



Modelling, Not Telling: Embedding 21st Century Skills in Teacher Education Through an Educational Escape Room

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Abstract

Integrating 21st-century competences into higher education requires more than policy rhetoric or theoretical endorsement; it demands concrete pedagogical practices that model creativity, collaboration, problem-solving, and adaptive thinking for future teachers. Although teacher-education programmes emphasise the importance of innovative, student-centred approaches in schools, they may remain anchored in traditional, discipline-bound and lecture-based formats. This paper presents a cross-curricular learning initiative designed to disrupt such habitual structures by introducing second-year teacher-training students to an immersive educational escape room as the starting point for a full-day interdisciplinary learning experience. The escape room serves as an active, task-based learning environment in which students engage with authentic problem-solving scenarios under time pressure. This design requires them to mobilise a broad range of 21st-century skills, shifting classroom dynamics from passive knowledge reception to creative, collaborative, and communicative meaning-making. The experience demonstrates in practice what teacher-education programmes frequently advocate in theory: that future teachers must learn through the pedagogies they are expected to enact. The pedagogical framework draws inspiration from Howard Gardner's theory of Multiple Intelligences. Challenges are intentionally designed to activate linguistic, logical-mathematical, spatial, interpersonal, intrapersonal, bodily-kinaesthetic, and other forms of intelligence, enabling students to contribute in varied and meaningful ways. This diversity of entry point competencies is often overlooked in conventional academic tasks, though the escape room generates new collaborative constellations in which leadership and participation shifts. Through this design, the escape room becomes a learning environment where multiple forms of ability are recognised, valued, and mobilised both Gardner's insights and contemporary 21st-century competence frameworks. Findings indicate that immersive, game-based learning designs can serve as powerful catalysts for reimagining teaching and learning in teacher-education programmes. By embodying rather than merely discussing 21st-century competences, the escape room bridges the gap between theory and practice and provides a concrete model of innovative pedagogy for future teachers.

Keywords: 21st-century skills; teacher education; cross-curricular learning; educational escape room;

1. Introduction

Integrating 21st-century competences into higher education involves more than policy rhetoric or theoretical endorsement; it requires pedagogical practices that actively model creativity, collaboration, problem solving, and adaptive thinking for future teachers. Within teacher education, however, a tension often emerges between what is emphasised in the curriculum and what is enacted and modelled in the higher education lecture halls and classrooms; in other words the difference between knowledge and competence. While programmes may well promote the importance of innovative, student-centred approaches in schools, the formats through which these ideas are taught may remain rooted in traditional, discipline-bound and lecture-based practices. This tension raises a key question: how can teacher education move from teaching *about* 21st-century skills to actively *modelling* them for students? While many programmes rightly incorporate opportunities for students to engage with such competences, these activities are often isolated within specific subjects rather than forming part of a coherent pedagogical approach. However, if future teachers are expected to implement these approaches in their own classrooms, the process must begin within teacher education itself. Learning how to teach in more collaborative, creative, and adaptive ways requires that such approaches are not only discussed, but experienced.

The study described in this paper draws on experiential and sociocultural perspectives on learning, where knowledge is understood as emerging through concrete experience and interaction [1] [2]. In addition, game-based and multimodal approaches inform the design, particularly in relation to immersion, engagement, and the mobilisation of diverse competencies [3] [4]. These perspectives provide a framework for analysing how the escape room functions as a learning environment in teacher education. These perspectives are reflected in the design of the escape room itself. From an experiential perspective, the activity can be understood as a structured movement through challenge, reflection, and

resolution [1], while the collaborative nature of the tasks reflects a sociocultural understanding of knowledge construction through interaction [2].

In response to this challenge, the present study explores how a more holistic and interdisciplinary approach might be carried out as modelling rather than presenting. The context for this was the organisation of a cross-curricular theme day for second-year teacher training students at Nord University, centred on artificial intelligence as part of a broader 21st-century competence framework. As an entry point to this topic, the focus was deliberately shifted towards what might be termed “natural intelligence” - the collaborative, creative, and problem-solving capacities students themselves bring to the learning situation. This was operationalised through the design and implementation of an interdisciplinary educational escape room, in which students engaged in time-restricted, collaborative problem-solving tasks requiring communication, adaptability, and collective meaning-making.

