escapED framework, the first step of the design process was to consider the participants and discuss the need for and purpose of an escape room, the difficulty level, mode, scale and time (Clarke et al., 2017). The second step was to formulate the learning objectives, which were 1) to apply the principles of constructive alignment on course planning and 2) to develop their group work skills. Aligned with the learning objectives, the course curriculum plan was chosen to be the meta-puzzle. The third step was to create the overall escape room theme and to develop the story line. The narrative was built around a problem in which university pedagogy teachers had lost a course curriculum that the participants had to rebuild from scratch; the theme was also topical, as curriculum work was ongoing across the target university.

The fourth step was to develop the puzzles, for which multiple brainstorming sessions took place, with the authors trying to align the learning goals and configure the puzzles and difficulty level while considering the storyline and time limits. A generative artificial intelligence model (ChatGPT) was utilised to create riddles for two of the puzzles. To encourage collaboration among participants, the authors chose a sequential puzzle structure (López-Pernas et al., 2019; Nicholson, 2015), whereby one puzzle needed to be solved to unlock a clue that led to the next puzzle, with the exception of three open puzzles that could be solved at any point. In addition, a Moodle page was created to include virtual activities that would spread the attention across the room, but also assist with the sequence and structure of the escape room. The fifth step regarded the location and equipment, which the authors considered during the brainstorming sessions by reflecting on their prior escape room experiences, exploring on-site locations and deciding which tools to include in tasks, such as locks, invisible ink, and a flashlight. Only a few intentional deceivers were included, such as extra binders, stationery, and books. As the authors had no budget for building the escape room, the facilities and equipment available at the university were utilised. The sixth step was the evaluation of the game experience, in which we organised a pilot with four participants, followed by feedback collection, reflection and adjusting the escape room.

## **Implementation**

### **Setup**

Prior to each escape room session, the authors prepared the room and set all the clues and puzzles as well as a box with hints that could be used if the group got stuck on a certain task. They organised multiple binders, a poster with an alphabet and a number assigned to each letter, a plant with cut paper covering its pot, a poster with university pedagogy references, a flashlight and office supplies for the room, which already had a whiteboard, locked cabinets and a computer (Figure 1 shows how the escape room was set up). Each tool, such as the flashlight, was assigned to one task; hence, it could only be used once.

Each puzzle, whether tangible or virtual, was linked to a certain task (see Table 1). As seen in Table 1, the escape room included a total of 13 puzzles: nine tangible and four

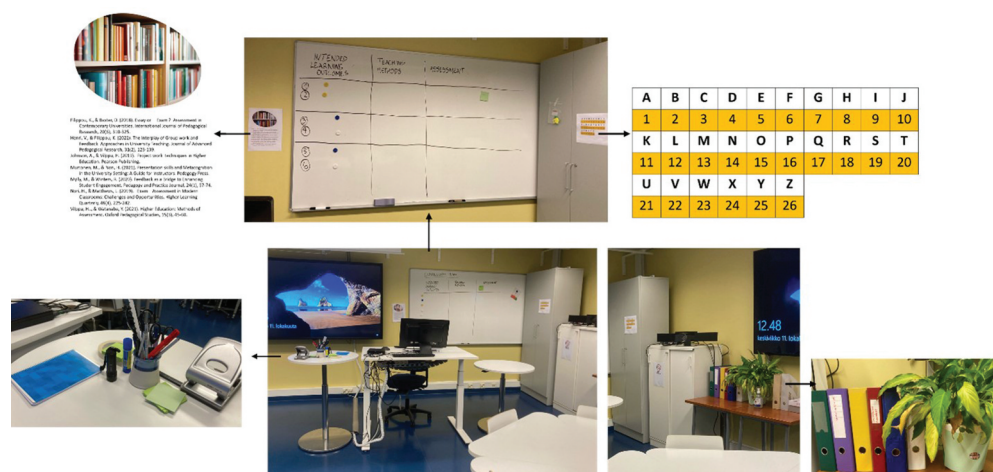


Figure 1. Escape room setup

Table 1. Puzzles and types of tasks.

