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Playful learning: Linking play properties to learning designs – a higher education scoping review

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A B S T R A C T

Playful learning in higher education is an emerging field of research, but it lacks a coherent definition or framework of implementation approaches. This article presents a scoping review of playful learning in higher education by investigating how the 'path' from playful learning theories and knowledge towards designing playful learning solutions is described. We examine how other studies have worked on creating playful learning solutions in terms of what theoretical frameworks authors mention and how play properties are linked to learning solutions. In the scoping review, international databases were applied, and 24 articles were selected for thorough analysis. It describes three strategies on how authors apply playful approaches in learning contexts in higher education: adopting a playful activity to implement playful learning in higher education; adding a playful twist to existing learning formats; and designing solutions based on a playful learning framework or play properties. This paper concludes by providing questions about how to address play properties in learning designs. The questions can be used to provide direction for making design decisions about playful learning contexts and solutions.

Introduction

In recent years, there has been an increasing focus on creative pedagogy within higher education. Traditional instruction is being scrutinised, and within the knowledge society, we have embarked on a quest to teach new and broader skill sets to meet future challenges (Ananiadoui & Claro, 2009; OECD, 2018; Sylva et al., 2010). For some time, attempts to change traditional teaching approaches have focused on inquiry-based learning, including problem-based learning, learning by doing (Dewey, 1997) and game-based learning (De Freitas, 2006). Consistent with these approaches, there seems to be a changing ethos in higher education in which the teacher's traditional role as a transmitter of knowledge for knowledge acquisition has shifted towards active student-led approaches that facilitate knowledge construction (Beetham & Sharpe, 2013; Wright, 2011).

Consequently, this has contributed to a growing desire among academics to consider pedagogies and practices that increase student enjoyment and satisfaction, pointing to playful learning's potential (Lala &Priluck, 2011; Nørgårdet al., 2017; Whitton & Langan 2019). Whitton and Logan (2019) assert that "there is a need for a better understanding of whether students believe that there is any place for joy in their university studies, and the elements – beyond games – that contribute to feelings of enjoyment and satisfaction" (p.1003). In line with this, we found playful learning to be an approach that contributes to this student-centered approach to teaching and learning (; Nørgård et al., 2017; Whitton & Langan, 2019; Whitton & Moseley, 2019). Despite the growing attention paid to playful approaches to teaching in higher education settings, these approaches are viewed most

often as targeting children (Zosh et al., 2017). However, papers on applications of playful higher education theory, method and practice have emerged (James & Nerantzi, 2019;; Jørgensen & Koeners & Francis, 2020; Nørgård et al., 2017, Nørgård and Moseley, 2021; Skovbjerg & Jensen, 2024; Jørgensen & Skovbjerg, 2023; Skovbjerg, 2021; Whitton & Moseley. 2019). Multiple review studies on playful learning in higher education also have found that several challenges are associated with working with playful approaches to teaching (Boysen et al., 2021; Jensen et al., 2020; Jørgensen et al., 2021). However, these review papers do not address how frameworks have been applied to create playful learning designs. In particular, the interconnection between play and teaching is controversial and contradictory, both theoretically and practically. Theoretically, play is challenging to deal with (Boysen et al., 2021, Sutton-Smith, 1995; Skovbjerg, 2021; Skovbjerg & Jørgensen, 2021; Jørgensen & Skovbjerg, 2023), and it is expressed concretely by an ambiguous use of concepts (Nørgård & Moseley, 2021). Also, Whitton (2018) points to how playful learning in higher education currently lacks a coherent definition or framework of implementation approaches. Consequently, it is not clear what play properties are applied in learning designs, and reflections on the diversity of play properties seem also to have potential (Jørgensen & Skovbjerg, 2023; Skovbjerg et al. 2022).

Therefore, this paper's purpose is to identify how the 'path' from playful learning theories and knowledge towards designing playful learning design solutions is described in the higher education literature. We conducted this study based on the following research questions:

How do studies work to create playful learning solutions in terms of what theoretical frameworks authors mention?

How are play properties linked to playful learning solutions?

We will provide an overview of frameworks and play properties that authors have applied.

The second exploration is like the work in which we examined how theory was used in designing fantasy play solutions (Skovbjerg et al, 2021).

The main contribution of this paper is:

- Developing an overview of what **playful learning theories and frameworks** have been used and in what manner they are applied in playful learning designs in higher education.
- Developing an understanding of how we can address **play properties** in the creation of playful learning designs in higher education so that this knowledge can be used to create valuable playful learning designs.

First, we describe this literature review's methodology. Second, we present three commonly used strategies on how playful learning theories are used in the selected papers. Third, frameworks and implementation approaches and suggestions for future research are discussed.

