



Game-based Learning and Storytelling for Teaching and Learning

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Background

This guidebook is part of a University of Hong Kong (HKU) initiative exploring gamed-based learning and storytelling as pedagogical innovations. The project responds to our institutional strategy of HKU's Teaching and Learning strategy of *Delivering to Our Students: Undergraduate Teaching and Learning Strategy 2021-28* and wider institutional initiatives to include students-as-partners as more creative and agentic approaches for teaching and learning.

The guidebook aims to present insights and findings based on seminars, workshops, semester-long experimental projects, and a conference we hosted focused on game design, learning through play, digital storytelling, advocacy projects, simulations, and speculative fiction.

Special Thanks

We are grateful to all those who participated in our workshops and events.

Thank you to teachers, administrative staff, and research assistants at [The University of Hong Kong](#) who were involved in or supported this project (listed in alphabetical order of surname):

Emily Chi Ting Chan, Senior Executive Assistant
Ashley Yau Yu Chan, Research Assistant
Cesar Cazan, Assistant Lecturer
Wincy Chan, Lecturer and Co-Investigator
Patrick Desloge, Senior Lecturer
Donn Gonda, Lecturer
Dr Tris Kee, Senior Lecturer
Dr Tyrone Kwok, eLearning Technologist
Prof Gray Kochhar-Lindgren, Honorary Professor
Dr Michelle Raquel, Senior Lecturer
Dr Michael Rivera, Lecturer
Nissom Zhengliang Sun, Research Assistant
Prof Julian Tanner, Director of the Common Core
Penny Tse, Executive Assistant
Chi Zhang, Research Assistant

We would also like to thank our external consultants [Press Start Academy](#) for their enormous assistance with co-facilitating the workshops, project, and the direct input and support in drafting this guidebook.

Vince Sui, CEO and Founder
Rachel Lu, Learning Strategy Lead
Xinny Liu, Intern
Cheryl Lee, Intern

Finally, we are grateful to the HKU Teaching and Development Grant (TDG), the Office of the Vice-President and Pro-Vice-Chancellor (Teaching and Learning), and the Curriculum Development and Quality Assurance Section (CDQA) of the Registry for their financial support of this project.

Section I:
**Introduction to Game-based
Learning, Gamification, and
Storytelling**

Games and stories in Higher Education

Telling stories and playing games are fundamental human activities, serving not only as mediums of entertainment but also as vital tools for connection and community building. These activities have deep historical roots, predating the advent of written text and fundamental civilisational technologies. Despite this, higher education remains anchored to lecture-based teaching methods and prioritises assessments over interactive learning, with a heavy emphasis on academic performance as the primary indicator of success and a gateway to career advancement. In many societies, including Chinese culture, the value of 'play' is often underestimated, perceived as a potential distraction from productivity and serious learning, as reflected in the proverb, "Diligence leads to mastery; indulgence in play leads to ruin (业精于勤, 荒于嬉)." Although this guidebook will not delve deeply into the cultural perceptions of play per se, it is a starting point for exploring games and stories in enhancing teaching and learning in higher education.

Games and stories are inherently engaging, providing contexts that foster not only interaction and dialogue but also critical thinking, creativity, and problem-solving skills. When these two mediums converge in the higher educational setting, they create a dynamic and compelling narrative, transforming the learning experience into an interactive journey. The integration of games and storytelling in education provide: i) a structured yet flexible environment where learners can experiment, fail, and succeed in safe and controlled settings; and ii) a medium for emotional and cognitive engagement for students to connect with the material on a deeper level, making complex concepts more accessible and memorable.

We hope to show you how these approaches can not only make learning more intuitive and enjoyable for student but also equips them with the skills necessary for success in a rapidly changing digital world. It invites teachers to rethink the role of play and stories in education, suggesting a future where learning is a rich, immersive, and interactive experience that prepares students not just for exams, but for a good life.

Gamification versus game-based learning

Gamification and game-based learning, while often used interchangeably, represent distinct approaches to the integration of gaming elements in education, particularly in higher education settings.

Gamification refers to the technique of applying game-like elements to non-game contexts, such as education. Common approaches in gamification includes leveraging elements like point scoring, competition, and leaderboards to incentivise behaviours to enhance student engagement and motivation. Gamification transforms a typical learning experience by integrating competition, cooperation, exploration, and storytelling, making it a dynamic and socially engaging process. Theoretical frameworks such as Keller's (1987) ARCS Model (Attention, Relevance, Confidence, Satisfaction) and Malone's (1981) Theory of Intrinsically Motivating Instruction are particularly relevant here.

Game-based Learning (GBL), on the other hand, involves the use of actual games designed for the specific purpose of learning. These games are not just about adding game elements to the learning environment but are structured around the game itself. The content is embedded within the gameplay, meaning that students learn by playing a game specifically designed to teach particular concepts or skills. This approach is deeply rooted in experiential learning, where students learn through experience and reflection on doing, which can be more effective for certain subjects or competencies. Theories such as Self-determination Theory, which emphasises the roles of autonomy, competence, and relatedness in motivation, and Flow Theory, which focuses on creating an engaging balance between challenge and skill, are crucial in designing effective game-based learning experiences.

In this guidebook, we will concentrate on Game-Based Learning (GBL) and storytelling and its applications to teaching and learning within higher education.

Support for teachers

If teachers are interested in developing games-based and narrative-driven learning activities and assessments tailored to your courses, please reach out to the HKU Communication-intensive Courses team at cics@hku.hk.

Section I: The Power of Stories

Storytelling in teaching and learning

Storytelling as a pedagogical approach in higher education leverages narrative mechanisms to significantly boost cognitive, emotional, and social engagement within learning environments.

Storytelling can enhance the comprehension of complex concepts through what Bruner (1990) calls “narrative cognition”. Embedding content within the framework of relatable stories facilitates better organisation and structuring of knowledge. This method not only makes learning materials more accessible but also boosts retention, providing a narrative scaffold that mimics how humans naturally construct and recall knowledge. Moreover, the storytelling methodology aligns closely with Dewey’s (1938) principles around experiential learning through engaging the learner’s emotions for learning to be effective. Appealing students’ affect and empathy, storytelling sustains motivation and deepens the retention of information, as emotional connections with content are more likely to be remembered and understood.

Storytelling provides environments where learners actively construct their understanding through interactions with content. In such settings, stories help students form personal connections with the material, fostering deeper and more meaningful learning experiences. The methodology can serve as an essential tool for cultural transmission and reflexivity, a core component of culturally responsive teaching. By weaving narratives that reflect diverse cultural backgrounds and perspectives, teachers can create inclusive classrooms that acknowledge and respect the varied epistemologies and experiences of all students. This approach, highlighted by scholars like Gloria Ladson-Billings (1995) and Paulo Freire (1970), promotes an educational environment where cultural differences are not only recognised but are also integral to the learning process.