Step	Puzzle	Task	Type	Sequential
1	Printed email with URL for Moodle and bold words	Notice the bold words and the repeated pattern of ILO letters	Tangible	Yes
2	Poster with letters and numbers	Substitute the letters with the numbers that form the 5-digit password	Tangible	Yes
3	Riddle (in Moodle)	Solve the riddle that leads to the binder	Virtual	Yes
4	Binder	Find the binder with the riddle's answer	Tangible	Yes
5	Word search	Identify the six verbs that can be used to create the ILOs for the curriculum and match them with predetermined contents	Tangible	Yes
6*	Empty paper and ink	Use a flashlight and create their own ILO	Tangible	Yes
7	Calculation	Calculate the equation in Moodle and use its result to unlock the 'Riddles' binder	Virtual	Yes
8	Riddles binder	Solve the riddles found inside the 'Riddles' binder	Tangible	Yes
9*	Crossword	Add the riddles' answers to the crossword	Virtual	Yes
10	Plant with cut paper around the pot that had an image of books	Match the picture on the plant with the poster	Tangible	No
11*	Poster of books with university pedagogy references	Put the cut paper on top of the poster to reveal words related to learning tasks and assessment	Tangible	No
12	Put letters in order	Form words with the letters and use the number of hours and ECTS for the course	Tangible	No
13	Checklist	Evaluate the curriculum plan based on the checklist criteria and submit it	Virtual	Yes

\* Following this step, the materials guided the participants to add elements to the course curriculum plan.

computer-based puzzles. While 10 of the puzzles were sequential, three of them (puzzles 10–12) were open to increase intricacy (López-Pernas et al., 2019).

### Introductory activity

When all the team members entered the room, the participants had the opportunity to introduce themselves to each other, and the authors ensured that a safe and friendly atmosphere was built. Some already knew each other from the university pedagogy courses. Then the authors briefed the participants by explaining the escape room rules,

presenting the learning outcomes, the narrative and meta-puzzle (Ferns et al., 2022). The participants were informed that all the materials needed to escape were in the room; the use of a computer would be needed (for using Moodle and a calculator), as well as writing the course curriculum plan on the whiteboard. When the curriculum was ready, there was a final task in Moodle that would help them escape the room. The language was English, but the participants could communicate in Finnish or English upon agreement. It should be noted that while the participants were in the escape room, the authors were also present in case support was needed. To assist participants and prevent them from spending excess time on a single puzzle, a box with hints for each step was available (López-Pernas et al., 2019), but all team members needed to agree before opening a hint.

The participants were informed that their prior teaching experiences and attendance in university pedagogy courses would be helpful in completing the escape room. Thus, recalling their prior knowledge and course discussions was encouraged. Finally, the participants were encouraged to carefully read the instructions and feedback from the activities in Moodle, but also to keep in mind that the curriculum needed to be applicable in a real university environment.

### *Steps 1–3: Joining Moodle and solving the first riddle*

The countdown started by giving the participants a printed email informing them that the new ‘Basics of University Pedagogy’ course curriculum was lost. The participants had to build the curriculum before the submission deadline, which was 45 minutes. Hence, they were encouraged to solve the puzzles and complete the tasks that would assist them in building the curriculum on the whiteboard. The email had a URL to the Moodle page, which required a 5-digit enrolment key. In addition, the following letters and words were in bold: ‘intended’, ‘learning’ and ‘outcomes’ (the first letters, I, L and O, were given as clues). A poster with letters and numbers (the coding key) was taped to an office cabinet door (see Figure 1). The participants had to notice the poster, choose the numbers under the letters and put them in order to form the 5-digit enrolment key for Moodle. After joining the Moodle page, the welcome note was a riddle, and its answer led to a binder with the same name.