Method

We applied a scoping review methodology because the field of playful learning in higher education remains relatively immature from a research perspective (Arksey & O'Malley, 2005; Whitton & Langan, 2019). Our intention is to produce an overview of relevant studies and derive essential trends, challenges, and potentials. The scoping review methodology includes five stages: 1) identifying the research question; 2) identifying relevant studies; 3) selecting studies; 4) charting data; and (5) collecting, summarising, and reporting the results (Arksey & O'Malley, 2005).

Step 1: Identifying the research question

The identification of the research question is driven by the wish to explore how playful learning theories and frameworks can provide direction for making design decisions about playful approaches in learning contexts. We are interested in the 'path' that authors describe from their selection of learning theories and knowledge towards implementing elements of the theories and frameworks in concrete playful learning solutions.

Based on the above, this paper addresses the following **research questions**:

1) To what (theoretical) framework do authors refer when writing about their work on playful learning?
2) How are play properties addressed?
3) How do authors provide direction for making design decisions about learning contexts, taking these play properties into account?

Step 2: Identifying relevant studies

Following Arksey and O'Malley (2005), we conducted keyword searches of the following databases, in iterative cycles: ACM, ERIC, JSTOR, and Microsoft Academic Search. ERIC was chosen due to its educational focus, while JSTOR and Microsoft Academic Search were chosen because they are general. ACM was chosen because it enabled us to identify design-based articles that focus on digital innovation.

To ensure that this search approach generated relevant articles, we developed a block-based search strategy. The search included peer-reviewed articles in English published between 2010 and 2021. Each search string comprised three blocks. The first search focused on identifying articles about playful methods, tools or a framework with which to implement playful learning in higher education settings. Different keywords related to 'playful', 'framework' and 'education' were tried and mixed. In the second search string, the focus was on finding articles that focus on educational designs and explorations of solutions with a playful approach. First, we focused particularly on teacher education and variations (i.e., 'pre-service teacher', 'teacher training', etc.). Then keywords such as 'higher education', 'university' and 'academia' were added to broaden the search. In the third search string, we aimed to identify articles that mainly focussed on 'playful learning' by searching for 'playful learning' or 'play-based' or 'playfulness' in the title, as well as educational designs and frameworks in higher education settings in general. The fourth search aimed to identify studies that adopt a more creative and experimental approach. Furthermore, it is valuable to check the reference list of studies to ensure that every relevant article was included (Arksey & O'Malley, 2005). Therefore, we checked all articles' reference lists included for full text reading, as well as key journals to identify articles that potentially were missed in the database and reference list searches.

This generated a pool of 406 relevant references (excluding duplicates) of which the title adequately reflects the research objective. Conference papers, book chapters, interviews, book reviews and short papers were excluded. We screened the abstracts of the remaining articles and excluded articles in which 'play' was used only as a verb, as well as when 'play' only occurred in the context of game play, playing an instrument, or playing a role. 'Role-play' was excluded when it served only as a tool in, for example, clinical education of medical professionals. Through screening abstracts, we focussed on three main elements:

- The texts should mention play in relation to learning.
- This learning should take place in a higher education context.
- The article should explore a playful learning solution or framework for the design of playful learning solutions.

This resulted in 84 articles selected for the next review stage, including eight articles selected through snowballing where we identified new papers based on those papers being examined (Wohlin, 2024). Full details of all the papers are in Appendix 1, table 4.

Limitations concerning search strategy

This scoping review adopted Arksey and O'Malley's (2005) literature search strategy. We only included peer-reviewed articles that mention play regarding learning. Furthermore, we excluded studies that focused on children, articles with game-based properties, highly digital-tech-oriented articles and purely theoretical articles that did not investigate an educational design. This left us with a limited amount of material, even though the search has been broad, but this scoping review's focus was to indicate how to make design decisions about playful approaches to play properties and learning designs in higher education, and we wanted to make sure we had an understanding of the design aspect specifically.

Step 3: Selecting studies

During the next phase, inclusion and exclusion criteria were developed further during the literature search process and guided by our research questions. During this process, all 84 articles were obtained and read by at least one of the authors, followed by group discussions and agreement on criteria. Through this iterative process, exclusion criteria were identified further:

- articles that focussed on game-based properties, such as competition and reward systems.
- tech or digital-oriented articles.
- articles that explored learning with an emphasis on teaching 'how to' regarding children's learning or children's play.
- conceptual and/or theoretical articles that did not investigate an educational design or design solution.

This screening process yielded 24 studies for inclusion in this scoping review. For further details of the selection process Appendix 1, table 5 for clarification.

Step 4: Charting data

The fourth stage of Arksey and O'Malley's (2005) method entails charting data. Each article was summarised in a table that included title, country, learning context, study aims, research design, paths from intention to realisation, framework/method/model, foundation, arguments for playful learning and results. First, initial line-by-line coding was entered into Dedoose. Dedoose is a digital app where researchers across platforms can work live with coding the material. We chose this platform because it was possible more researchers to work with the material at the same time with the material. For more information www.dedoose.com. During the second phase, we applied focus coding in which we used frequent earlier codes to sift through the data and categorise it. This was followed by axial coding, in which we further identified properties and dimensions of our 24 articles' categories and subcategories (Charmaz, 2006).

