Exploring the Connection Between Game-Based Learning, Social and Emotional Learning, and Critical Thinking through Tabletop Role-Playing Games

by

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ABSTRACT

The purpose of this thesis is to explore the potential of tabletop role-playing games (TTRPGs) as educational tools for developing critical thinking and social-emotional learning (SEL) competencies. This study focuses on identifying the key elements that make TTRPGs effective in cultivating these competencies and developing a rubric to assess their presence in TTRPGs. A comprehensive literature review is conducted to synthesize findings from various studies on game-based learning, critical thinking, and SEL. From this review, categories for examination are formulated, including problem-solving tasks, decision-making scenarios, reflective activities, and information analysis and evaluation. Data is collected and categorized according to these themes. From these data, educators may learn how to effectively implement TTRPGs in educational settings to foster critical thinking and SEL competencies. A rubric is developed to assess the presence of these elements in TTRPGs, considering factors such as game mechanics, gameplay rules, facilitation, and narrative elements. That rubric is then applied to a small sample of TTRPGs to demonstrate how to use the rubric.

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List of Abbreviations and Terms

TTRPG (Tabletop Role-Playing Games): Games where players gather around a table, or virtually, to play the role of fictional characters within a shared narrative. These games are typically guided by a game master (GM) who narrates the story, facilitates gameplay, and resolves in-game actions using a set of rules and mechanics. TTRPGs emphasize collaborative storytelling and problem-solving, allowing players to make meaningful choices that impact the narrative's direction.

GBL (Game-Based Learning): A pedagogical approach that uses games to enhance learning outcomes. GBL leverages the engaging and immersive nature of games to motivate learners, promote active participation, and facilitate deeper understanding of concepts. This approach can be applied across various educational levels and subject areas, utilizing digital or analog games.

SEL (Social and Emotional Learning): An educational framework that focuses on developing essential social and emotional competencies in individuals. This often involves teaching and practicing skills related to self-awareness, self-management, social awareness, relationship skills, and responsible decision-making.

GM (Game Master): Refers to someone who is running an RPG. They can be thought of as the narrator of the story. The use of the term GM by itself indicates anyone who runs RPGs, not just someone who runs applied RPGs.

Game Mechanics: The rules and systems governing the game.

NPC (Nonplayer Character): Within TTRPGs, an NPC is any character controlled by the game master (GM), rather than players. NPCs serve various functions in the game, such as providing information, acting as allies or antagonists, and driving the narrative forward.

ACER (Australian Council for Educational Research): An independent research organization that conducts research and develops educational resources to improve learning outcomes. In my research I am specifically utilizing the ACER framework for critical thinking skills development. This framework provides a structured approach to evaluating and assessing critical thinking competencies by categorizing skills into three strands: knowledge construction, evaluating reasoning, and decision-making.

CASEL (Collaborative for Academic, Social, and Emotional Learning): A leading organization that advocates for and provides resources to promote the integration of SEL into educational settings. CASEL's framework for SEL identifies five core competency clusters: self-awareness, self-management, social awareness, relationship skills, and responsible decision-making. I am using CASEL's framework, along with the Wisconsin Department of Public Instruction's guide, as a foundation for assessing the presence of SEL competencies within TTRPGs.

Introduction

What if every decision in a student's life were captured in a brief, second-long snapshot? Imagine viewing a student's existence through a series of fleeting images, each reflecting their interactions with themselves, others, and their environment. How would students categorize these images? Surely, some would be more meaningful than others. Some snapshots are inconsequential in the grand scheme of a student's life, such as choosing which toothpaste to buy. However, others would capture the depth of their contemplation on significant decisions, like who they build lifelong relationships with.

Daniel Kahneman, Nobel laureate psychologist, in his book *Thinking, Fast and Slow*, introduces a framework of two thinking systems. The first is the fast-thinking system that is automatic, intuitive, and prone to errors (Kahneman 13-14). Kahneman argues that this system is typically used for most routine decisions, like the toothpaste example. The second is the slow-thinking system, which requires effort, is reasoned, and is more reliable for complex decision-making (Kahneman 13-14). Kahneman's two-system framework highlights the existence of different modes of thinking. While fast thinking efficiently handles mundane tasks, slow thinking is essential for performing important tasks effectively. This distinction encourages the recognition of when to rely on intuition and when to engage in deeper cognitive processes.

