Embedding Psychology Themes in University Induction Using a Digital Escape Game

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Abstract: An "escape room" style game was developed as an induction activity for first year psychology students, encouraged by the need for icebreakers that meet specific, relevant and transparent learning outcomes. The game concept was designed using the escapeED framework for game-based-learning (Clarke et al., 2017), including consideration of narrative, participants, theme, objectives and evaluation. Groups of up to six students worked on an iPad "board" that had clickable objects on a representation of a lecturer's desk. Students had 20 minutes to solve four puzzles that identified objects to click on and reveal digits for a padlocked bag. However, clicking the wrong objects would cause loud music that would "disrupt the staff office". The four puzzles symbolised learning outcomes that students will develop throughout their course, such as seeking and evaluating evidence, using maths, and referencing. The puzzles also used staff profiles to promote discussion about psychology research, prompt the development of supportive networks and relationships with staff. A realistic calendar puzzle highlighted the social and academic opportunities that students should engage in as part of the psychology community, which they could also identify as by wearing the pin badge they unlocked on completion of the game. Psychology staff facilitated reflection on icebreaker activities, including themes of teamwork and leadership roles, asking for help, and learning and adapting from mistakes. A thematic analysis of three focus groups later highlighted that students resist looking at assignment feedback and are concerned about wasting staff time in office hours. This led to recruitment of senior students to facilitate the escape room, and changes in our reflective practice tutoring to address issues raised during the game. Overall, students reported a sense of fun and competition from the activities and felt better prepared for learning after the introduction to psychology skills during induction.

Keywords: Realistic, Psychology, Reflection, Icebreaker, Community

1. Introduction

Icebreaker activities typically encourage groups of individuals to introduce themselves and begin to develop a spirit of teamwork, community or belonging. This can be applied to university courses during induction, as students meet their peers and start to develop friendships and supportive academic networks. Icebreaker activities tend to be game-based or playful, and Chlup and Collins (2010) argue that this helps to foster a safe environment for adult learners, supporting students to share knowledge and learn from each other, and communicate concerns or solutions for shared problems. Indeed, introductory activities are arguably important in the context of social and emotional learning, as learners must be aware of their own behaviours and develop skills to understand and relate to others (Dressel, 2020), particularly since the transition to university might introduce greater diversity in the social sphere. Chlup and Collins give examples of icebreaker activities such as sharing unique personal interests or characteristics, engaging in reflection on how an individual relates to other members of a class, and swapping creative ideas to answer a prompt. These activities could foster qualities such as social engagement and interdependence, and celebrate diversity. The current research project began as an evaluation of the icebreaker activities for psychology induction at a UK university, where the original activities included a teambuilding challenge to construct a spaghetti tower, "find a person who…(matches various criteria)", and a problem solving discussion on moral dilemmas, though the learning outcomes for these was unclear.

Several studies have demonstrated effectiveness of icebreakers for increasing class engagement and sense of connection. For instance, Abbas et al. (2022) used chat bots in an online discussion forum to stimulate icebreakers between university students and found that over half of participants reported engagement with users on the platform had increased their sense of belonging at university. Similarly, Sasan et al. (2023) found that students who participated in icebreakers were more engaged in class discussion and reported greater sense of community. Students also reported that icebreakers helped generate a friendly atmosphere and positive mood for learning, and it helped to make facilitators more approachable. Chopik and Oh (2024) reported that students taking part in a self-disclosure icebreaker experienced a significant increase in perceived closeness with classmates and sense of belonging. Similarly, Jarusriboonchai et al. (2016) developed a mobile game where players answer personal questions about themselves and are challenged to learn information about the rest of the group. The playfulness of the game allowed participants to avoid perfectionism and enjoy being creative with their answers. The looseness of the game rules allowed different groups of participants to approach the

tasks in different ways, which parallels individual differences in learning. They also describe participants laughing at others making mistakes, indicating a non-threatening learning environment.