Step 5: Collating, summarising and reporting results

During the fifth and final stage, findings were summarised and reported. While analysing the articles, we identified **three different strategies** on how authors apply playful approaches in higher education learning contexts.

1) Strategy 1: Twelve articles adopt a specific playful activity and implement it into learning approaches; this playful activity is the central focus (Table 1).
2) Strategy 2: Nine articles add a playful twist to existing learning formats, in which the individual learning domain is the foundation, and a certain playfulness is added to reach domain-based goals (Table 2).
3) Strategy 3: Three articles design a solution based on a playful learning framework or playful learning properties. In this category, the studies design their interventions around play properties, which are the real foundation of their solutions. In all three studies, a clear link exists between design intention, design decisions and realization (Table 3).

Within these three strategies, we identified **two subcategories** that relate to how authors address and consider play properties in the design of playful learning solutions (clarified in table 1, 2 and 3):

1) 'Limited link' often defines play, but there is a limited link to this theory in describing the activity, i.e., the addressed play theory was hardly applied in their designs.
2) 'Clear link' contains designs in which properties are addressed clearly, and design decisions are linked clearly to the same theory.

The analyses of the articles related to the three main strategies are described and discussed in the following sections. Each paper was coded uniquely to one of the strategies.

Results: Three main strategies

In this section we present three main strategies for ways in which that the papers have worked on creating playful learning solutions in terms of what theoretical frameworks authors mention and how play properties are linked to learning solutions.

Strategy 1: Adopt a playful activity to implement playful learning in a higher education context

Twelve articles (A, B, C, D, E, F, G, H, I, J, K and L, table 1) adopt a specific playful activity and implement this into their learning approaches. The activity itself is used as a tool to motivate students in an innovative way, build social and reflective skills, adjust to a variety of different learning styles, or build an understanding of children's developmental needs and provide the students with a range of tools to support their future work as primary school teachers.

Strategy 1	Limited link	Clear link
A: Excell, L., and A. J. Van As. 2018.	x	
B: Dann, S. 2018.		x
C: Dickinson-Delaporte, S., A. Gunness and H. McNair. 2020.		x
D: James, A. R. 2013.		x
E: James, A., and S. Brookfield. 2013.		x
F: Kettula, K., and S. Berghäll. 2013	x	
G: Lace-Costigan, G. 2017.	x	
H: Payton, J. 2020	x	
I: Peabody, M. A., and S. Noyes. 2017	x	
J: Souto-Manning, M. 2011	x	
K: Tseng, W. C. 2017.	x	
L: Zenk, L., N. Hynek, G. Schreder, A. Zenk, A. Pausits and G. Steiner. 2018	x	

Table 1: An overview of the included articles belonging to Strategy 1 with varying specificity of how the authors' intentions are linked to design decisions for the realisation of playful learning solutions.

Framework use

Three studies (B, C and H) describe a framework that uses play concepts. The other studies' theoretical frameworks are often based on domain-specific theories, such as constructivism, experiential learning and learning by doing (Dewey, 1997), although a few (A, C, D, E, H and J) refer specifically to play theory (Brown, 2012; Henricks, 1999; Piaget, 1997; Vygotsky, 1978; & Wood, 2009). Excell and van As (A) in particular refer

explicitly to play theory (Piaget 1997; Wood, 2009). When describing the ultimate solution, they refer more often to the domain-specific theory; thus, limited links to play theory exist in their design decisions.

Six studies (B, D, E, I, K and L) incorporate the Lego Serious Play (LSP) technique. The LSP technique often is used as a framework that authors follow in a structured way without specifying play properties or elaborating on design decisions about the facilitator or student's role or the environment. There is one exception that chooses LSP as an activity, but on top of this, describe how they add a framework to guide design decisions (B). Dann (B) incorporates the LSP technique and designs the intervention around, as they call it, three *'permissions'*: play; ownership; and use. Design decisions and insights from the final intervention are linked clearly to these three 'permissions'. In Dickinson-Delaporte (C), a transmedia play framework is used to guide design decisions and contains five characteristics – *resourcefulness, sociality, mobility, accessibility and replay ability* – which have the potential to enhance learning. Payton (H) adopts multiple activities and lists four pillars that could be viewed as a framework for designing activities: *play; trust; risk-taking;* and *mindfulness*. In the realisation, they implement activities that they perceive as playful, but do not ground them in the presented play knowledge.

Intended and realised play properties

Play properties or context conditions for playful learning mentioned often within this category include ownership, creating a safe environment, collaboration and taking risks. Below, we go through the two identified subcategories that relate to how the authors address and consider play properties in the design of playful learning solutions.