Storytelling encourages students to engage in perspective-taking and dialogic learning, fostering critical thinking and higher-order reasoning skills. Through stories, learners explore multiple viewpoints and complex social dynamics, enhancing their ability to navigate and understand real-world situations. This multifaceted approach is not only interdisciplinary but transdisciplinary by equipping students with the tools to tackle complex real-world challenges.

Methods and applications

The following are a few examples of narrative-driven approaches that we found teachers used to improve student engagement and learning.

News for real-world context

One common and effective method is to link course content with news media (current or historical). Implementation examples include:

1. *Weekly News Analysis*: Each week, students take turns presenting relevant media articles in tutorials or lectures. Alternatively, teachers assign an article for reading and analysis.
2. *Debate Session*: A media story is presented and students are asked to engage in a debate through deploying concepts or perspectives from the course. Students may be asked to identify problems, suggest solutions, and discuss the implications of these events.
3. *Roleplaying*: Students can take on the roles of multiple stakeholders affected by an issue covered in the news. This activity helps students explore different perspectives and develop empathy.

Other people's stories

Inviting guest speakers to share their related stories offers students a live storytelling experience. This approach is effective in “breaking up” the lectures with real-world examples from diverse voices beyond just the teachers. Some preparation tips to optimise learning:

- a. Send your guest the syllabus, a summary of what students have learned so far, and any questions from the students (Ask your students to prepare questions to send to the speaker).
- b. Introduce the speaker with a brief overview of their background and the relevance of their talk to the course. Moderate the session to include time for presentation and ample Q&A.
- c. Afterwards, ask student to complete a related activity – for example, write a short paragraph reflection and post this on a Padlet page (real-time collaborative whiteboard).

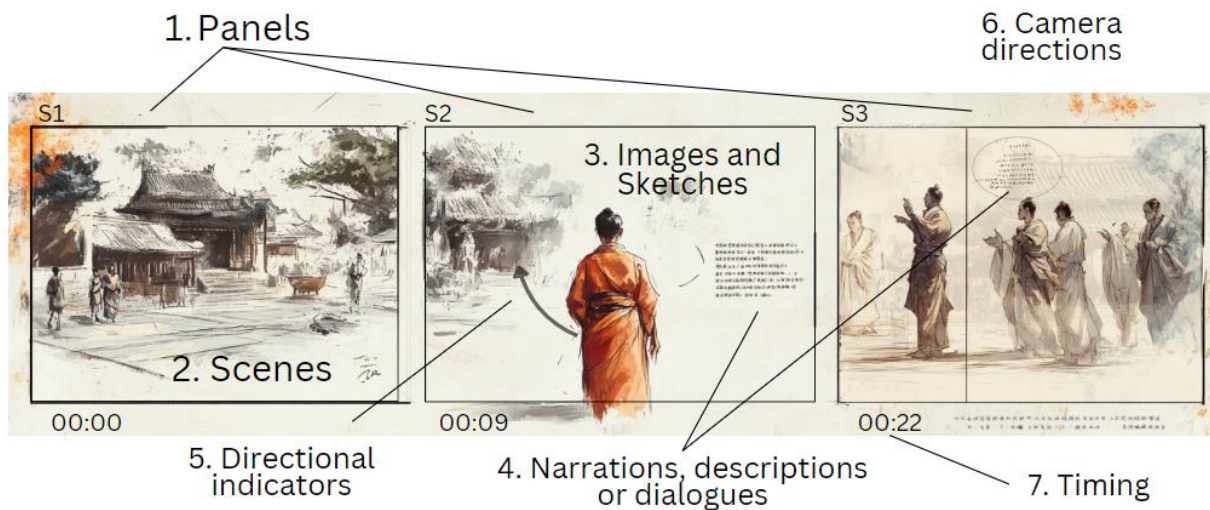
Storyboarding

Storyboarding is a visual and organisational methodology that helps students map out narratives in a sequential and coherent manner. Storyboarding technique are implemented frequently in film-related courses. This method involves creating a series of drawings or illustrations that outline a story's progression (like a comic strip), which helps visualise complex ideas and connect them to the course content.

Getting started

Introducing storyboarding to students	Teachers should begin by demonstrating how to create a storyboard, breaking down its elements into distinct scenes. Provide references and inspirations. Get students to research the style and genre. Give permission for them to experiment and make mistakes.
Applications	Students can use storyboarding to tell a story or retell a historical event, outline the mechanisms or impacts of technologies, physical or biological pathways, summarise a scientific experiment, or illustrate problem-solving processes.
Resources required	While digital tools such as tablet apps or online apps can be used for storyboard creation, paper and pencil is sufficient. Alternatively, storyboards can also be photographic and digital (using platforms like Canva, Google Slides) – students can use photos or images to represent different scenes in their story.

Elements of a storyboard



1	Panels	These are the individual frames or boxes that make up the storyboard. Each panel represents a specific part of the story or scene. Panels are
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		typically arranged in a chronological sequence from left to right and top to bottom.
2	Scenes	Each panel depicts a particular scene or shot from the narrative. A scene shows a specific setting and action occurring within it, while a shot is more focused, showing a particular angle or detail within the scene.
3	Images and Sketches	These are the drawings within each panel that visualise the scene. They can range from rough sketches to detailed illustrations, depending on the purpose of the storyboard. The images show characters, settings, important objects, and actions that are critical to understanding the sequence of events.
4	Narration, descriptions, or dialogues	Beneath or within the panels, there might be dialogue or text that accompanies the images. This can include character dialogue, voice-over narration, or descriptive text that provides context or details about the scene that are not immediately apparent from the images alone.
5	Directional indicators	These are arrows or lines that indicate movement or the direction of action within a panel. They help clarify the flow of action and guide the viewer's eye through the sequence of events.
6	Camera directions	For film and animation, specific camera directions may be included to indicate camera movements such as panning, zooming, or tracking.
7	Timing	Each panel may include timing information, especially in animation and film. This indicates how long a particular scene or shot should take, which is crucial for pacing the narrative and synchronising with dialogue or music.
8	Notes and annotations	Additional notes and annotations can added provide details about what is happening in the scene, technical requirements, special effects, music, or background information that is essential for understanding the context.

Note: Depending on the intended use of the storyboards, some of the elements listed above may not be relevant.