One element missing from some educational and icebreaker games is a formal reflection on the learning outcomes of the activity (Veldkamp et al., 2022; Cloude et al., 2021). Brooks et al. (2014) noted that students do value learning about their learning outcomes, and this could be embedded early in the curriculum to help students gain self-awareness, evaluate their learning needs, and acknowledge their values and transferable skills (Higher Education Academy, 2015; Pretorius & Ford, 2016). Delaney et al. (2021) used a group reflection following an engineering icebreaker, where students were challenged to build effective towers and discuss their performance; players indicated problems that could be addressed as they developed through the module. Similarly, Braad et al. (2023) asked learners about their metacognition (thinking about thinking) following game-based learning, which was perceived as useful for novices. An escape room was chosen for the current project as it can provide a breadth of collaborative learning tasks to reflect upon, and adapts well to target challenges to sense of belonging during university induction, including communicating expectations, building relationships with teaching staff and socialisation within course groups (Thomas, 2012).

Fotaris and Mastoras' (2019) systematic review highlights how escape rooms can have several benefits, including leadership, problem solving, critical thinking and communication. The use of narrative in Escape Room design makes them well suited to a constructivist approach to learning, as diverse learners collaborate to find the best method of addressing problems, perhaps based on their prior knowledge, experience and education. Morrell, Eukel and Santurri's (2020) nursing escape room highlighted perceived benefits, including confidence, engagement and active listening, and real-life implications. Escape games can be set in the context of induction, such as in Nybo et al. (2020), who introduced staff, academic calendars, polices and learning objectives. It also lends itself well to providing scaffolding, such as using pre-determined hints, evidenced in von Kotzebue et al.'s (2022) digital escape room on sex education. The escape room can also provide immediate feedback and action, which are effective in aiding game-based learning (Wouters & Oostendorp, 2013). A psychology-themed escape game was run with three first-year psychology cohorts and evaluated within the context of university induction and sense of belongingness.

2. Game Concept

The game was designed using the escapeED framework for game-based-learning (Clarke et al., 2017), including consideration of narrative, participants, theme, objectives, and evaluation. Importantly, the puzzles were varied and accessible to those who are new to psychology, and have varied skillsets. The first version of the game was piloted by game designers and enthusiasts, who completed it successfully with no psychology background. The game takes place in a seminar room on university campus, during the first week of induction. Four classes of 15-20 students organise themselves into groups of up to six and are given a name badge to write on. Students are verbally briefed that they have 20 minutes to solve four puzzles and unlock a padlocked bag on their desk. Groups are given an A4 booklet containing the instructions and puzzles and participants are encouraged to separate the puzzles so they can work on several at once, but encouraged to help each other and seek support from the three tutors (psychology lecturers) facilitating the session. Each group has an iPad that displays the "board" for the game (created in PowerPoint) and requires players to click on objects to find digits for the padlock. The board represents a lecturer's desk and depicts 19 objects including a computer, calendar, lunchbox, and pin board with "staff of the week" profiles. The instructions explain that the lecturer has a gift for players but has hidden the padlock combination; players are given permission to "move" objects but if they click on the wrong ones it will "unplug the earphones" and cause loud music to play and disrupt the office. The music included 10 second clips from popular rock, metal, ska, drum n' bass and 80's pop, and aimed to foster a sense of individuality and approachability of tutors. Selecting the correct objects reveals a padlock digit and plays applause audio.

The rationale for the four puzzles is explained in terms of psychology learning themes, community and belonging. The choice of puzzle focus was guided by feedback from first-year tutors, and identified skills that students start developing early in their degree, including statistics, referencing, critical thinking, and finding information from reliable academic sources. This aimed to set the context and expectations for ongoing studies. One of the most important elements of the game was to encourage students to learn to make mistakes and ask for help; earlier student feedback had indicated that some avoided booking office hours with tutors because they did not want to "*waste staff time*" or ask stupid questions, thus might miss opportunities for support. From the second version of the game, senior students were recruited to facilitate the game and take part in reflective discussion, where they emphasised the importance of engaging with tutors consistently.