### *Steps 4–6: Word search and flashlight (intended learning outcomes)*

In the binder, there was a word search puzzle with six verbs that could be used to create the curriculum’s ILOs. In addition, there were strips of paper with predetermined contents printed on them, as well as an empty strip with a symbol of a flashlight (a clue). The participants used the flashlight on the paper, and the sentence ‘Create your own ILO’ appeared. After this, the participants had to choose suitable verbs and combine them with the contents to create the ILOs and add them to the whiteboard for the course curriculum plan.

### *Steps 7–9: Calculation, riddles and crossword (teaching methods)*

Once the ILOs were discussed and written on the whiteboard, the participants continued with the next available information from Moodle: ‘Have you found the riddles? Can you solve this crossword? Discuss the teaching methods and learning activities’. Once the participants clicked the link to proceed, they received instructions to find the riddles in the room, and saw an equation and a crossword on the Moodle page. A binder in the

classroom with the title 'Riddles' had a three-digit lock. After the participants solved the equation, manually or by using the computer's calculator, they received a three-digit result that opened the lock. Inside the binder, there were three riddles describing specific teaching methods. Each method had to be added to the crossword, and the participants could check their answers or retry. After that, they discussed the teaching methods and added them to their course curriculum plan on the whiteboard.

### *Steps 10–11: Poster (assessment)*

After considering the intended learning outcomes and teaching methods, the next part of the constructive alignment process was the assessment. An open puzzle guided the participants to choose appropriate assessment methods for the curriculum plan. In the room was a plant with green paper covering its pot and a small picture with books (a clue). Next to the whiteboard was a poster with the same picture and a list of references. The participants had to notice that the pictures were the same and that the green paper was cut so that when it was put on top of the poster, it covered all the references except the words 'exam', 'essay', 'project work', 'feedback' and 'presentation'. The participants could then consider these assessment methods for their curriculum plan.

### *Step 12: Letters in order (other components)*

Since the beginning of the escape room activity, there had been an envelope with the label 'Important!' on the whiteboard. This was another open puzzle with letters and numbers that, when put in order, indicated the number of hours and credits for the course.

### *Step 13: Final checklist and evaluation (constructive alignment)*

When all the parts of the curriculum were added, a short checklist was available in Moodle that encouraged the participants to check all the parts, ensure that the assessment methods matched the ILOs and the teaching methods and consider the other components of the curriculum. Once the checklist was completed and submitted, a video appeared informing the participants that they had successfully completed the escape room. It should be noted that throughout the escape room, while solving the puzzles, the participants discussed clues and puzzles but also how they fit into constructive alignment theory and the course planning task.

### *Facilitated debriefing*

With the completion of the escape room activity, the participants had the opportunity to participate in the study (see the next section), discuss and reflect on their experience and contribution.

## *The study*

### *Participants and context*

In total, five escape room sessions were organised, with one team in each session and altogether 25 participants (three to six participants per team). The escape room was offered in connection with university pedagogy training (basic and advanced level studies) and as one of the workshops at the Faculty of Education Community Day. In

the target university, it is possible to study up to 60 European credit transfer and accumulation system (ECTS) credits, equalling the formal teacher qualification in Finland. However, an educational escape room has never been involved in the pedagogical training even though trainings have been organised since the 1990s.

The participants were recruited by emails and through Moodle sites of university pedagogy training. Participation in both the escape room and the study was voluntary, and one could participate in the escape room but decline to participate in the study (that is, to fill in the feedback questionnaire). The whole process took a maximum of 90 minutes, half of which was reserved to the escape room activity and the other half to introductory activity, answering the feedback questionnaire and debriefing.

The response rate for the feedback questionnaire was 100%. Nine participants had never participated in a recreational escape room, whereas the others had had multiple previous experiences. Only one of the participants had previously participated in an educational escape room. Most of the participants (68%) had completed at least 25 ECTS pedagogical studies, while one had not studied pedagogy at all and a third (28%) reported having studied pedagogy from one to 25 ECTS credits. The topic of curriculum planning was not at all familiar to one participant, whereas to others it was somewhat (44%) or very familiar (52%). All teams managed to escape within the 45-minute time limit, with the fastest escaping in 29 minutes and the slowest in 43 minutes. The average time for escaping was 37 minutes.