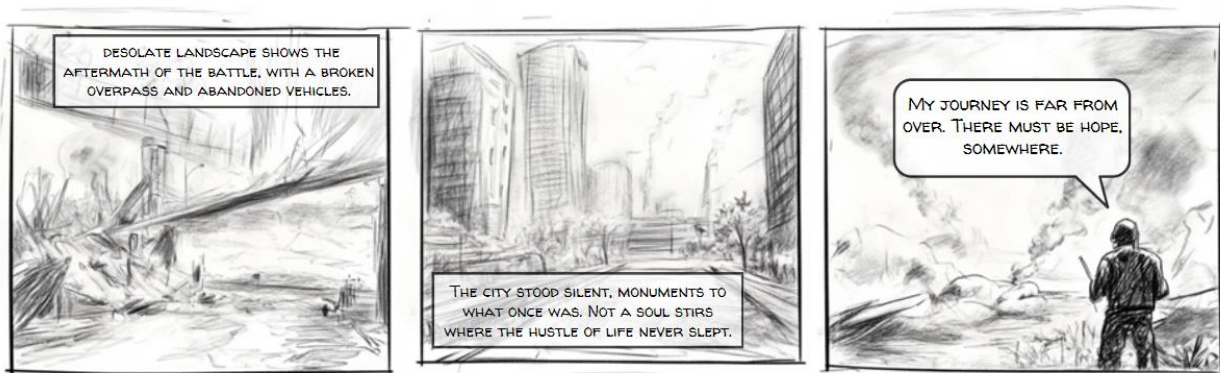
Example of a storyboard sketch about war



Comics or Illustrated Story

Students can create a classic comic strip with storyboard panels by illustrating their scenes and adding dialogue or descriptions underneath.

Example of comic strip with descriptions and dialogue



Generative AI: With appropriate prompting techniques and post-editing, generative AI image-generation apps can also produce illustrated comics. The multimodal functionality of generative AI apps is able to support students with writing the descriptions and dialogue.

Examples of AI-generated comics strips



Film or animation

Storyboarding can be adapted into film or animation by videoing or animation software that adds movement and sound. Student may consider using generative AI apps in workflow to create videos and animation including images (Midjourney, DALL-E, Stable Diffusion), video (Runway, Pika), sound and music (Sora, Udio).

Speculative fiction

Speculative fiction (SF) invites students to use genres like science fiction, fantasy, dystopian, and utopian narratives to imagine alternate “what-if” scenarios. This can offer an opportunity to explore complex and interrelated concepts, ethical dilemmas, and emerging trends in more open-ended ways. SF can lead to unexpected insights and promote transdisciplinary thinking. The approach is frequently used in professional futures thinking and foresight analysis.

Brainstorming

Students examine elements related to the course (concepts, methodologies, behaviours, technologies) and generate as many alternative ideas as possible. Teachers can guide students through questions like:

- What if social media could read our thoughts?
- What if humans could augment with animals?
- What if passports and visas were abolished worldwide?
- What if every artifact in a museum could tell its own story?
- What if there were a global language that only used musical notes?
- What if your fitness level was displayed publicly like a social media status?

Worldbuilding

Worldbuilding provides an avenue for exploring complex issues within a fictional but thought-provoking setting. Present a world operating under different rules than our own reality (societal structures, technology, ecological, culture, economics, politics etc.). The exercise could be a continuation of the previous brainstorming exercise.

Students discuss what it would be like living in such a world. They can also create characters that inhabit and interact with the world and discuss the challenges and opportunities this speculative environment presents.

For example:

- Instead of global warming, we had global cooling.
- Instead of money, the primary currency is an individual’s emotional wellbeing and contribution to the happiness of others.
- Earth’s gravity changes periodically.
- Imagine a society where humans age backwards

Writing speculative narratives

Students write their own short stories or pieces of speculative fiction. These could be individual projects or part of a collaborative effort, where the class builds a shared universe.

Case Study: Horizon Scanning on Sustainability

In a collaborative project with the consulting firm BSR, students created speculative scenarios about the future in 2030 to explore how emerging signals could possibly influence various domains, including social, cultural, economic, environmental, and political spheres. This exercise helped students critically think through the nuances and details but gauge the potential sentiments towards anticipated changes.

Integrated Multimedia

Instead of written stories or oral discussions, students can present their worlds through digital and visual ways via through storyboarding, digital presentations, images, GIFs, animation, video, and sound. Generative AI applications can create visual representations loosely around the students' descriptions but also stimulate creative possibilities.

Examples of images of sustainable future worlds using generative AI app Midjourney



Podcasting

Podcasting has gained popularity for teachers as a learning and assessment task that practices students’ oral literacies. The method allows students to share narratives, explore topics deeply, and connect with audiences on a personal level. New technologies and platforms have also made podcasting cost-effective and shareable to global audiences.

Diverse styles	<p>The podcast style can be serialised narratives, single-episode stories, thematic series, interviews, and roundtable discussions. This flexibility allows students to choose the best way to present their story, whether they are unfolding a complex fictional tale or discussing real-life events.</p> <p><i>Going further:</i> Video podcasting, often referred to as “vodcasting” or “vidcasting,” add a visual component to the audio experience. However, this method is more complicated and may require a more specialised setup.</p>
Soundscapes	<p>Podcasts often utilises music, sound effects, and varied vocal tones to create rich, immersive soundscapes that enhance the narrative. These elements can set the mood, emphasise dramatic points, or help to clarify transitions between segments or ideas.</p>
Research, Scripts, and Questions	<p>Students should be encouraged to conduct in-depth research on the topic before writing their verbal scripts and developing questions for interviews or roundtable discussions. They should also consider what aspects of the topic would be most engaging for their audience.</p>
Technologies	<p>While students may want to use professional microphones, headphones, production consoles, and a studio, advances in post-production technology enables high-quality podcast production.</p> <p>Audacity: A free and open-source digital audio editor and allows users to record audio directly through a microphone. It supports multi-track recording and editing to enhance sound quality and clarity such as trimming, splitting tracks, noise reduction, level adjustment. (https://www.audacityteam.org/)</p> <p>Adobe Podcast: This free software cleans up podcast audio using AI technology to make voice recordings sound as if they were recorded in a professional podcasting studio. (https://podcast.adobe.com/enhance)</p>
Sharing and distribution	<p>There are multiple platforms to post and distribute podcasts including Anchor, Spotify, Buzzsprout, Podbeam, Apple Podcasts, and Google Podcasts.</p>

Case Study: *Hanging in the Imbalance*

Students used podcasting to research and explore gender-related issues, selecting topics around gender reassignment and dysphoria, intergenerational issues around women and work, depictions of women in movies and gaming, and women in STEM. Students created their own branding and visuals, invited professors and community experts for roundtable discussions, and developed marketing collaterals to promote their podcast series. In this way, the assignment promotes interdisciplinary learning, empowers student choice, develops their digital, visual, and oral literacies, and professional skills.