2.1 Puzzle 1: Definition Search

Participants are given nine general psychology definitions and must fill in a grid with a one-word name for each definition (e.g. brain, stress, memory). These align vertically down the centre to spell out "bold four". A cognitive psychology journal abstract is included at the bottom of the page, aptly focused on visual search and memory when there are distractor objects. Five words in the abstract are in bold and name objects from the desk, which makes no sense within the context of the abstract. One letter of each of these objects is replaced by a number, e.g. "**Spe4kers**", and the bold 4 indicates the correct object. Players are not immediately told that they can search online for answers to the definitions, as the aim was to encourage them to ask questions about the rules. The puzzle aims to remind students that they have the skill to expand their knowledge by continually searching for answers.

2.2 Puzzle 2: Academic Timetable

Students are presented with a timetable grid that shows real modules, as well as activities including study groups, Campus Jobs, sports and societies, CV workshop and participating in research. This highlights how university is 9-5, and encourages students to consider the different opportunities available to them. Beginning at "start", players must follow a series of arrows to navigate through the grid and should end on one of the desk objects. Arrow directions are obtained by answering seven multiple choice questions on topics including biological, cognitive and clinical psychology. The task also encourages students to keep track of their working, so they can evaluate where they have made mistakes.

An underlying theme of this task was to encourage students to take part in a rich array of extra-curricular activities, particularly having observed low attendance for Psychology Society and career events. Such activities can help to develop soft skills, boost social engagement and self-confidence (Buckley & Lee, 2021), as well as increase wellbeing and belonging (Winstone et al., 2020), so are a valuable part of the university experience. Reflecting on experiences, skills, and employability is also embedded in the curriculum since students might not appreciate or communicate these on their CV (Dibben & Morley, 2019).

2.3 Puzzle 3: Maths

This puzzle highlights the active research of psychology stuff, showcasing a poster on perceptions on eating meat. Attention is drawn to a pie chart and bar graph about eating insects and other animals. Players must calculate a sum and select one of four answers, each of which is paired with one object from the desk. This task encourages mistakes if players are not attending to detail, since the pie chart gives raw data, so the sum will be incorrect if they do not calculate percentage first.

This puzzle encourages students to learn to accept and spot mistakes in a safe environment, which is an important part of learning (Brookfield, 2017). As much as 80% of learners can feel anxiety when working with numbers (Onwuegbuzie & Wilson, 2003), and this can lead to avoidance and fear of failure. Group reflection on this activity provides a platform to voice apprehension, where tutors can reassure new starters that they will be supported throughout their learning of statistics. Research also finds that students are reluctant to communicate statistically (Malik, 2015) so the puzzle provides an early opportunity to practice this. Tutors can model their approach to solving problems and position learners in the zone of proximal development, helping them to attain a higher level than what they can manage independently (Vygotsky & Cole, 1978). Engaging in this type of task could be used to help develop metacognitive skills (thinking about thinking) and self-efficacy (Franklin & Garfield, 2006), and is expanded in another research project that the students take part in during their modules.

2.4 Puzzle 4: Referencing

In this task, players complete a referencing puzzle to identify which of four colleagues was "staff of the week". Provided staff profiles include a photograph, current research keywords and other interests (e.g. boardgames and playing double bass). Solving the puzzle spells out "therapy" which matches one staff profile, which can then be clicked on the iPad board. The puzzle tasks include finding the first letter of a journal or article title, or the first initial of an author, and a visual guide is provided to identify different parts of a reference. This puzzle introduces an abstract from a child psychology journal (published by a colleague) to demonstrate the types of literature students should be reading. The reference list is formatted in APA style (American Psychological Association) and gives a head start to understanding the benefits of following guideline standards.