### *Data collection*

After each escape room activity, the participants were informed of the research and the research aim. Informed consent was obtained from the participants. The study did not involve intervention in the physical integrity of the participants, deviation from informed consent, studying children under the age of 15 without parental consent, exposure to exceptionally strong stimuli, causing long-term mental harm beyond the risks of daily life or risking participants' security (cf. Finnish National Board on Research Integrity, 2019). Thus, a Finnish ethics review was not required.

The questionnaire was in English and comprised background questions (e.g. the number of previous escape room experiences, pedagogical studies and familiarity with the topic of curriculum planning), followed by five open-ended questions as well as quantitative statements derived and adapted from Gordillo et al. (2020). The open-ended questions were related to participants' perceptions of positive and negative aspects, as well as the perceived educational value of the escape room and their ideas of using an escape room in their own teaching. The 17 statements were rated on a five-point Likert-type scale ranging from 'I totally disagree' (1) to 'I totally agree' (5).

### *Data analysis*

The quantitative data were analysed with SPSS Statistics Version 25 utilising descriptive statistics and Wilcoxon tests to assess whether the observed median significantly differed from the median point of the scale (e.g. Persico et al., 2023). The qualitative data gathered by open-ended questions were analysed using data-driven content analysis (Elo & Kyngäs, 2008). The first author developed the categories and coded the responses to these categories. To establish reliability of the coding, the second author acted as an interrater and coded 50% of the data. The agreement proportion was 94.3% and the remaining disagreements were resolved through discussion. One statement could be included into several categories.

## Results

### Quantitative results

The results of the quantitative items are summarised in Table 2. On average, the participants agreed most with the items related to enjoyment, sufficiency of initial guidance, and organisation of the escape room. The answers were the most dispersed in items concerning difficulty of focusing on learning because of feeling stressed, learning from peers and equal involvement of the members, as well as adequate duration of the escape room, pointing to the fact that these aspects were perceived differently between teams or individuals. Most disagreed items were related to experiencing the escape room as stressful or too difficult, so on average, the complexity of the escape room was perceived appropriate. In all but one item, Wilcoxon test showed that the median was statistically significantly different from the hypothesised median ( $p < .05$ ): above the hypothesised median in the affirmative items and below the hypothesised median in the negative items (Table 2).

### Qualitative results

The answers to the open-ended questions were categorised under four main themes: positive aspects, negative aspects, perceived educational value, and intention to use an escape room in one's teaching. Table 3 shows the codes and their frequencies, and includes examples of the participants' statements. Concerning the positive aspects of the escape room, collaboration was most frequently mentioned, followed by amusement, task-related aspects and perceived learning gains, such as university pedagogy vocabulary revision or reflection of basic ideas of curriculum planning. Positive task-related

**Table 2.** Descriptive statistics concerning items on escape room evaluations ( $N = 25$ ) on a scale from 1 to 5. Wilcoxon tests were carried out to assess whether the median was significantly different from the median point of the scale (3).