Section II: Games with stories

Game-based Learning

Games, as defined by Kapp (2012) are “systems in which players engage in an abstract challenge, defined by rules, interactivity, and feedback, that results in a quantifiable outcome often eliciting an emotional reaction”. Games in higher education can foster active learning by engaging students in interactive problem-solving and real-world scenarios, enhancing both motivation and retention of complex material.

Storytelling, when integrated with games, becomes a particularly potent pedagogical tool because of its emphasis on the process and performance (Jayemanne, 2018), through its relationship in constituting fictionality, rules, and psychological engagement (Goetz, 2018). The use of storytelling in higher education can decrease de-personalisation and lead to increased student engagement. Games that incorporate storytelling elements not only enriches students’ learning experience but also prepares students better for real-world challenges by simulating complex life scenarios and providing a safe space to navigate and solve problems.

Play and Games in Learning

Educational theories and evidence generally support the importance of the play in learning that guides and inspires curriculum design and development which covers a wide range of disciplines and age groups. From early childhood onwards, play has been helpful to the biological gene expression and crucial for children’s socio-emotional, cognitive, physical, and language development (Erikson, 1963; Lam, 2018; Montessori, 1967; Piaget, 1952; Sameroff, 2009; Vygotsky, 1978). Despite the obvious advocacy for “play”, scholars and researchers in the field have failed to come to a unanimous consensus on the definition of “play”, largely as a result of the various manifestation of play in reality that are present in different situations and contexts (Johnson 2016; Lam 2018; Lau, 2018; Moyles, 1989; Sheridan, 2011). In her second edition of *The Excellence of Play*, Moyles (2005) made a rather poetic statement that analogised the definition of “play” as “seizing bubbles”. A major approach to study “play” is to categorise it into different forms across different stages. To capture the level of social interactions, play can be phased into: solitary, parallel, and interactive (Johnson, 2016; Parten, 1932). And to denote the cognitive forms of play, play can be categorised into functional, constructive, dramatic, and games with rules (Johnson, 2016; Piaget, 1952;). “Play” in a reality setting can be nested within each other, such as being both solitary and functional, or interactive and dramatic. Researchers are also invested in establishing the criteria by identifying certain attributes play possesses, based on the notion that the more criteria are met by a behaviour, the more likely such a behaviour can be identified as “play”, common attributes of which include: positive affect, freely chosen, motivation and primary

autonomy control, self-determined meaning, non-literality, and the need for relaxed situations and minds. Play actions and play thoughts are also reciprocally related (Johnson, 2016).

Games on the other hand, due to the difference in design, scope, and application, there are elements in games that are less present in “play”. After studying a variety of game models proposed by philosophers, scholars, and historians, Salen & Zimmerman (2004) summarised 15 key traits of a game. For example, most games are goal-oriented, while “play” does not necessarily need to have any measurable outcome. Games are also designed around whether explicit or implicit rules (no matter how a game is loosely structured and designed), which is not necessarily inherent for “play”. Many different “play stages” precede and take more priority than “game with rules” (Piaget, 1952). “Free-play” is another popular and well-established construct, where rules are absent throughout the play (Wood, 2004). Despite those discrepancies, a game does share quite a number of important similarities with “play”, such as player autonomy and control, social interactions, and the dramatic or pretended imagination. With the increasing accessibility and adoption of digital technologies, proponents for digital games, particularly in the educational field, believe that the virtual worlds can create a powerful interactive learning environment where learners can execute their ideas into action. Because games are engaging, goal-driven, requiring deep thoughts and necessary decision-making, the focus of gaming is to achieve outcomes by solving problems, rather than simply learning facts and information (Chu, 2009; Gee, 2004; Salen & Zimmerman, 2004; Shaffer et al., 2005), which from our perspectives, is a notion of the focus of games in learning, not necessarily gamification.

Student-designed games

The creation and design of these games can be approached in two fundamentally different ways: teachers creating games for students to play, and students designing the games themselves.

Teacher-designed: When teachers design games, there generally more control of learning outcomes. The reason is that these games tend to be highly structured to guide students through specific learning paths, reinforcing key concepts and skills in a controlled environment.

Student-designed: Alternatively, allowing students to design their own games “flips” the learning by placing students in the role of creator. This method promotes deep engagement and a profound understanding of the subject matter, as students must apply what they’ve learned to develop a functional and enjoyable game. While this requires more time and guidance on behalf of the teachers and knowledge of game design, student feedback indicates that the tasks nurture creativity, problem-solving skills, and technical abilities, offering students a sense of ownership and pride in their learning process.

Type of games

Games for learning can come in analogue/non-digital, digital, or hybrid formats and span various game genres, sub-genres, or combinations.

Examples of game genres

Card and board	Action/ Adventure	Art
Tabletop roleplaying	Roleplaying	Social
Dice games	Simulations	Virtual / augmented reality
Puzzle and problem-solving	Visual novel	Interactive fiction
Sports and physical	Sandbox	Open-ended play

Open-ended play: Unlike structured play, which typically follows predetermined rules and objectives, open-ended play is characterised by activities that do not have a fixed outcome. For instance, you could give students assorted LEGO pieces and let them build objects they feel connects with the course content. You may ask students to verbalise their reasons to the class as an additional exercise.

Framework for Game-based learning with storytelling

We take references from the game-based learning scholar Gee (2008), which has also been adopted by MIT Education Arcade in their deep learning projects (Klopfer et al., 2018), and summarised supportive game-based learning design and process with several features:



Principles	Description
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Meaningful, not Generic Goals	The learning experiences are memorable when there are meaningful goals and the outcomes related to those goals for the players to focus on and achieve.
Player Autonomy	Players in games often have autonomy, which fosters active engagement and personal agency.
Narrative-driven	The narratives formed through players' actions and outcomes in the game can help them better understand and apply the lessons learned and interpret the experiences to be effective for future problem-solving.
Plenty of Experience and Interaction	Interactions with the game give feedback to support error recognition and assessment and to build deeper understanding through explanation. Interaction between peers and mentors in discussions and debriefing sessions give further opportunities for players to apply past experiences to new situations.

Meaningful Goals

Some game designers may be drawn to complex game mechanics early in development, and others may even aim to build games around specific rules they perceive as innovative and mindblowing right from the start. However, the purpose of good games, particularly good games with learning objectives, is not necessarily about the rules. Instead, rules exist to prompt players to achieve meaningful goals within the context, ensuring that the objectives in the game feel organic and personal rather than generic.