Building upon this foundation, it is crucial to understand the implications of relying solely on the fast-thinking system. Without the intentional engagement of our slow thinking system, students become susceptible to the path of less resistance. In students' fast-paced lives, they are constantly inundated with information from the

moment they wake up to the moment they go to sleep. This constant flow of information often incentivizes the autopilot fast-thinking system to decide how students feel and think about the things they interact with daily. To compound this effect, the rapid advancement of technology in 2024 continues to transform students' environment. Social media platforms, in particular, have reshaped how students interact, communicate, and consume information. The rise of digital platforms like Facebook, Twitter [currently X], and Instagram has led to a shift towards digital structures in interpersonal interactions and communication (Aust et al. 113). The omnipresence of social media in today's society is further highlighted by the fact that, in a survey conducted by the Pew Research Center in 2021, 84% of young adults of ages 18-29 report using social media, with 39% of 18-24-year-olds relying on it as their primary news source (Kohnen et al. 45). This constant influx of information through social media can overwhelm students' cognitive processes and lead them to rely on their fast-thinking system to make decisions and form opinions. This can result in superficial engagement with information and a lack of critical analysis. Algorithms further exacerbate this issue by curating content that reinforces existing biases (Wang and Yuxiang 529), potentially leading to echo chambers where students are only exposed to information that confirms their pre-existing beliefs.

However, there are still more factors that compound social media platforms' influence on how information is consumed and propagated. For example, the rise of social media influencers adds a layer of complexity to confirmation bias. Social media gradually enables users to form parasocial relationships with influencers, similar to friendship or intimacy, in which users increasingly tend to seek influencers for guidance because they perceive the influencers they follow as trusted sources of information

(Wang and Yuxiang 530). This can lead individuals to automatically trust information from influencers students follow, especially when it aligns with their existing beliefs (Wang and Yuxiang 533). This dynamic complicates the traditional understanding of confirmation bias, as it is not always a conscious effort to avoid dissonance but can also stem from misplaced trust in influential figures who are perceived as relatable and trustworthy (Wang and Yuxiang 532). This trust can override the desire to critically evaluate the information students consume from these perceived trusted sources.

The reinforcement of ideas propagated by influencers and believed by their followers in echo chambers creates curated silos of information that alter how students interact with and consume information in our digital world. The proliferation of these information silos highlights how the issue of hyper-connectivity requires a comprehensive approach to developing cognitive and emotional resilience. These issues can profoundly impact students' personal lives and societal cohesion by fostering environments where critical thinking is diminished and biases are reinforced. For instance, by fueling the rise of misinformation and reinforcing echo chambers that can limit exposure to diverse perspectives outside of what is "correct" through personal bias.

Reflecting on the real-world consequences of these challenges emphasizes the need for intentionally integrated skill development in the next generation of students that extends past "slow thinking". To better understand the nuanced impacts on the lives of everyday people who allow the information they receive from influencers they trust in online silos of information to dictate how they perceive reality, consider the tragic personal loss of my mother. She had succumbed to online misinformation during the height of the pandemic in 2020. She became entangled in a delusional narrative spread

through social media, leading her to sever ties with her husband and daughters and move to another country abruptly based on unfounded beliefs.

This personal experience is just one of many stories of people who have made life-changing decisions based on the compounding effect of using a fast-thinking framework that prioritizes consuming information and choosing to form an opinion without engaging in critical thinking or considering the impact of one's personal actions on others. For further evidence that I am not alone in this experience of relationships being impacted by the prevalent spread of misinformation, the subreddit r/QAnonCasualties, with over 280,000 members, can be a source of similar anecdotes of personal experiences. One r/QAnonCasualties user states, "My Dad's Getting Worse...He actually believes that what Trump and Q say is real and the rest is a conspiracy. His brother was debating with him and bringing up actual statistics about taxes and [issues]. My dad? Called it fake [and] a lie." (u/LettuceSea9519) This example demonstrates the principle of "What You See Is All There Is" (Kahneman 85) and the suppression of doubt (Kahneman 81). These are both characteristics of System 1 thinking.