Eight papers provide a limited link between intention and realisation (A, F, G, H, I, J, K and L)

In the first subcategory, the authors often define play and addressed play properties, but while describing the activity or design decisions, there exists a limited link to this theory. For example, in a study conducted by Lace-Costigan (G), the author aims to examine the use of Play-Doh in an undergraduate anatomy module as a method of enhancing engagement. She refers to Henricks (1999), who postulated that the process of play is more important than the result. Lace-Costigan (G) addresses properties such as *process-oriented, open-endedness and explorative learning*. However, the realisation is structured, with students following a clear path in which they execute what they are being told to do. Three examples incorporate the LSP technique in a university setting (I, L and F). Two studies (I and L) mention a non-judgemental, safe and playful environment that both studies allege helps students take ownership of and responsibility for their own learning. However, they do not state how this is considered in design decisions about the activity. The authors do not address how the facilitator creates an atmosphere of safety, nor is it clear how this playful environment is created and what role the students play in achieving this.

Four studies provide a clear link between intention and realisation (B, C, D and E)

In four examples, the authors adopt a playful activity in which properties clearly are addressed, and design decisions are clearly linked to that same theory (B, C, D and E). Three articles adopt the LSP technique (B, D and E), and all three address the importance of facilitating a safe environment and elaborate on it. Dann (B) highlights the importance of creating a safe environment conducive to sharing, exploration and social risk-taking. Dann (B) also mentions that facilitators take time to ensure that participants feel comfortable, take ownership and trust their hands. In James (D), the focus is on the importance of providing freedom so that participants can experiment and test ideas without fear of failure. The activities are guided by a respectfulness of ownership and opinion. James (D) points out the facilitator's role in reminding participants of the importance of listening to each other, rather than simply waiting for their turn to speak, and the value of understanding different perspectives.

Strategy 2: Adding a playful twist to existing learning formats

Nine articles add a playful twist to their existing learning formats (M, N, O, P, Q, R, S, T and U). Papers that adopt this strategy often refer to the outcome and value of play to facilitate the acquisition of new skills, and its value as a tool with which to foster enjoyment, interest and motivation while reducing anxiety (Q and S). Cassim (P) refers to play as a tool for empowering students in different ways and breaking the ice. Authors in this category add a certain playfulness to their own learning domains. Bulunuz (O) defines *playfulness* as making learning easier, providing fun and interesting phenomena, generating a supportive social environment and creating a positive classroom atmosphere. Morris (Q) notes that when playing, one becomes more open to the world as the player becomes 'lost in the moment'.

Strategy 2	Limited link	Clear link
M: Arnab, S., S. Clarke and L. Morini. 2019		x
N: Ayling, P. 2012	x	
O: Bulunuz, M. 2015		x
P: Cassim, F. 2020.	x	
Q: Morris, N. J. 2020		x
R: Pavlou, M. 2020a and Pavlou, M. 2020b	x	
S: Phillips, R. 2015		x
T: Wolfe, H. E. 2020		x
U: Zhao, L., W. He and Y. S. Su. 2021	x	

Table 2: An overview of the included articles belonging to Strategy 2, with varying specificity as to how the author's intentions are linked to design decisions for realisation of playful learning solutions.

Framework use

In seven out of nine studies, a definition of *play* is provided, in which the authors explicitly refer to play theory (Brown, 2012; Henricks, 1999; Piaget, 1997; Sutton-Smith, 1995; Vygotsky 1978) (M, N, O, P, R, T and U). Four papers describe their practices as playful learning (O, P, R and U). These studies' theoretical framework often is based on domain-specific theory, constructivism, experiential learning and learning by doing (Dewey, 1997). Four articles in this category use a clear framework or model to guide their design decisions (N, U, O and M). Bulunuz (O) applies the three-stage play-debrief-replay model and playful learning pedagogy as an instructional method. The first stage involves providing the necessary environment in which the instructor lets the students freely explore materials to become familiar with them, after which students reflect on and discuss what they observed, tried and wondered about. Finally, the instructor encourages students to pose their own questions and design their own experiments.

Pavlou (R) uses James Paul Gee's (2003 (video-game-inspired)) learning principles as a guideline to align the activities with the course's objectives and intended outcomes. The emphasis is on actively involved learning, *interaction with peers, having embodied experiences, making choices* and *having the autonomy to customise various activities.* Wolfe (T) designed a four-week unit on play in which play is considered through the representation of each aspect of Gray's (2013) definition of *play*, in which activities are *self-chosen, self-directed, intrinsically motivated, guided by mental rules with room for creativity, imaginative, and/or conducted in an alert, active and relatively unstressed frame of mind.*

Intended and realised playful learning properties

Play properties for learning that often are mentioned in studies that adopt this strategy include taking risks, taking ownership of one's own learning, being lost in the moment and embracing failure. Below, we go through the two identified subcategories that relate to how authors address and consider play properties in the design of playful learning solutions.