Item	$M \pm SD$	<i>Mdn</i>	Wilcoxon test
The escape room was fun	4.80 $\pm$ 0.41	5.00	$Z = 4.67, p < .001$
The initial guidance provided was enough	4.71 $\pm$ 0.66	5.00	$Z = 4.42, p < .001$
The escape room was well organised	4.67 $\pm$ 0.70	4.00	$Z = 4.33, p < .001$
I liked the fact that the escape room used both digital and face-to-face puzzles	4.60 $\pm$ 0.58	5.00	$Z = 4.46, p < .001$
I would recommend the escape room for other university pedagogy students	4.52 $\pm$ 0.71	5.00	$Z = 4.32, p < .001$
The duration (<1 hour) of the escape room was adequate	4.40 $\pm$ 1.15	5.00	$Z = 4.20, p < .001$
The narrative of the escape room was attractive	4.28 $\pm$ 0.61	4.00	$Z = 4.34, p < .001$
The escape room was an immersive experience	4.28 $\pm$ 0.74	4.00	$Z = 4.21, p < .001$
I remembered and applied knowledge of the subject during the game	4.28 $\pm$ 0.89	5.00	$Z = 4.00, p < .001$
The escape room was an effective way to review the topic of curriculum planning	4.24 $\pm$ 0.83	4.00	$Z = 4.03, p < .001$
There should be more games of this type in our university teaching	4.24 $\pm$ 1.01	5.00	$Z = 3.91, p < .001$
I learned from my peers during the escape room	4.08 $\pm$ 1.19	5.00	$Z = 3.60, p < .001$
All the members of the team were equally involved in solving the puzzles	3.88 $\pm$ 1.13	4.00	$Z = 3.16, p < .01$
The escape room encouraged me to think about curriculum design in a new way	3.24 $\pm$ 1.23	3.00	$Z = 1.07, p = .283$
It was difficult for me to focus on learning because I was feeling stressed	2.16 $\pm$ 1.34	2.00	$Z = -2.87, p < .01$
The escape room was a stressful experience	1.96 $\pm$ 0.98	2.00	$Z = -3.62, p < .001$
The escape room was too difficult	1.80 $\pm$ 1.04	1.00	$Z = -3.81, p < .001$

**Table 3.** Codes, their frequencies and example statements of the qualitative data.

Code label	f	%	Example statement
<i>Positive aspects</i>			
Collaboration and groupwork	16	64	'Collaborating with peers' (P6)
Fun and amusement	15	60	'It was FUN!' (P24)
Tasks and organisation	15	60	'The tasks were relevant; the Moodle page was nice'. (P26)
Perceived learning gains	15	60	'One was able to apply the knowledge accumulated during university pedagogy studies' (P23)
Immersion and motivation	6	24	'I was completely absorbed in the task'. (P13)
Time	5	20	'45 minutes was a good time'. (P13)
<i>Negative aspects</i>			
Tasks and organisation	16	64	'You didn't always know how specifically the tasks needed to be solved (e.g. the order of learning outcomes)' (P12)
Group size and heterogeneity	4	16	'At times you were a bit inactive when there were six people in the group'. (P28)
Time	4	16	'The time limit can bring a little bit of panic [...] maybe we just needed a little more of it'. (P16)
Language	2	8	'Using native language would have facilitated the ILO task'. (P21)
<i>Perceived educational value</i>			
Skills and/or knowledge development	9	36	'It was a good exercise in group work' (P23)
Review and revision	8	32	'I think it was a good way to revise what we learned' (P18)
Supplement to other teaching methods	4	16	'Suitable to complement other teaching methods' (P28)
Phase of studies	3	12	'The value could be bigger if this was used earlier in the studies' (P22)
Not much educational value	2	8	'Maybe having fun was the main point, not learning' (P20)
<i>Intention to use an escape room in one's own teaching</i>			
Conditionally yes	12	48	'Yes, if there is an appropriate place for it' (P7)
Yes	8	32	'Yes, already thinking!' (P8)
No	4	16	'No, I can't imagine how to apply this in the contents I teach'. (P22)

aspects were, for example, 'good mix of media' (P6), 'good balance of clue finding and content delivery' (P7), as well as 'nice tasks and different materials' (P22). Approximately a fifth reported positive aspects related to immersion and motivation, such as that 'it felt very engaging' (P16) or time, such as perceiving the time limit generous or considering the time pressure motivating.