Goals in games are meaningful when they are organically integrated into the game's theme. They contribute to the immersion by providing a sense of purpose and direction that enhances the player's connection to the virtual world the game presents. When the players achieve the goals, the game should also offer tangible rewards or emotional satisfaction back to them, both within and beyond the game play session. This can include unlocking new content, progressing the storyline, or building connections within the player group.

Case Study: Barter Land (2022)

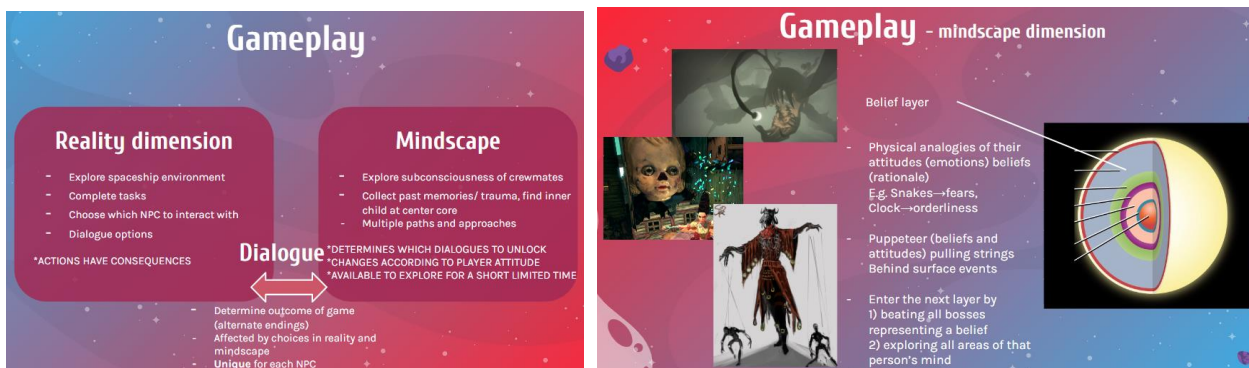
Barter Land is a single-player student-developed game based on *CCGL9063 How to Make Sense of Money*. In this game, the player is a citizen on the fictional island of *Barter Land*, where you will learn about the concepts, practice, and implications of bartering through a series of exchanges and interactions with the characters in the game. The objective is clear and meaningful: you need to manage your resources effectively to barter with various characters with different resources, ultimately meeting your needs and winning the game.



As players actively manage their resources and engage in successful bartering with different characters round by round, they build up their cumulative resource stack that are useful for later bartering, as well as unlock additional characters with new and unique resources that present increasingly difficult bartering challenges, serving as immediate, tangible rewards that keep players engaged and motivated to continue progressing in the game.

Case Study: Outer Space (2022)

The Outer Space, designed by a student-designed game based around CCHU9022 *Journey into Madness*, offers an alternative design with implicit yet effective learning goals. The game aims to educate players on mental diversity and foster empathy. Rather than making this educational goal explicit, say for example, a simulation of a therapy session, the game is presented as a space-themed expedition where players complete missions in a spaceship with crewmates, who are NPCs (non-playable characters) with diverse backgrounds, memories, and aspirations. Although operating a spaceship itself is not necessarily a mental diversity goal, the game's real objectives align closely with the learning outcomes: to win the game, the players must develop awareness and skills for empathy and diversity through managing their interactions with the NPCs.



Features and constraints

1. How different layers are unlocked

The access to deeper layers in the Mindscape, or certain areas are unlocked in regards to

- a. Stages of game progression
 - achieved a certain deliverable
 - *Player free to interact with crewmate NPCs in any order, but there are gates in performing actions to ensure chronological progression of story line

- a. Trust
 - performance in Mindscape levels
 - *Collectibles, health remaining



In designing the game, the students referred to the course learning objectives, course concepts, and inspirations from other games and cultural references.

Player Autonomy

Player autonomy in educational games significantly enhances the learning experience by empowering players to make meaningful decisions that contribute to meaningful goals. One key aspect of this autonomy is decision-making. Players are presented with multiple decision points throughout the game, where their choices directly and indirectly impact the storyline and the outcomes. This ensures that players feel a strong sense of control over the narrative and its development, which enhances engagement and retention of educational content.

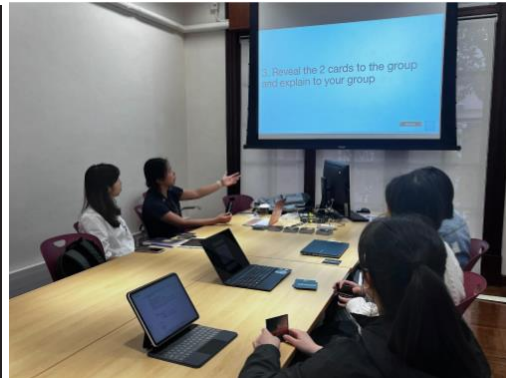
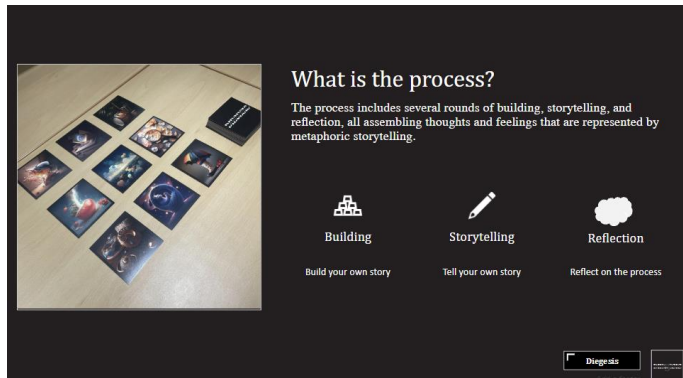
In the earlier case *Barter Land (2022)* for example, every bartering action and decision in the game has a direct, immediate, and cumulative impact, which is clearly linked to the solid learning outcomes of bartering principles. Players must strategise and make thoughtful decisions, considering the unique resources and demands of each character they encounter, thereby mastering the fundamental principles of bartering.

Another element of player autonomy is exploration. Players need to feel the agency to explore the game world at their own pace, deciding which areas to visit and which quests to undertake. This open-world approach encourages curiosity and self-directed learning, allowing players to discover educational content and concepts in a natural and engaging context. For example, in the earlier case *The Outer Space (2022)*, players have control over where they wander around and what and who they engage with in their surroundings, allowing the gameplay to develop organically.