Given the context of this post, the user's father is firmly entrenched in the QAnon narrative, and this caused him to dismiss contradictory information as "fake". This example demonstrates an unwillingness to engage in the effortful process of considering alternative viewpoints (Kahneman 81), which is a hallmark of System 2. The father's prior beliefs are reinforced by repeated exposure and emotional investment, which likely makes him resistant to engaging with challenging information. Another user shares, "My mom believes Palestinians are crisis actors. (And we're Palestinian-American.) My brother and I lost our s*** this morning when we heard from our mom that she thinks the

Palestinians are 'acting'—and 'laughing at all of us.' She has 'seen videos of them pretending to be hurt and then getting up and laughing'" (u/rocketshep1). This example highlights the availability and affect heuristic and its connection to emotional reasoning (Kahneman 138-140). This user's mother's belief appears to be heavily influenced by emotionally charged videos she saw circulating within her online community that promote a specific narrative. This readily available and emotionally charged content likely overshadows other sources of information or perspectives. Particularly those that might challenge her existing beliefs. In both examples, the users' parents arrive at conclusions without engaging in the kind of deliberate, effortful reasoning characteristic of System 2. Their thinking is driven by readily available, emotionally charged information that is propagated in their online echo chambers of like-minded people. This led to the quick formation of judgments that confirm pre-existing beliefs.

Slow thinking, in contrast, would involve aspects of critical thinking such as actively seeking out diverse perspectives, carefully evaluating the reliability of sources, and acknowledging the possibility of bias. While these examples are based on the actions of parents, it is a testament to how important it is to incorporate critical thinking into students in an educational setting so they can grow into adults that have the tools to question their own assumptions and have the capability of revising their thinking in light of being exposed to new information.

Building upon my personal narrative and the examples from other Reddit members with similar experiences, it becomes clear that critical thinking alone may not be sufficient to navigate the complexities of the digital age. While critical thinking is essential for evaluating information and making informed decisions, it might not fully

address the emotional and social aspects that influence how students process and act on information. This is where Social and Emotional Learning (SEL) comes into play as a complementary framework that supports and enhances critical thinking skills.

In recognizing the limitations of critical thinking alone, SEL provides a holistic approach to skill development. SEL competencies, such as emotional regulation and social awareness, are essential for applying critical thinking effectively in real-world situations. For example, a student might possess strong analytical skills but struggle to evaluate information objectively due to confirmation bias fueled by strong emotions. By integrating SEL, students can develop greater self-awareness, regulate their emotions, and foster empathy, which in turn supports more effective and balanced decision-making processes.

Through my research on this topic, I find evidence that higher levels of SEL are associated with numerous positive outcomes (Hromek and Roffey 628-629). Research has demonstrated that enhanced SEL reduces perceived stress and increases overall well-being (Slaski and Cartwright 63-68). Additionally, SEL contributes to improved coping abilities and mediates aggressive behaviors (Jagers et al. 171-179). Beyond these benefits, SEL enhances psychosocial functioning (McCraty et al. 246-268) and reduces instances of bullying (Bear et al. 140-157).

In recognizing the interconnectedness of SEL and critical thinking in decision-making, it becomes clear that these two sets of skills can be developed synergistically through interactive and engaging platforms like tabletop role-playing games (TTRPGs). TTRPGs inherently involve analyzing situations, evaluating arguments, and making decisions, which are all core components of critical thinking (Chen and Wu 3018-3019).

The open-ended nature of TTRPGs games allows for an adaptation to diverse real-world scenarios (Angelelli et al. 4) which also helps foster critical thinking skills in players. In TTRPGs players often encounter complex problems that demand strategic thinking and creative problem-solving that push them to think critically and adapt to unexpected situations (Ruiz-Ezquerro 51). Building upon this insight, it was through the experience of playing a TTRPG myself, *Heart: The City Beneath*, that it became apparent that students can learn a lot about themselves when they play the role of someone else. It was through the careful crafting of my actions in the game which requires me to analyze my situation and how I would act in different scenarios which forces me to think slowly and come up with creative solutions.