Four papers provide a limited link between intention and realisation (N, P, R and U)

Four out of nine papers address play properties while introducing their topics. When presenting their realisation, it is unclear how these play properties are addressed and what exactly made the activities playful. In Pavlou (R), several play properties are described, with an emphasis on the importance of students becoming co-designers, which relates to students taking ownership of their own learning and enjoying autonomy. Furthermore, Pavlou highlights the properties of taking risks; allowing creativity to emerge; and being open to new experiences. Pavlou (R) does not make this connection when describing design decisions, nor were the properties obvious in the activities. However, the activities are structured and pre-defined, with students asked to approach assignments in playful ways, in which playfulness is pre-defined.

Five papers provide a clear link between intention and realisation (M, O, Q, S and T)

Within this strategy, five out of nine papers address clear play properties that are visible in the design decisions on learning designs (M, O, Q, S and T). One example in which three intended properties – *adding elements of surprise, variation* and *repetition* – are visible in design decisions by Bulunuz (O). Morris (Q) highlights how a multi-sensory, playful and experimental approach can contribute while teaching sensory geographies in practice. To anticipate on student's anxiety about an unfamiliar assessment, Morris provides the teams with a private blog to encourage risk taking. Furthermore, Morris mentions that early and detailed formative feedback is incorporated to create an environment in which students feel free to experiment and make mistakes. The teacher's role is transformed from 'transmitter of knowledge' to 'facilitator of learning'. In this way, students are encouraged to feel a sense of ownership and take control over their work. Wolfe (T) highlights how students need a safe environment and multiple entrances for play by reminding students multiple times that there is no right answer. Arnab (M) creates a safe space by building playful activities into the early weeks of the module and encouraging students to open up and feel 'vulnerable' in front of their cohorts, but in a safe and structured way through play.

Strategy 3	Limited link	Clear link
V: Thorsted, A. C. 2014		x
W: Thorsted, A. C., R. G. Bing and M. Kristensen. 2015		x
X: Whitton, N. 2018		x

Table 3: An overview of the included articles belonging to Strategy 3 with varying specificity on how the author's intentions are linked to design decisions for the realisation of playful learning solutions.

Strategy 3: Designing solutions based on a playful learning framework or play properties

Three articles designed a solution based on a playful learning framework on playful learning properties (V, W and X). In this category, studies design their interventions around play properties – the real foundations of their solutions. Thorsted (V) examines the use of play in a problem-based project learning format. The focus is the realisation that play may take us in unexpected directions and that a play process never can be predicted or controlled. Thorsted, Bing and Kristensen (W) found that the relationship between students is also an emphasised factor during a problem-based learning process in which play functions as a 'mediator'. Whitton (X) establishes an initial definition of *playful learning* through the metaphor of the magic circle. Whitton (X) highlights the positive construction of failure, which helps learners immerse themselves in the spirit of play and the development of intrinsic motivation to engage with learning activities. In all three studies, a clear link exists between design intention, design decisions and design realisation.

Framework use

Thorsted (V) developed the Connection, Impression, Emergence FIE model (Danish Forbindelse, Indtryk, Emergens), which is a concept to help facilitators and participants navigate unpredictable processes. This model comprises six steps. For the first four steps – *framing, connection, impression and emergence* – it is important that participants do not enter with a solution mode, but rather try to establish room for openness, collaboration and meaningful contact with the given challenge. This is called the 'unfolding mode', and Steps 5 and 6 are the 'solution mode', in which new ideas are developed (ideation) and their attention is directed towards finding a solution (harvest). FIE framed the task given to the students.

Thorsted et al. (W) refer to the, by Thorsted developed, knowledge model for Play and problem-Based Learning (PpBL) to outline the difference between problem-based learning (PBL) and PpBL. The first two elements of this model refer to explicit and tacit knowledge (PBL), which are both guided by a wish to find a solution. Practice and theory are expected to merge to accomplish a certain play-experience-learning outcome in which play is viewed as a tool (W). The last element (PpBL) presents an openness for the unknown and future possibilities to go from play as a function towards play-experience building.

Whitton (X) uses the metaphor of the magic circle (Huizinga, 1955) to create a framework for playful learning in adulthood. The magic circle has three key characteristics: the positive construction of failure; helping learners immerse themselves in the spirit of play; and the development of intrinsic motivation to engage with learning activities. The framework distinguishes between playful tools, which can be used to encourage or develop playfulness; playful techniques, which can elicit playfulness in learners; and playful tactics, which are strategies that add playfulness in different contexts.