Player autonomy can also come through communication, interpretations, and narratives derived from the game. As players engage with the game and the other players through actions, decisions, and interactions, they are actively expressing themselves and shaping the direction of the game on an ongoing basis.

Case Study: Diegesis (2023)

Diegesis (2023) is a facilitated game created by Rachel Lu, a HKU student and staff at Press Start Academy, to help process emotions and promote mental wellbeing as part of the WeThrive @ HKU event. It is a set of illustrative cards with conceptual and abstract visuals that can be used to build metaphoric interpretations in response to questions or prompts posed by the facilitator. The game is facilitated with prompts that are guided questions players need to respond with their cards. However, the players have full autonomy in interpreting the meaning of the cards, based on their own projection of personal experiences, opinions, and emotions. They can also build stories based on the images to reconstruct and reframe their personal narratives.



Narrative-driven

A compelling narrative game captures students' interest and motivates them to continue playing and learning, creating emotional connections with the content and making learning more memorable and impactful. The narrative is also compelling for contextual learning, as the educational content is embedded within scenarios and contexts that is relevant and interesting.



Student Case: *Big Tech Scandal (2022)*

The narrative framework of *Big Tech Scandal (2022)* is a multiplayer game that immerses players in scenarios where they must balance ethical integrity and strategic advantage as big technology conglomerates. Through their actions and decisions, players explore the complexities of corporate responsibility, ethical dilemmas, and civic engagement in a digital era. The game challenges them to critically assess the virtual game world compared to the real world, developing insights into the implications of their choices on broader societal values such as transparency, accountability, and fairness.

The narratives can also come from players who can create and share their personalised narratives based on their own perspectives and experiences, which are directly relevant to the learning outcomes and objectives. This process helps players internalise knowledge by connecting it to their own lives, making the learning experience more meaningful and impactful. By engaging in narrative creation, players can reflect on their actions and decisions, fostering deeper understanding and retention of the subject matter. Additionally, when the narratives are presented and shared with others, it promotes collaboration and a sense of community and further improves the overall learning experience.

In the earlier example *Diegesis (2023)*, players craft and share narratives about themselves inspired by abstract illustrations on their cards. Through carefully designed guided questions, players are prompted to conduct meaning-making through imagination and entirely personalised storytelling.

Plenty of Experience and Interaction

People learn most effectively through experiences when they receive immediate feedback, allowing them to recognise errors and understand where their expectations fall short. In all the earlier case studies, players benefit from the opportunities built in those games to apply their interpretations of the feedback to new but similar situations, where they can refine and apply their learning in a different way.

Learning experiences and interactions also come from the social discussions and mentoring sessions *outside of the game* itself. Sharing, debriefing sessions, and effective mentoring are essential for translating the experience into tangible and solid learning outcomes. Take *Diegesis (2023)* as an example, every player actively shares their stories and perspectives during each round.

When the play is over, the facilitator conducts a short debriefing session, allowing players to reflect on their experiences, discussing the emotional and cognitive processes involved in understanding themselves, and interpreting others. This reflection fosters emotional expression, self-awareness, and mindfulness—crucial mental health and wellbeing components.

Assessing Student-Design Games

The following set of rubrics is offers guidance on assessing student-created serious games, both digital and analog formats. The rubric includes components for assessing students' play test sessions to an audience of players.

It covers five key components: Learning objectives, game design, technical execution, educational value and delivery. Each component is also broken down into suggested sub-criteria for consideration.

Criteria	Grade A	Grade B	Grade C	Grade D	Grade F
Learning Objectives	Objectives are explicitly stated, easy to understand, and intricately connected to game mechanics.	Objectives are clear but could be more connected to game mechanics.	Objectives are stated but connection to game mechanics is weak.	Objectives are vague and poorly connected to game mechanics.	Objectives are missing or unrelated to game mechanics.
Alignment with Content	Every aspect of the game, from its mechanics to its narrative, reinforces the educational goals directly and effectively. The content covered is comprehensive, reflecting an in-depth understanding of the subject that maximizes learning outcomes.	The game successfully incorporates key concepts and skills relevant to the subject matter, but there might be room for deeper integration or coverage of additional topics.	The game covers basic concepts and partially supports the curriculum, but it misses opportunities to enhance understanding or fails to address certain key areas of knowledge.	The game touches on relevant topics only superficially or inaccurately, providing little educational benefit and potentially leading to misconceptions.	The game either completely misses or misrepresents the subject matter, offering no educational value and failing to meet any curriculum standards.
Achievability	Objectives are well within the reach of learners, given the	Most objectives are achievable, with a few that might stretch the	Objectives are achievable but may require effort that	Many objectives seem just out of reach for most learners, with a	Objectives are not realistically achievable within the game's

Criteria	Grade A	Grade B	Grade C	Grade D	Grade F
	game design and mechanics. Challenges are thoughtfully calibrated to ensure learners can achieve the goals through reasonable effort and skill development, providing a clear path to success. Learners feel motivated and empowered as they progress.	learner's ability beyond what is reasonable without additional support. Challenges are mostly appropriate, but some may not align perfectly with learner capabilities or game pacing, requiring occasional external assistance.	occasionally feels disproportionate to the intended learning outcomes. Some game elements may not fully support the achievement of these goals, causing occasional frustration or the need for repeated attempts.	noticeable misalignment between the game's challenge level and the player's abilities. Learners might achieve the goals, but not without excessive struggle or reliance on help not provided by the game itself.	current design. Challenges are too demanding or poorly aligned with educational goals, leading to significant learner frustration and demotivation. There is little to no possibility of achieving the goals through normal gameplay.
Relevance	Objectives are perfectly aligned with current educational standards and real-world applications, enhancing the learning experience by directly connecting game activities with practical, real-life contexts. Every element of the game serves a well-defined educational purpose.	Objectives are largely relevant to educational goals and show clear connections to practical applications. There are minor aspects of the game that might not directly contribute to these goals but do not detract significantly from the overall relevance.	While objectives align with educational goals to a fair degree, there are noticeable elements within the game that seem disconnected or only superficially related to the real-world or curriculum standards. The game could benefit from a stronger focus on applicable knowledge and skills.	Objectives show limited relevance to the intended educational goals. Most of the game content does not directly support or enhance understanding of real-world applications or curriculum standards, leading to a disjointed educational experience..	Objectives have no clear connection to educational goals or real-world applications. The game fails to integrate any meaningful educational content, rendering it ineffective as a learning tool and not serving the intended educational purposes.
Game Design	Innovative, User-Friendly, Engaging	Solid Design, Generally User-Friendly	Functional but Lacks Engagement	Basic Design, Not Intuitive	Flawed Design, Non-functional