Despite the many positive remarks, the category of tasks and organisation was the most frequently mentioned negative aspect, containing statements related to open-ended tasks (no single correct answer), the number or difficulty level of the tasks. For example, the ambiguity of the meta-puzzle, the curriculum plan, was highlighted. Although creative aspects were appreciated and understood in the pedagogical context, some participants wished for more specific task criteria: 'As purely from an escape room point of view, having a clear, set number of methods and assessments [in the curriculum plan] would be better instead of being able to choose a few and come up with your own'. (P9). Sometimes focusing on one specific puzzle might have distracted attention from the meta-puzzle: 'I was concentrating on one thing so I missed the other parts' (P6). Group size and heterogeneity were perceived negatively by a few participants, pointing to too big groups or different pace of the team members. Some participants saw the time limit as a negative aspect, as 'the emphasis on time distracted from the pedagogically relevant talk around the course plan' (P5). Even though they knew prior to participation that the language of the escape room was English, two of the participants considered the language as a hindrance.

When the participants were asked about the educational value of the escape room, the most frequent categories were related to developing skills or knowledge, and review and revision of existing knowledge. As there were participants with different amount of prior studies on university pedagogy, some felt the escape room suitable for their current phase, whereas others with more experience in university pedagogy felt it better suitable for beginning students. Two participants were more critical about the educational value: 'It was fun, but there were no new things to be learned apart from how people work in this kind of situation'. (P22).

Last, the participants were asked whether they could consider using an escape room in their own teaching. Almost half of them were cautiously positive, pondering on using it if, for example, they got help for organising it or if it were fully online. Eight people were more assertive about using an escape room, whereas four would not consider using it due to the content of their teaching or the problem of scalability for large student groups.

## Discussion

The use of educational escape rooms, especially in the field of higher education, has been gaining popularity for several years. However, to our knowledge, the use of escape rooms as part of university pedagogy training has remained underexplored. In an attempt to address this research gap the authors developed an educational escape room on curriculum planning and collected participant feedback from university teachers and doctoral students about the experience.

The university pedagogy escape room was generally received favourably by the participants, although some critical remarks also emerged. The escape room was successful as a fun, well-organised and immersive experience, and it was perceived to contribute well to reviewing and applying the learned knowledge. As such, it was perceived to fit best for the basic-level studies, whereas for advanced studies, it might have been too easy. As Mills and King (2019) noticed, learning new concepts via escape game might be shallow, since the time limit requires simple puzzles. However, the escape room can be used to reinforce students' prior learning, putting their theoretical knowledge into practice and (even though it was not used for this purpose) as an assessment task (Veldkamp et al., 2020).

The quantitative and qualitative results confirm that peer-learning and collaboration took place during the escape room. These are necessary skills for curriculum planning process, which often entails discussing and establishing shared understandings of the curriculum among the participants (see e.g. Sullanmaa et al., 2021). In addition, the results provide evidence that the participants applied effective strategies and employed their problem-solving skills to tackle the escape room's meta-puzzle and tasks through reviewing and applying the curriculum planning knowledge they gained from the pedagogical studies. Moreover, the discussions concerning specific tasks such as, creating their own intended learning outcomes and matching them with the predetermined contents, solving the riddles, and evaluating the curriculum plan based on the checklist criteria contributed to the development of their curriculum planning skills.

Compared to nursing, for example, where topics for an escape room can be created easily based on patient data (e.g. Brown et al., 2019) and the solution usually has one right answer, inventing suitable topics and contents for the escape

room in university pedagogy proved somewhat difficult. It also affected the scenario and type of the meta-puzzle (curriculum plan), as we wanted to leave space for creativity (López-Pernas et al., 2019), reflection and discussion for the participants. This meant that although certain elements needed to be involved in the solution, there was no one right answer; the intention was that the participants would discuss and pedagogically justify their solution. The ambiguity and interpretability of the meta-puzzle solution troubled some of the participants, but this was discussed in the debriefing. Even though many of the tasks were sequential and provided ideas for the curriculum, other participants enjoyed discussing various options and were not bound by the puzzles' results. However, there might be a risk that focusing on different puzzles under limited time may distract the attention from the core pedagogical content (Taraldsen et al., 2022) or that the time pressure encourages solving the escape room as quickly as possible, instead of deeper pedagogical discussions and reflection of the meta-puzzle solution.