Intended and realised playful learning properties

In all three articles, play properties are intertwined in the aforementioned frameworks and models. Creating safe spaces, encouraging exploration and imagination, and trying to establish room for openness to let go of expectations, embrace failure, and take risks are the most significant play properties mentioned within this category. Step 2 of FIE (V) refers to the creation of 'a community of play', which is understood as 'a personal and trust-based relationship that unfolds us as human beings at an individual, as well as a collective, level and hereby enhances a more meaningful and personal human encounter' (V). This step's purpose is to reach a stage at which students feel safe, comfortable, and trusting so that they can let go, start playing and become open-minded and creative. This is followed by a FIE phase (Steps 3 and 4), in which participants enter a play world that allows them to experiment and try out new ideas before arriving at an ultimate solution. Likewise, Thorsted et al. (W) brings in play from the first meeting with the supervisor and established 'a community of play' to boost students' confidence and give them the courage to let go of their desire to be in control. Thorsted (V) mentions that this community of play encourages them to try out new methods, accept risks and remain open to the unknown. Whitton (X) enhances the positive construction and acceptance of failure by incorporating an activity in which failure is an inevitable part of the process. The facilitator creates the safe space by constantly reminding the participants that there are no correct answers and encouraging space for risk-taking, creativity and innovation. Thorsted et al. (W) also reflects on the aforementioned importance of the relationship between the teacher and student. Students were introduced to each other through a playful approach with story cubes. This promotes a feeling of trust, leading to more open and honest dialogues that results in acceptance of the risk related to play, fostering the courage to experiment. Whitton (X) highlights that it is crucial to recognise that using games or playful activities will not, in and of themselves, create safe and playful learning spaces, i.e., participants need the opportunity to build trust and develop relationships properly over time.

Discussion

We presented what (theoretical) frameworks the authors refer to when writing about their work on playful learning. Furthermore, we identified play properties and analysed how authors provide direction for making design decisions about learning contexts, taking these play properties into account. Similar to an analysis of theory use in designing fantasy play solutions to provide concrete insights and reflective questions about theory use for play designers (Skovbjerg et al, 2021), this paper helps playful learning designers become more reflective about their approach on how to embed playfulness in their designs. This will further help authors and playful learning designers build on each other's work more effectively.

While the scoping review does not contribute to a more coherent definition, or a framework of playful approaches to learning in higher education (Whitton, 2018), it does provide an overview of frameworks and play properties that the authors in our review have applied. This can be a first step towards describing important elements to be considered in a definition or description.

In the following section, this review's findings are summarised, highlighted and discussed for each strategy.

Adopting a playful activity to implement playful learning in a higher education context

Articles in the first category focus on implementing a playful activity aimed at motivating students or building on reflective and social skills, in which the playful activity often serves as a tool with which to reach a specific outcome. This playful activity often is based on learning-by-doing principles, experiential learning and constructivism. These address play properties to contextualise the value of play while explaining their intention, but when describing design decisions, there are often limited links to that same theory. The LSP technique often is used as a framework, which authors follow in a structured way without specifying play

properties or elaborating on design decisions about the facilitator or student's role, nor the environment. There is one exception that chooses LSP as an activity, but on top of that, it describes how they add a framework to guide design decisions (B). Design decisions in the realisation of, e.g., taking ownership and feeling comfortable clearly are linked to properties within this framework. Two other studies describe a framework that used play concepts (C and H). Dickinson-Delaporte (C) describe five characteristics that have the potential to enhance learning. The activity clearly is designed around these characteristics, but these properties are centered around techniques to modify the activities. Authors do not address play properties that refer directly to students, such as having agency, accepting failure or creating a safe environment in which students can feel comfortable learning and playing.

Adding a playful twist to existing learning formats

Articles that adopt strategy 2 often refer to the outcome and value of play. Their own learning domain is the foundation, and a certain playfulness is added to reach domain-based goals. In this strategy, a shift occurs – from being guided by the playful activity towards letting a certain playfulness guide their decisions. However, four out of nine articles still provided a limited link between intended play properties and their realisation. Play properties often mentioned in studies that adopt this strategy include taking risks; taking ownership of one's own learning; getting lost in the moment; and embracing failure. Design decisions made to address these properties are visible in five out of twelve studies, mainly by elaborating on the importance of the teacher's role as a facilitator and creator of a safe environment. In one case (O), the author refers to the properties *elements of surprise, variation* and *repetition.* Similar to the study conducted by Dickinson (C), the authors clearly consider these properties in design decisions. However, these properties are centered around techniques to modify the activities, rather than addressing play properties that refer directly to students.

In strategies 1 and 2, the focus often appears to be on modifying or implementing a playful activity instead of addressing the aforementioned play properties that refer directly to students and create an atmosphere in which one feels comfortable enough to be playful. It then becomes clear that what Whitton (2018) points to as mentioned in the introduction that there is a lack of coherent definitions of play in those frameworks.

Designing solutions based on a playful learning framework or play properties

To sum up this category, studies design their interventions around play properties, which are the real foundation of their solutions. All three articles use a pre-defined model or framework in which play properties, such as being open to the unknown, embracing failure and creating safe spaces for play, are of significant importance. They present different ways to incorporate this by linking play properties to design decisions of their playful learning solutions. This is based mainly on the importance of creating safe spaces somewhere in the process in which students feel safe, comfortable and trusting, allowing them to let go, start playing and become open-minded and creative.