Drawing on observations from the activity and student feedback, the paper examines how this design functioned as a learning environment for the enactment of 21st-century competences. Rather than positioning the escape room solely as an engaging or motivating activity, the analysis suggests that it can be understood as a form of embodied pedagogy, through which students experience the kinds of learning environments they are expected to create in their future classrooms. In doing so, the study contributes to ongoing discussions about how teacher education might more effectively bridge the gap between pedagogical theory and practice.

2. Pedagogical Design And Methodological Approach

The escape room was designed by colleagues Raymond Lillevik and Patrick Murphy and took place in the campus black box theatre, which was reconfigured to create an immersive learning environment. The activity centred on four distinct boxes, each secured with a padlock, which students were required to open by identifying clues distributed throughout the room. Each box represented a specific topic and contained tasks that later formed the basis for the subsequent workshop on artificial intelligence.

To unlock the boxes, students interpreted both overt and hidden clues in order to construct three-digit codes. The topics - ranging from John 3:16 (of Biblical reputation) to dead writers, reggae, and fantasy literature - were deliberately varied, creating a diverse and interdisciplinary set of challenges. The design required students to draw on different forms of knowledge and ways of thinking, while negotiating meaning collaboratively within their groups. A 60-minute time limit structured the activity, introducing a sense of urgency that shaped both the pace and the collaborative dynamics of the task. In this sense, the escape room functioned not only as a sequence of tasks, but as a situated and collaborative learning environment.

The study adopts a small-scale qualitative, practice-based approach to examining this teaching method. The study involved 26 second-year teacher education students enrolled in programmes for years 1–7 and 5–10, randomly organised into six groups. Data were generated through three primary sources: first, observational notes taken during the activity captured students’ engagement, interaction patterns, and problem-solving processes, with particular attention paid to moments of collaboration, frustration, and achievement. Second, student feedback was anonymously collected following the session, in the form of a questionnaire focusing on students’ experiences of the activity and its perceived relevance for their future teaching practice. And third, feedback through dialogue immediately following the escape room session and completing questionnaires.

The role of the researcher as both designer and facilitator position the study within a practitioner inquiry tradition. While this enables close insight into the learning process, it also requires awareness of potential bias. The analysis is therefore interpretive in nature, aiming to identify recurring patterns across observations and student responses rather than to produce generalisable findings. The data were analysed thematically, guided by the study’s focus on engagement, collaboration, and the enactment of 21st-century competences, and interpreted through the theoretical perspectives outlined in the paper. Ethical considerations were addressed by ensuring voluntary participation and anonymisation of student contributions.

3. Analysis And Discussion

The analysis that follows draws on observations and student feedback from the escape room activity. Students’ engagement began even before entering the room, increasing both attention and readiness to engage. As one student reflected, “I was curious from the start - it didn’t feel like a normal lesson at all.” This highlights how the framing of the activity itself contributed to heightened motivation



and engagement. Being informed in advance that the session would start with an escape room generated curiosity and anticipation, which carried into the learning situation. This expectation was further intensified by the physical staging of the experience, as students were led blindfolded into a black box theatre reconfigured as an unfamiliar and immersive environment. The transition from a familiar classroom to a multisensory and unpredictable space signalled that this would not be a conventional learning activity, increasing both attention and readiness to engage. These dynamics align with game-based learning perspectives, where immersion and novelty play a central role in sustaining engagement [3], as well as with the concept of flow coined by Csikszentmihalyi, where challenge and immersion generate deep involvement [5].