Compared to escape rooms within certain disciplines or specific subjects, the target group of university pedagogy students is usually very heterogeneous. While some are doctoral students just at the beginning of their academic careers, others may have years of teaching or research experience at the university. In addition, university pedagogy students represent different disciplines. While multidisciplinary groups and discussions with colleagues from different faculties and career phases are, in our experience, usually among the most praised aspects of university pedagogical training, the heterogeneity of the group might pose challenges for planning the content of an escape room. Future research on escape rooms within university pedagogy training could include more homogeneous groups of university pedagogy students with similar backgrounds and compare their experiences.

The strength of this study lies in the careful planning of the escape room according to the EscapED framework (Clarke et al., 2017) and the qualitative data that supplement and enrich the evaluation derived from the quantitative items. Due to the exploratory nature of the study, the sample size was modest, which can be considered the main limitation of the study. However, as it is typically difficult to recruit busy university staff to participate in studies, especially those that require active participation and interaction, we think that the data are adequate to provide insights into the escape room experience as well as on how to improve the escape room and what to consider in the future. Future studies could explore the effect of escape rooms on learning with a more sophisticated study design that includes testing before and after the escape room intervention, as well as a control group (Quek et al., 2024). In addition, researchers could focus on scaling escape rooms for larger classes to gain a more thorough understanding of escape rooms and their usefulness. Specifically, a larger sample would generate rich data allowing more robust statistical analyses to examine various dimensions such as, skills development or comparing the escape room experience with participants' background characteristics and their experiences. Further, future studies could add more targeted questions and statements in the questionnaire to address the variable of group size, task complexity, and language use.

### **Practical implications**

The primarily positive reception of the escape room encouraged the authors to consider it as a part of university pedagogy studies, where it could even be used as a method of formative assessment during the course. At least in the field of nursing, escape rooms have been used as an evaluation method alongside more traditional forms of evaluation (Gutiérrez-Puertas et al., 2020; Roman et al., 2020). It could also be integrated with other learning experiences, such as flipped classroom approach (Mills & King, 2019). An interesting idea for future applications would be to use peer observation and feedback, which was considered positively in an earlier study (Ferns et al., 2022). In the context of university pedagogy training, the observers could provide feedback concerning, for example, the level and content of pedagogical discussion during the escape room. Furthermore, adding a presentation element, in which teams could present, comment and evaluate each other's solutions to the meta-puzzle after completion of the escape room, would deepen the pedagogical discussion.

A concern that arose from the feedback given by the participants was the team size, which should be quite limited to guarantee active participation and equal engagement during the escape room (Nicholson, 2015). In addition, the scalability of the escape room in response to large student group sizes was considered a barrier to utilising the escape room in one's own teaching. Therefore, virtual escape rooms could be considered because they enable the simultaneous or asynchronous participation of multiple teams or individuals and are thus more flexible given different class sizes compared to physical settings (Dittman et al., 2021). Within university pedagogy training, the difficulty level or topics could also be different depending on the phase of the studies in which the escape room is included. Content-wise, the reported escape room would have the best fit for basic level studies; other topics could be considered for intermediate and advanced level studies.

### **Conclusion**

To conclude, the study demonstrated the educational value of escape rooms in university pedagogy training, especially in applying and reviewing prior knowledge regarding curriculum planning. The positive reception among university teachers and doctoral students suggests that escape rooms can be an engaging teaching method, with the potential benefit of skill and knowledge development. The study also demonstrated, that GBL, such as the escape room approach, is not suitable for students only, but research on teachers' experiences is also needed (Persico et al., 2023). However, considering other interactive learning methods used in the field of university pedagogy, further research is needed to provide a comparative analysis between them and the use of escape rooms. This would bring new knowledge to the field and allow for a thorough comparison on the advantages and limitations of escape rooms in university pedagogy. Finally, as most of the escape room research is from the field of medicine and STEM subjects, future studies should also continue to examine the use of educational escape rooms in fields where they are not established teaching methods (Taraldsen et al., 2022).

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