Through play, I was also able to put myself in the shoes of a character who did not have the same intentions, background, or perspectives on life that I had. Research shows that by stepping into the shoes of a character players can develop empathy and social awareness (Chen and Wu 3020, Worthington 139). When playing games in general in educational contexts, young people have been shown to learn to work together, share ideas, and navigate social dynamics within the game's context which in turn promotes a safe environment for collaboration and perspective-taking (Hromek and Roffey 626, 641). The critical thinking aspects of “slow thinking” and the importance of SEL, along with the impact of both of these skills on decision-making, create the connective thread that my thesis hinges on answering: Is it possible to leverage the immersive and collaborative nature of TTRPGs to cultivate both critical thinking and SEL competencies, thereby equipping individuals with the necessary tools to thrive in an information-saturated environment? Furthermore, how can educators prepare themselves to make

informed decisions about which games might best support the development of critical thinking and SEL skills?

Methodology

This thesis systematically explores how TTRPGs facilitate the development of critical thinking and SEL skills. The methodology is structured around a multi-step process, beginning with the evaluation of critical thinking and SEL frameworks, followed by a comprehensive literature review, rubric development, and case study analysis of the rubric being applied to TTRPG game guides.

To begin, I assess publicly available frameworks that define detailed critical thinking and SEL competencies. For critical thinking I utilize the ACER framework which organizes critical thinking into three strands: constructing knowledge, evaluating reasoning, and decision-making. I selected this framework because out of all critical thinking frameworks, it provides the most structured and tangible competencies. For SEL competencies, I apply the framework developed by the Wisconsin Department of Public Instruction in collaboration with CASEL. This framework categorizes SEL into three primary domains: emotional development, self-concept, and social competence. By integrating both frameworks into my research, I establish a clear foundation for assessing the educational potential of TTRPGs in developing these dual skill sets.

Building on the framework evaluation, I conduct a comprehensive literature review to gather insights into GBL and its application to TTRPGs. The review focuses on identifying key elements within TTRPGs that promote critical thinking and SEL competencies. Studies on GBL, critical thinking, and SEL are analyzed to extract

recurring themes such as problem-solving tasks, emotional regulation, empathy, decision-making scenarios, and reflective activities. This step helps establish criteria for evaluating how TTRPGs can cultivate these competencies in players.

Based on the findings from both the framework evaluation and literature review, I developed a rubric to assess the presence of critical thinking and SEL competencies within TTRPGs. The rubric, found in Appendix B, uses a simplified three-point scale: required, optional, and absent. Required means the game requires players to engage in critical thinking or SEL tasks. Optional means the game offers optional rules or scenarios that allow players to engage in these tasks. Absent means no mechanics or scenarios promote these competencies.

The rubric breaks down into two types of categories that evaluate four key areas within TTRPGs. The two category types are game structure influence, which reflects how much the game is shaped by its mechanics and rules, and educator influence, which shows how much control the educator has through facilitation and narrative. Game mechanics, which are rules that guide player actions, and gameplay, which are how rules shape interactions, are two of the four key areas. They fall under game structure influence. GM, which is the role of the facilitator in guiding reflection and narrative elements, which are story-driven prompts that evoke emotional responses or ethical dilemmas, are the other two of the four key areas. They fall under the category of educator influence.

This rubric provides a structured tool for assessing how well TTRPGs foster both critical thinking and SEL skills. To apply this rubric effectively, I conduct case study analyses using instruction manuals from selected TTRPGs. These manuals offer detailed

insights into game mechanics, rules, and narrative structures that inform my evaluation process. By focusing on a diverse range of games with varying mechanics and player interactions, I ensure a comprehensive assessment of their potential to foster critical thinking and SEL skills.[1]

Through this integrated approach, my research provides actionable insights for educators to harness the full educational potential of TTRPGs, ultimately contributing to more resilient and emotionally intelligent individuals capable of navigating the complexities of modern-day life.

Framework Evaluation

To understand how TTRPGs can aid in developing critical thinking and SEL skills, it is important first to establish what SEL skills are, given existing research. Establishing clear definitions is crucial because they provide a foundation for effectively assessing the integration of these skills into TTRPGs.

Defining Critical Thinking Competencies

Critical thinking is often defined as reflective thinking that analyzes and evaluates existing information, arguments, and communications using logic and reason (Heard et al. 2-3; Beyer 49, 270–276). This analytical approach is important because it enables the assessment of complex information in a systematic way.