This task aimed to emphasise the approachability of staff, with unique and perhaps relatable interests. Psychology students have a personal academic tutor for their entire degree, but attendance at timetabled sessions can be low, so encouraging elements of less formal interaction might help foster open communication, staff-student community, and potentially support higher retention.

2.5 Reflection

On unlocking the bag students were rewarded with an "Achievement Unlocked" pin badge to identify themselves as part of the university psychology community. The bags also contained paper feedback forms to evaluate the game. Game facilitators helped to ensure 100% completion for students who engaged in the task. Tutors facilitated a group reflection on challenges, learning and evaluation of the task, with topics including growth mindset (Dweck, 2015), making mistakes, encouraging use of personal tutors, and discussing how reflective practice has a prominent place in psychology education (Van Beveren et al., 2018; Halpern et al., 2010). Group reflection typically lasted up to five minutes.

3. Evaluation

The game was evaluated by reflecting on the gameplay, debriefing with game facilitators, collecting feedback slips, and then more formally by conducting focus groups and collecting survey data.

3.1 Gameplay

In the first play-through of the game around 70% of groups completed, which meant some were not rewarded with a badge or sense of achievement. Facilitators were further instructed to give extra hints to groups struggling to finish in time, increasing completion to 90%; one or two groups failed to engage in the task, or with facilitators. Some tutors were observed supporting one group for the entire session, rather than working the room, which took some element of independence from learners, so future games incorporated a more formal briefing, and outline of expected aims and learning outcomes. Likert scales were used to collect feedback from 54 participants: 25.92% said it was too hard while 66.67% said it was about right; 88.89% said it was fun, with the remainder being undecided, 87.04% agreed it helped them interact with peers and 70.3% agreed it helped them interact with tutors (20.37% undecided). The game was then simplified and reordered to make it clearer which elements were puzzles and which purely for context.

3.2 Qualitative Data

Three focus groups were conducted by an undergraduate research assistant, each with four participants. Focus groups lasted around 45 minutes and the game materials were distributed to refresh memory. The focus group included questions about induction and expectations, walking through experience of doing the game, challenges and enjoyment, perceived learning and social life several weeks on. Data was analysed using thematic analysis (Braun & Clarke, 2006) and three themes will be discussed: appropriateness of induction activities, evaluating performance and social connection.

3.2.1 Appropriate of Induction Activities

When evaluating their first weeks at university, students reflected on their experiences. Mature students commented on some activities being childish, such as signing up for a doctor "*it was a bit tedious to me*", "*I was literally clawing at my eyes wanting to do something that was psychology or just work or something…I felt my motivation dropping a bit*". Thus, it is important that the game is mature as well as playful. Other students did not attend some induction activities, so it is important to emphasise the value of psychology-themed induction in advance. The escape game was evaluated as "*best activity so far*", "*it's a bit of a taster…this is what we're going to cover in a fun and interesting way*", and students valued the "*doable chunks*". Experiences on the game parallel the academic reality, including the need to read instructions carefully and ask for help if unclear "*before you start tackling the problem...first, you need to know what you're about to do*". It also mirrors the breadth and depth of study: "an *expectation of the amount of work that you have to do to get a four-digit number".* Students discussed feeling lost, both physically and psychologically "*I felt nervous…I had no idea where to go*", which parallels feelings when participating in an escape room. However, students valued our separate Treasure Hunt Walking Tour, which helped decipher the abbreviations for buildings and give a sense of space.