Criteria	Grade A	Grade B	Grade C	Grade D	Grade F
Creativity and Originality	The game showcases exceptional creativity in its design and mechanics. It introduces novel concepts or approaches that significantly enhance the learning experience. The game not only engages but also inspires with its originality, setting a new standard for educational game design.	The game displays notable creativity and some original ideas in its execution. It offers a fresh perspective on familiar concepts, contributing positively to the player's learning and engagement. While some elements may be conventional, the overall approach feels innovative.	The game includes some creative elements, but many aspects remain standard or derivative. It integrates a mix of traditional and innovative ideas, though the original components are not always fully developed or central to the game's design.	Creativity is minimal, with the game largely relying on tried and tested mechanics and ideas. There are few signs of original thought, and the game does little to distinguish itself from others in the educational genre. It may be functional but lacks inspiration.	The game shows no real creativity or originality. It heavily borrows from existing games without adding new or innovative aspects. The educational approach is entirely conventional, offering no unique features or engaging methods to enhance learning or interest.
User Interface Design	The user interface (UI) is intuitive, user-friendly, and efficiently designed, enabling effortless navigation and interaction. All elements are logically placed, easy to access, and enhance the gameplay, contributing significantly to a seamless user experience.	The UI is well-designed, with most elements being easy to understand and use. Minor issues in navigation or interface layout might exist but do not significantly hinder the user experience..	The UI design is adequate, supporting basic game functions and user needs. However, it may lack refinement, with some elements causing occasional confusion or inefficiency in navigation.	The UI is poorly designed, with confusing or complex navigation that hinders gameplay. It requires users to spend unnecessary time learning to navigate rather than focusing on the game content.	The UI is counterintuitive and significantly detracts from the game experience. It is difficult to navigate, leading to frustration and detracting from educational objectives.
Interactivity	The game offers frequent and meaningful interactions that are integral to	Interaction within the game is substantial, with many opportunities for the	The game includes a moderate level of interactivity. Some sections are engaging,	The game offers minimal interactivity, with few opportunities for players to engage	The game lacks interactivity, functioning more as a passive viewing

Criteria	Grade A	Grade B	Grade C	Grade D	Grade F
	gameplay and learning. Players are consistently engaged through interactive elements that support educational outcomes.	player to engage actively with content, though some parts of the game may offer limited interaction.	but others lack interaction, resulting in uneven player engagement.	actively. Most content is passive, providing a less engaging experience..	experience. There is little to no engagement required from the player, severely limiting the educational potential.
Aesthetics	The game's visuals and audio are of high quality, appealing, and suitable for the intended educational content. Aesthetics enhance the learning experience by being both engaging and appropriate to the game's themes.	The aesthetics are generally good, with attractive designs and sounds that occasionally lack consistency or thematic alignment but still contribute positively to the game environment.	The game's aesthetics are acceptable but might appear generic or lack refinement. Visuals and sounds are functional but do not significantly enhance player engagement or learning.	Aesthetics are minimalistic and underdeveloped, with visuals and audio that do little to attract or retain interest, potentially detracting from the educational effectiveness of the game..	The game's aesthetics are poorly implemented, with inappropriate or unappealing visuals and sounds that hinder the learning process and distract from educational goals.
Accessibility	The game is accessible to a wide range of players. It incorporates features like visible fonts, subtitles, colour-blind modes, ensuring that everyone can participate fully and equally.	The game includes several accessibility features, though some users might still encounter minor barriers to full participation. Minor improvements could broaden accessibility further..	Accessibility features are present but limited. The game caters to some but not all accessibility needs, potentially excluding players with certain disabilities from fully engaging with the game.	Few accessibility features are present, and the game does not adequately support players with disabilities, significantly limiting who can effectively use and learn from the game.	The game lacks any meaningful accessibility features, effectively preventing players with disabilities from using it. This lack of consideration can exclude a significant portion of potential users.
Technical Execution	Flawless Performance, Advanced Features	Minor Bugs, Good Performance	Occasional Glitches, Adequate Performance	Frequent Issues, Poor Performance	Non-operational, Severely Flawed

Criteria	Grade A	Grade B	Grade C	Grade D	Grade F
Functionality	The game operates with core features working as intended. It is free from bugs and errors, providing a smooth user experience throughout all aspects of gameplay.	The game performs well with minor issues that do not significantly impact the overall experience. All major features function properly, but there might be occasional glitches.	The game has some functional problems that affect gameplay. Major features work, but bugs or glitches are evident and moderately impact the user experience.	The game frequently encounters functional issues that significantly disrupt gameplay. Essential features are prone to failure, affecting the ability to play or learn effectively.	The game is largely non-functional, with critical problems that prevent effective operation. Many features do not work, making the game practically unplayable.
Performance	Gameplay is smooth and consistent across multiple sessions. Rules and mechanics work seamlessly, ensuring a reliable and predictable gaming experience.	Gameplay is mostly consistent, with minor variations that do not significantly affect the game's outcome or enjoyment.	Players may encounter occasional inconsistencies in gameplay that can affect the outcome or enjoyment to some degree.	Inconsistencies in gameplay are frequent and noticeably impact the game's fairness or enjoyment.	Gameplay is erratic and significantly affects player experience and game outcomes, often leading to disputes or dissatisfaction.
Educational Value	Maximizes Learning, Highly Effective	Significantly Enhances Learning	Moderately Effective, Some Learning	Limited Learning Impact	No Discernible Educational Value
Engagement	Players feel absorbed in the game world. The narrative, environment, and gameplay mechanics are seamlessly integrated, fostering a deep connection with the game.	Players are strongly engaged with the narrative and environment. Minor inconsistencies in world-building or mechanics may slightly break immersion but do not significantly hinder engagement.	Players are generally engaged but occasionally distracted by inconsistencies or limitations in the narrative or game mechanics.	The game frequently fails to engage players fully. Discrepancies in the narrative or mechanics regularly disrupt the sense of immersion.	Players feel disconnected from the game world. The narrative, environment, and mechanics are poorly integrated, offering little to no immersion.