Fig. 1. Entering the escape room

The tasks themselves were deliberately challenging, and both individuals and groups experienced periods of frustration when encountering difficulties. However, these moments of struggle were closely linked to strong emotional responses upon success. When groups unlocked boxes and progressed in the activity, this was more often than not marked by spontaneous and audible celebrations. Such collective expressions of achievement contrast with traditional classroom settings, where success is typically individualised and less visibly embodied. From an experiential learning perspective, these moments of tension and resolution constitute powerful concrete experiences that can later be reflected upon and conceptualised [1]. The intensity of the experience suggests that emotionally charged learning situations play an important role in supporting deeper engagement and retention.

The imposed time constraint introduced a clear sense of urgency, which in turn necessitated collaboration and reinforced collective responsibility and shared focus. One student noted that “we had to rely on each other – none of us could solve it alone.” This illustrates how the task structure made collaboration a necessary condition for progress rather than an optional strategy. Students quickly recognised that tasks could not be solved individually and that effective communication was essential. This resulted in high levels of participation across groups, with students contributing in different ways depending on the demands of the task. Competitiveness between groups further intensified engagement, functioning as a motivational driver without undermining collaboration. Instead, it reinforced collective responsibility and shared focus. These dynamics reflect a sociocultural understanding of learning, in which knowledge is constructed through interaction and joint problem-solving [2]. The shifting roles within groups, where leadership changed in response to different challenges, can also be understood as participation within a community of practice, in which learning emerges through shared activity and evolving roles.[6]



Fig. 2. Immersed in collaborative, problem-based, and time-bound challenges.

A particularly striking aspect of the activity was the visibility of diverse competencies among students. Different participants demonstrated different strengths depending on the nature of the task, with some excelling in logical reasoning, others in spatial or practical problem-solving, and others in communication and coordination. The escape room promoted forms of competence that are not always recognised in traditional academic settings. As one student remarked, “people who usually don’t speak much were suddenly the ones solving things”. This illustrates how the activity redistributed participation and made diverse competencies visible. This resonates with Howard Gardner’s theory of multiple intelligences [7] and aligns with multimodal perspectives that view meaning-making as extending beyond purely linguistic forms [4]. At the same time, the activity challenged more static understandings of differentiation. Rather than positioning students along a fixed axis of ability, competence within the escape room was situational and task dependent. The teacher’s role as game master, providing targeted hints and guidance in response to immediate needs, illustrates a dynamic and responsive form of adapted learning. In this context, distinctions between “stronger” and “weaker” students became less pronounced, as successful problem-solving depended on the collective mobilisation of varied competencies.

The shared experience of challenge, frustration, and eventual success also had a clear impact on group dynamics. Completing the escape room within the allotted time contributed to a strong sense of collective achievement, which carried over into the subsequent workshop on artificial intelligence. Groups were more cohesive, communicative, and willing to collaborate, suggesting that the escape room functioned not only as a standalone activity but as a social and pedagogical foundation for further learning. From a transformative learning perspective, such experiences may influence not only immediate engagement but also students’ orientation towards subsequent learning activities and pedagogical approaches [8].



Fig. 3. Overcoming frustration was a real challenge

Taken together, these findings suggest that the escape room functioned not merely as an engaging activity, but as a form of embodied pedagogy, in which students experienced key principles of student-centred learning in practice. By immersing students in collaborative, problem-based, and time-bound challenges, the activity created a learning environment in which 21st-century competences were not discussed in abstract terms, but actively enacted. The findings highlight how such experiences make visible the complexities of collaboration, differentiation, and meaning making, while also challenging traditional assumptions about classroom roles and practices. In this sense, the escape room can be understood not simply as a teaching activity, but as a pedagogical model that demonstrates what student-centred learning looks like in practice.

For teacher education, this points to a clear implication: if future teachers are expected to design learning environments that foster creativity, collaboration, and adaptability, they must themselves meaningfully encounter such environments as learners. Bridging the gap between theory and practice therefore requires not only new content, but new forms of teaching through which these competences can be experienced, reflected upon, and taken into their future classrooms. This suggests that modelling pedagogy in teacher education is not simply an enhancement, but a necessary condition for developing pedagogical competence in contemporary classrooms.

Photos by Patrick Murphy. Students have granted permission for the to be used in this paper.

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