3.2.2 Evaluating Performance

Students reflected on their performance during the game, general academic skill, and being evaluated by peers and staff. The musical element of the game introduced a social comparison: "*I felt dumb at first, but since everyone was making mistakes I felt more comfortable and it was funny*"; it is useful to reflect on learning to improve, as students also commented that they resist looking at assignment feedback, and thus may miss opportunities to develop. One development from the game was that we changed the personal tutoring system, so all year groups meet together, and can share reflection on their challenges and achievements, to encourage others: "*Yeah, I think it might have helped me if my teammates were just as clueless as I was, in the sense that would have given me like, a comforting feeling that I'm not stranded on my own*". Although the game was evaluated as being quite hard, many commented on enjoying the sense of competition with others, feeling pride upon achievement "*oh my God I feel so great*", and not feeling "*inadequate*". However, some did comment on anxieties about learning, and seeking support from tutors "*I don't like asking for help either cuz I feel like they're gonna think I'm like stupid or something. So I just sat there like, 'uh-oh, what am I gonna do', and luckily, the lecturers are so nice and they sat with me*", for this reason we recruit senior students to join induction and talk about the value of engaging with tutors.

3.2.3 Social Connection

Groups discussed intentions to socialise at university, challenges and successes when making friends, and interacting with tutors. Several commented on focussing purely on learning: "*I don't want to make friends*" and "*I don't really have to fit in*", though also reflected that they now value the social connections they have developed. Students may not immediately appreciate the support that peers can provide, but social media platforms are a way of helping one another "*we have a little group chat where we just cry about things we don't understand*". Some students who did not connect well at the start also discussed feeling lonely and considering dropping out, describing some interactions as "*superficial*" because they only attend university for a few hours a week. This is why students are encouraged to form regular study groups (as highlighted in one of the puzzles). Another sub-theme was on personal interests, with some being disappointed with the university societies, and others feeling like induction was not aimed at them, due to their religion. A student suggested distributing flyers with halal food options around the city, and the university now hands out maps showing local LGBTQ venues. Our staff-organised socials are now more inclusive from this discussion, with one participant commenting "*I was SO happy when I saw the staff had added a trip to Sprinkles [ice cream venue]".* Conducting induction activities in person (rather than online) is beneficial as students will gravitate towards people who look similar or approachable, with one commenting to a mature student "*I knew if I sat next to you I'd feel safe*", and they reflected on how we connect with people who are going through the same experience. There was some contrast in how students connected with staff. Some were "*excited*" to talk to researchers "*in the sort of area I want to go into*" and valued informal research chats with staff in the corridor, others noted the importance of the personal tutor system when transitioning to university "*you kinda feel like, lost. So... you have like lots of doubts…if you have a specific person to ask questions, then that's gonna be easy*". One student who considered dropping out said they did not "*know if I was succeeding*", so would have valued reaching out to staff.

3.3 Discussion

The game successfully provided a fun, different and relevant introduction to psychology study, breaking the ice socially and academically. It models provision of a comprehensive taster of learning objectives and could be adapted to different courses. The escape game style allowed tutors to provide scaffolding for all groups and mirror the expected engagement in seminars. The process of planning the game encouraged collaboration with colleagues, to highlight and target development needs and better coordinate this across year groups. Similarly, focus group discussions allowed students to voice their experiences, leading to a change in personal tutor sessions, which now combine year groups and end with a social that splits across three venues, to cater for diversity needs (instead of just going to the pub). The element of music in the game was useful to provide instant feedback to players, and indicate need for support from tutors. This helped to provide a light-hearted atmosphere for learning and making mistakes, similar to Jarusriboonchai et al. (2016) and Sasan (2023). The inclusion of a reflective debrief allows tutors to draw attention to developing skills and achievements in the game and academic study, such as social engagement, leadership, compromise, and providing critical feedback. There was also indication that the informal interaction with staff across induction helped make them more approachable during seminars.