The articles provide frameworks, metaphors or models with which to guide design decisions clearly and establish a space in which one feels free and comfortable to play. For example, the FIE model (in V) establishes different modes in which students are expected to have different attitudes, depending on their phase. The model already guides students towards establishing spaces for openness with which to build a trust-based relationship so they can let go by following various steps. Therefore, playful activity, like colouring or building something from clay, is not what guides design decisions, but rather play properties. According to Whitton (X), playful activities will not in themselves create safe and playful learning spaces. Trust must be built, and relationships must be developed over time to be able to facilitate play in these learning contexts. Whitton addresses these properties and uses the metaphor of the magic circle to design Eduscapes. Properties such as being open to the unknown, embracing failure and creating safe spaces in which to play clearly are visible in their realisation; however, their presented playful learning framework – comprising playful tools, techniques and tactics – does not provide other authors or teachers with ways to implement the concept of the magic circle, nor does it automatically address the aforementioned play properties. It would be valuable to address directions to link the concepts of the magic circle and the aforementioned play properties to this framework's tools, techniques and tactics to inform design decisions more thoughtfully and to make sure that all the play properties are applied and explored as having potentials for learning practices (Jørgensen & Skovbjerg, 2023).

Based on the literature review, we suggest addressing the following questions in a future framework for playful learning to ensure that playful learning designs are centered around play properties instead of (only around) playful activities:

- What play properties do you intend to address?
- Which design decisions must be made to address these properties?

- Do you address these play properties while making design decisions about teachers, facilitators or students' roles?
- Do you address these play properties while making design decisions about the environment, tools, techniques or tactics?
- Is there an appropriate link between your intention and the realisation of the playful learning design solution?

Conclusion

We indicated which (theoretical) frameworks authors refer to when writing about their work on playful learning. Furthermore, we identified play properties and analysed how authors provide direction for making design decisions about learning contexts, taking these play properties into account. Future work needs to focus on further developing a framework that can guide design decisions for playful learning in a higher education context. It also should help teachers consider appropriate play properties in decisions about learning contexts. The framework needs to inform design decisions that relate to play properties, such as creating safe spaces, having agency, taking risks, embracing failure, being open to the unknown and forging relationships between teachers and students. It also should provide direction on which tools or techniques should be employed, depending on the intended properties that will be addressed in the playful learning design solution. In other words, it needs to point towards directions to link intentions to the realisation of playful learning design solutions.

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Appendix 1

Strategy 1	
A	Excell, L., and A. J. Van As. 2018. 'Strengthening Early Childhood Teacher Education Towards a Play-Based Pedagogical Approach Through a Music Intervention Programme'. *South African Journal of Childhood Education* 8(1): 1–10.
B	Dann, S. 2018. 'Facilitating Co-Creation Experience in the Classroom With Lego Serious Play'. *Australasian Marketing Journal* 26(2): 121–131.
C	Dickinson-Delaporte, S., A. Gunness and H. McNair. 2020. 'Engaging Higher Education Learners with Transmedia Play'. *Journal of Marketing Education* 42(2): 123–133.
D	James, A. R. 2013. 'Lego Serious Play: A Three-Dimensional Approach to Learning Development'. *Journal of Learning Development in Higher Education* (6).
E	James, A., and S. Brookfield. 2013. 'The Serious Use of Play and Metaphor: Legos and Labyrinths'. *International Journal of Adult Vocational Education and Technology (IJAVET)* 4(3): 1–12.
F	Kettula, K., and S. Berghäll. 2013. 'Drama-Based Role-Play: A Tool to Supplement Work-Based Learning in Higher Education'. *Journal of Workplace Learning*.
G	Lace-Costigan, G. 2017. 'Perceptions of Play: Using Play-Doh to Enhance the Student Experience in Bioscience Higher Education'. *International Journal of Game-Based Learning (IJGBL)* 7(3): 26–37.
H	Payton, J. 2020. 'Using Mindful Play to Unlock Creativity: A Creative Companion'. *PRISM: Casting New Light on Learning, Theory and Practice* 3(1): 8–33.
I	Peabody, M. A., and S. Noyes. 2017. 'Reflective Boot Camp: Adapting LEGO® SERIOUS PLAY® in Higher Education'. *Reflective Practice* 18(2): 232–243.
J	Souto-Manning, M. 2011. 'Playing With Power and Privilege: Theatre Games in Teacher Education'. *Teaching and Teacher Education* 27(6): 997–1007.
K	Tseng, W. C. 2017. 'An Intervention Using LEGO® SERIOUS PLAY® on Fostering Narrative Identity Among Economically Disadvantaged College Students in Taiwan'. *Journal of College Student Development* 58(2): 264–282.
L	Zenk, L., N. Hynek, G. Schreder, A. Zenk, A. Pausits and G. Steiner. 2018. 'Designing Innovation Courses in Higher Education Using LEGO® SERIOUS PLAY®'. *International Journal of Management*

	and Applied Research, 5(4): 245–263.