Criteria	Grade A	Grade B	Grade C	Grade D	Grade F
Complexity	The game features a balanced level of complexity that challenges users without overwhelming them. It encourages players (appropriate to the target audience's capabilities) to engage in analysis, synthesis, and evaluation to progress.	The complexity level is generally suitable for the intended users, though some aspects may be too simple or slightly too challenging, requiring minor adjustments.	The game's complexity is inconsistent; some parts may not engage the user enough, while others might be too difficult, leading to possible frustration or disengagement.	The game struggles with significant issues in balance; it is either too simple, offering little challenge, or too complex, which could alienate or frustrate users.	The game's complexity is entirely unsuitable for the intended audience, either being so simple that it fails to engage or so complicated that it is inaccessible to most users.
Feedback Mechanism	Feedback is precise and easily understandable. Players have no ambiguity about what the feedback conveys and how it relates to their actions.	Feedback is mostly clear, with occasional minor ambiguities that do not significantly hinder understanding.	Some feedback is clear, but there are instances where players may be confused or unsure about the message or its implications.	Feedback often leaves players confused, lacking clear indicators of what is being communicated or why.	Feedback is consistently vague or misleading, providing little to no helpful information to the player about their actions or results.
Delivery	Clear, Professional, Well-Organized	Mostly Clear, Well-Prepared	Somewhat Disorganized, Unclear at Times	Disorganized, Lacks Clarity	Incoherent, Poorly Presented
Facilitation/Presentation	Facilitation is clear and enhances the game experience, providing clear, engaging, and timely guidance.	Generally provides good support and enhancement to the game, with occasional lapses in clarity or engagement.	Provides basic guidance that is just sufficient for progressing through the game without adding much value.	Often fails to clearly guide or engage players, with guidance that may be confusing or poorly timed.	Misguides players or detracts from the experience, offering incorrect or unclear instructions and reducing engagement.

Criteria	Grade A	Grade B	Grade C	Grade D	Grade F
Organisation and pacing	Highly organized, logical flow that enhances understanding. Well-paced.	Well organized, but could be more logical or fluid. Good pacing.	Organization is lacking, causing some confusion. Pacing is inconsistent.	Poorly organized, difficult to follow or understand. Pacing is uneven or poorly aligned with content	No organization, completely haphazard or chaotic. Uninteresting or frustratingly structured

Conclusion

Incorporating game-based learning and storytelling into higher education is not just an innovative pedagogical approach but a transformative student-centered one that aligns with the fundamental ways individuals and societies engage and learn.

With storytelling, we highlighted some of the different ways this methodology can be implemented in courses teaching and learning, through news media, guest speakers, storyboarding methods, speculative fictioning, and podcasting. With games, teachers can create immersive learning experiences that go beyond traditional teaching methods. Furthermore, the examples from *Barter Land (2022)*, *Outer Space (2022)*, *Diegesis (2023)*, and the *Big Tech Scandal (2022)* demonstrate how involving students in creating games and delivering the games can deepen learning and make it more emotionally resonant and personally meaningful. These activities foster fosters 21st century competencies such as communication, collaboration, critical thinking, and creativity. All of these activities are made easier through advancements in digital technologies.

We believe the power of stories and games can offer students a way towards a more agentic learning experience that taps into their imaginations to inspire profound growth and transformative self-formation.

References

- Bruner, J. (1990). *Acts of meaning*. Harvard University Press.
- Chu, S. (2009). Digital Game-Based Learning in Higher Education. In M. Khosrow-Pour, D.B.A. (Eds.), *Encyclopedia of Information Science and Technology, Second Edition* (pp. 1120-1124). IGI Global. <http://doi:10.4018/978-1-60566-026-4.ch178>
- Dewey, J. (1938). *Experience and education*. Kappa Delta Pi.
- Erikson, E. H. (1963). *Childhood and society*. New York, NY: W. W. Norton & Company, Inc.
- Freire, P. (1970). *Pedagogy of the oppressed*. Continuum.
- Gee, J. (2004). *What video games have to teach us about learning and literacy*. New York: Palgrave Macmillan.
- Gee, J. P. (2008). Learning and games. In K. Salen (Ed.), *The ecology of games: Connecting youth, games, and learning* (pp. 21–40). Cambridge, MA: MIT Press.
- Jayemanne, D. (2019). *Gaming and the Arts of Storytelling*. MDPI - Multidisciplinary Digital Publishing Institute.
- Johnson, J. (2016). Play, definition of. In D. Couchenour, & J. Chrisman (Eds.), *The sage encyclopedia of contemporary early childhood education* (pp. 1012-1014). SAGE Publications, Inc, <https://www-doi-org.eproxy.lib.hku.hk/10.4135/9781483340333.n302>
- Kapp, K. (2012). *The gamification of learning and instruction: Game-based methods and strategies for training and education*. San Francisco: Pfeiffer.
- Keller, J. M. (1987). Development and use of the ARCS model of instructional design. *Journal of Instructional Development*, 10(3), 2-10.
- Klopfer, E., Haas, J., Osterweil, S., & Rosenheck, L. (2018). *Resonant games : design principles for learning games that connect hearts, minds, and the everyday* (pp. 23-24). The MIT Press.
- Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. *American Educational Research Journal*, 32(3), 465-491.
- Lam, P., & Northeastern University. Education. (2018). *Bridging Beliefs and Practices : A Study of Hong Kong Kindergarten Teachers' Perceptions of "Learning Through Play" and the Implementation of "Play" in Their Practices*.
- Lau, G. (2018). Ideology of Joyful Learning through Play in Early Childhood Classroom in Hong Kong: Misconceptions or Paradoxes? *International Journal of Educational Reform*, 27(4), 359-378.
- Malone, T. W. (1981). Toward a theory of intrinsically motivating instruction. *Cognitive Science*, 5(4), 333-369.
- Montessori, M. (1967). *The absorbent mind*. Madras, Kalakshetra Publications.
- Moyles, J. R. (1989). *Just playing?: Role and status of play in early childhood education*. Buckingham, MK: Open University Press.

- Moyles, J. R. (2005) *The Excellence of Play* (second edition). Buckingham: Open University Press.
- Parten, M. B. (1932). Social participation among pre-school children. *Journal of Abnormal and Social Psychology*, 27(3), 243–269. <https://doi.org/10.1037/h0074524>
- Piaget, J. (1952). *Play, Dreams and Imitation in Childhood*. New York, NY: Norton.
- Salen, K., & Zimmerman, E. (2004). *Rules of play : game design fundamentals*. MIT Press.
- Sameroff, A. (2009). The transactional model of development [electronic resource] : How children and contexts shape each other (1st ed.). Washington, D.C.: American Psychological Association.
- Shaffer, D., Squire, K., Halverson, R., & Gee, J. (2005). Video games and the future of learning. *Phi Delta Kappan*, 87(2), 104-111.
- Sheridan, M. D. (2011). *Play in early childhood: From birth to six years*. New York, NY: Routledge.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. London, UK: Harvard University Press.
- Wood, E. (2014). Free choice and free play in early childhood education: Troubling the discourse. *International Journal of Early Years Education*, 22(1), 4-18.

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The Teacher Development Grant at the University of Hong Kong supported the development of this guidebook.

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