One limitation of the project was that the many elements made it difficult to evaluate their effectiveness, whether that be sense of belonging, or skill development and awareness. A university belonging scale was included to question sense of connection, respect and welcoming (Imperial College, 2020, adapted from Yorke, 2015) but responding was low (indicating another issue that first year students do not engage with research participation). Indeed, the focus groups provided useful insight, but might have recruited more outgoing and confident students and not those who were disengaged with the game, who might need more support. The game itself did not enforce prolonged social engagement, or interaction with all the tasks, as participants could choose to complete one puzzle independently. The group reflection could address this, but should be expanded to 30 minutes, explicitly discuss all learning outcomes and make it relatable to the domains assessed: cognitive, knowledge, practical and professional skill and transferrable skills. These activities could be revisited a month after induction, as Thomas (2012) stressed the need for induction to extend beyond the welcome week.

References

Abbas, N., Whitfield, J., Atwell, E., Bowman, H., Pickard, T. and Walker, A., 2022. Online chat and chatbots to enhance mature student engagement in higher education. *International Journal of Lifelong Education, 41*(3), pp.308-326.

Braad, E., Degens, N., IJsselsteijn, W. and Barendregt, W., 2023, September. Design Experiments in Game-Based Learning of Metacognition. In *Proceedings of the 17th European Conference on Game-Based Learning: ECGBL 2023*. Academic Conferences and publishing limited.

Braun, V. and Clarke, V., 2006. Using thematic analysis in psychology. Qualitative research in psychology, 3(2), pp.77-101.

Brookfield, S. D. (2017). *Becoming a critically reflective teacher*. John Wiley & Sons.

Brooks, S., Dobbins, K., Scott, J.J., Rawlinson, M. and Norman, R.I., 2014. Learning about learning outcomes: The student perspective. *Teaching in Higher Education*, *19*(6), pp.721-733. Chlup, D.T. and Collins, T.E., 2010. Breaking the ice: using ice-breakers and re-energizers with adult learners. *Adult Learning*, *21*(3-4), pp.34-39.

Buckley, P. and Lee, P., 2021. The impact of extra-curricular activity on the student experience. *Active Learning in Higher Education, 22(*1), pp.37-48.

Chlup, D.T. and Collins, T.E., 2010. Breaking the ice: using ice-breakers and re-energizers with adult learners. *Adult Learning*, *21*(3-4), pp.34-39.

Chopik, W.J. and Oh, J., 2024. Implementing the fast friends procedure to build camaraderie in a remote synchronous teaching setting. *Teaching of Psychology*, *51*(2), pp.227-233.

Clarke, S., Peel, D., Arnab, S., Morini, L. and Wood, O., 2017. EscapED: A framework for creating educational escape rooms and interactive games to for higher/further education. *International Journal of Serious Games, 4*(3), pp.73-86.

Cloude, E., Carpenter, D., Dever, D., Azevedo, R. and Lester, J., 2021. Game-based learning analytics for supporting adolescents' reflection. *Journal of learning analytics*, *8*(2).

Delaney, K., Nagle, G. and Chen, M., 2021. Gamification of Icebreaking Activities for Mechanical Engineering Students Embarking on a Problem Based Learning Module. INTED2021 Proceedings, 1, 10595–10600.

Dibben, L. and Morley, D.A., 2019. Using the Living CV to help students take ownership of their learning gain. *Employability via Higher Education: Sustainability as Scholarship*, pp.441-457.

Dressel, D.P., 2020. Breaking the Ice to Build Relationships: Using Icebreakers to Create New Relationships, Promote Emotional Safety, and Incorporate Social and Emotional Learning: Editor: Ferman Konukman. *Journal of Physical Education, Recreation & Dance, 91*(5), pp.51-54.

Dweck, C., 2015. Carol Dweck revisits the growth mindset. *Education week*, *35*(5), pp.20-24.

Fotaris, P. and Mastoras, T., 2019, October. Escape rooms for learning: A systematic review. In *Proceedings of the European Conference on Games Based Learning* (pp. 235-243).