Strategy 2	
M	Arnab, S., S. Clarke and L. Morini. 2019. 'Co-Creativity Through Play and Game Design Thinking'. *Electronic Journal of e-Learning* 17(3): 184–198.
N	Ayling, P. 2012. 'Learning Through Playing in Higher Education: Promoting Play as a Skill for Social Work Students'. *Social Work Education* 31(6): 764–777.
O	Bulunuz, M. 2015. 'The Role of Playful Science in Developing Positive Attitudes Towards Teaching Science in a Science Teacher Preparation Programme'. *Eurasian Journal of Educational Research* (58): 67–88.
P	Cassim, F. 2020. 'Decolonising Design Education Through Playful Learning in a Tertiary Communication Design Programme in South Africa'. *International Journal of Art & Design Education* 39(3): 523–535.
Q	Morris, N. J. 2020. 'Teaching Sensory Geographies in Practice: Transforming Students' Awareness and Understanding Through Playful Experimentation'. *Journal of Geography in Higher Education* 44(4): 550–568.
R	Pavlou, M. 2020a. 'Game-Informed Assessment for Playful Learning and Student Experience'. *Journal of Classics Teaching* 21(41): 42–51. Pavlou, M. 2020b. 'Game-Informed Assessment for Playful Learning and Student Experience (Part II)'. *Journal of Classics Teaching* 21(42): 19–30.
S	Phillips, R. 2015. 'Playful and Multi-Sensory Fieldwork: Seeing, Hearing and Touching New York'. *Journal of Geography in Higher Education* 39(4): 617–629.
T	Wolfe, H. E. 2020. 'A Case Study of Preservice Music Teachers' Experiences With Play in a General Music Methods Course'. *Journal of Music Teacher Education* 30(1): 24–38.
U	Zhao, L., W. He and Y. S. Su. 2021. 'Innovative Pedagogy and Design-Based Research on Flipped

	Learning in Higher Education'. *Frontiers in Psychology* 12, 230.
Strategy 3	
V	Thorsted, A. C. 2014. 'How Play Enhances Creativity in Problem-Based Learning'. *Akademisk kvarter* (*Academic Quarter*), 31–44.
W	Thorsted, A. C., R. G. Bing and M. Kristensen. 2015. 'Play as Mediator for Knowledge-Creation in Problem-Based Learning'. *Journal of Problem-Based Learning in Higher Education* 3(1).
X	Whitton, N. 2018. 'Playful Learning: Tools, Techniques and Tactics'. *Research in Learning Technology*, 26.

Table 4: List of included papers

	Full read
Search 1 applied to ERIC, ACM, JSTOR, Microsoft Academic Search (search in abstract) 'playful' or 'play' or 'play-based' or 'playfulness' or 'playing' or 'playful learning' AND (search in abstract) 'methods' or 'tools' or 'framework' or 'principle' or 'programme' AND 'higher education' or 'university students' or 'pedagogy' or 'learning' or 'learning approach' or 'teacher' or 'student' or 'university' or 'academia'	23
Search 2 applied to ERIC, ACM, JSTOR, Microsoft Academic Search (search in abstract) 'solution' or 'qualities' or 'value' or 'design' or 'educational design' or 'learning design' or 'course' or 'curriculum' or 'approach' or 'activity' AND (search in abstract) 'playful' or 'play' or 'play-based' or 'playfulness' or 'playing' or 'playful learning' AND 'higher education' or 'teacher education' or 'university students' or 'teacher training' or 'pedagogy' or 'learning' or 'learning approach' or 'teacher' or 'student' or 'pre-service' or	20

'university' or 'academia'	
Search 3 applied to ERIC, ACM, JSTOR, Microsoft Academic Search (Search in title) 'playful learning' or 'play-based' or 'playfulness' AND (search in abstract) 'higher education' or 'teacher education' or 'university students' or 'teacher training' or 'pedagogy' or 'learning' or 'learning approach' or 'teacher' or 'student' or 'pre-service' or 'university' or 'academia' AND 'activities' or 'design' or 'intervention' or 'learning design' or 'approach' or 'method'	12
Search 4 applied to ERIC, JSTOR, ACM, Microsoft Academic Search (Search in abstract) 'creative' or 'creativity' or 'experience' or 'hands on learning' or 'art' or 'experimental' AND (search in abstract) 'playful' or 'play' or 'play-based' or 'playfulness' or 'playing' AND (search in abstract) 'higher education' or 'teacher education' or 'university students' or 'teacher training' or 'pedagogy' or 'learning' or 'learning approach' or 'teacher' or 'student' or 'pre-service'	21
Snowballing (references, specific journals)	8

Total full read:	84

Table 5: Search Strings