Franklin, C. and Garfield, J.B., 2006. The GAISE Project: developing statistics education guidelines for Pre K-12 and College Courses: 2006 NCTM Yearbook. In *Thinking and reasoning with data and chance: 2006 NCTM yearbook* (pp. 345-376). National Council of Teachers of Mathematics

Halpern, D.F., Anton, B., Beins, B.C., Bernstein, D.J., Blair-Broeker, C.T., Brewer, C.L., Buskist, W., Casad, B.J., Dixon Jr, W.E., Harper, Y.Y. and Hailstorks, R., 2010. Principles for quality undergraduate education in psychology.

Higher Education Academy, 2015. Framework for embedding employability in higher education. *The Higher Education Academy framework series*.

Imperial College London: Sense of belonging. https://www.imperial.ac.uk/education-research/evaluation/what-can-i-evaluate/sense-of-belonging/. (2020). Accessed 1 Sept 2022

Jarusriboonchai, P., Malapaschas, A. and Olsson, T., 2016, May. Design and evaluation of a multi-player mobile game for icebreaking activity. *In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (pp. 4366-4377).

Malik, S., 2015. Undergraduates' Statistics Anxiety: A Phenomenological Study. *Qualitative Report*, *20*(2).

Morrell, B.L., Eukel, H.N. and Santurri, L.E., 2020. Soft skills and implications for future professional practice: Qualitative findings of a nursing education escape room. *Nurse Education Today*, *93*, p.104462.

Nybo, S.E., Sahr, M., Young, M., Axford, K., Sohn, M., Lyons, M. and Klepser, M., 2020. Design of a large-scale escape room for first-year pharmacy student orientation. *Currents in Pharmacy Teaching and Learning*, *12*(11), pp.1340-1347.

Onwuegbuzie, A.J. and Wilson, V.A., 2003. Statistics Anxiety: Nature, etiology, antecedents, effects, and treatments--a comprehensive review of the literature. *Teaching in higher education*, *8*(2), pp.195-209.

Pretorius, L. and Ford, A., 2016. Reflection for learning: teaching reflective practice at the beginning of university study. *International Journal of Teaching and Learning in Higher Education*, *28*(2), pp.241-253.

Sasan, J.M.V., Tugbong, G.M. and Alistre, K.L.C., 2023. An Exploration of Icebreakers and Their Impact on Student Engagement in the Classroom. *Science and Education*, *4*(11), pp.195-206.

Thomas, L., 2012. Building student engagement and belonging in Higher Education at a time of change. Paul Hamlyn Foundation, 100(1-99).

Van Beveren, L., Roets, G., Buysse, A. and Rutten, K., 2018. We all reflect, but why? A systematic review of the purposes of reflection in higher education in social and behavioral sciences. *Educational Research Review, 24*, pp.1-9.

Veldkamp, A., Rebecca Niese, J., Heuvelmans, M., Knippels, M.C.P. and van Joolingen, W.R., 2022. You escaped! How did you learn during gameplay? *British Journal of Educational Technology*, *53*(5), pp.1430-1458.

von Kotzebue, L., Zumbach, J. and Brandlmayr, A., 2022. Digital escape rooms as Game-Based learning environments: A study in sex education. *Multimodal Technologies and Interaction*, *6*(2), p.8.

Vygotsky, L.S. and Cole, M., 1978. *Mind in society: Development of higher psychological processes*. Harvard university press.

Winstone, N., Balloo, K., Gravett, K., Jacobs, D. and Keen, H., 2022. Who stands to benefit? Wellbeing, belonging and challenges to equity in engagement in extra-curricular activities at university. *Active Learning in Higher Education*, *23*(2), pp.81-96.

Wouters, P. and Van Oostendorp, H., 2013. A meta-analytic review of the role of instructional support in game-based learning. *Computers & Education*, *60*(1), pp.412-425.

Yorke, M., 2016. The development and initial use of a survey of student 'belongingness', engagement and self-confidence in UK higher education. *Assessment & Evaluation in Higher Education*, *41*(1), pp.154-166.