[1] Throughout this research process, regular consultations with my thesis advisor have been instrumental in refining my approach and addressing methodological challenges. These discussions help ensure that my research remains aligned with its objectives while enhancing its academic contribution to understanding the role of game-based learning in developing critical thinking and SEL competencies.

Critical thinking has been a subject of extensive study by many influential educational philosophers. A pioneer in American education philosophy, John Dewey, conceptualized critical thinking as “active, persistent, and careful consideration” of beliefs and knowledge (Dewey 9). Dewey’s perspective emphasizes the deliberate ongoing nature of critical thinking.

Another well-known educational philosopher, Matthew Lipman, built upon Dewey’s work and developed the “Philosophy for Children” approach in the 1970s, which advocated a pedagogical approach that teaches thinking skills and the ability to question and reason (“Philosophy for Children”). Lipman’s approach placed emphasis on the evaluative nature of critical thinking and linked it to responsible judgment that is criteria-based, self-correcting, and context-sensitive (Lipman 38–43). Lipman connection illustrates how critical thinking fosters adaptability in judgments across different situations.

Two additional educational philosophers, John McPeck and Harvey Siegel focused on “reflective skepticism” (Heard et al. 2) and “rational thinking” (Heard et al. 2), respectively. Their perspectives highlight the need to question assumptions and critically evaluate reasoning to make informed decisions. Robert Ennis is also an influential figure in educational philosophy who contributed significantly to the field by extending critical thinking to decision-making processes, outlining stages like defining problems, selecting criteria, formulating solutions, and monitoring implementation (Ennis 44-48). Ennis's broader scope demonstrates the practical application of critical thinking in real-world scenarios to enhance problem-solving and strategic planning abilities.

Building upon these foundational concepts, the Australian Council for Educational Research (ACER) has developed a comprehensive framework for critical thinking. This framework integrates cognitive skills and affective dispositions (Heard et al.), thus presenting critical thinking as a multifaceted construct. The ACER framework's holistic approach ensures that critical thinking is not viewed in isolation but as part of a broader skill set that promotes effective analysis, evaluation, and decision-making.

I will use the ACER framework as a foundation to systematically assess the presence of critical thinking competencies in TTRPGs while incorporating insights from the other sources cited in this section to refine and enhance my assessment criteria. The reason for selecting this framework is because it aligns well with the goals of my thesis, which is to provide a structured approach to evaluating critical thinking competencies, along with SEL competencies, on a scale from low to high presence in TTRPGs. There are U.S.-based organizations like the American Educational Research Association (AERA) that conduct research on critical thinking. However, they do not offer an equivalent structured framework that is as well-suited for assessing competencies on a scale of low to high presence. The ACER framework's clear delineation of skill levels and its focus on practical application make it particularly valuable for evaluating critical thinking in the context of my research.

The ACER framework operates on the premise that critical thinking can theoretically be broken down into separate abstract skills. These skills are typically utilized simultaneously or in quick succession during authentic critical thinking tasks (Heard et al. 11). Recognizing this simultaneity is important because it mirrors real-life scenarios where decisions and analyses are rarely linear. The existing literature largely

agrees that critical thinking encompasses inference, evaluation, analysis, interpretation, explanation, and self-regulation abilities (Thomas and Lok 93-105), pointing out its multifaceted nature.

The framework organizes critical thinking into distinct strands for assessment purposes based on their specific applications: constructing knowledge, evaluating reasoning, and making decisions. (Heard et al. 11). This categorization allows for a more targeted and effective evaluation of each component, which ensures that assessments can accurately measure the diverse aspects of critical thinking. Moreover, the ACER framework acknowledges that these strands are often employed simultaneously and adapt to various situations. This holistic perspective ensures that critical thinking is viewed as a dynamic and flexible process essential for effective problem-solving and informed decision-making in diverse real-world contexts (Heard et al. 11).

Table 1 below demonstrates the significant overlap between the work of the aforementioned educational philosophers in critical thinking and the ACER framework. While each thinker has a unique emphasis, the ACER framework incorporates elements from various critical thinking approaches. This integration of approaches into a single framework provides a comprehensive structure that encompasses many key ideas proposed by these influential figures in the field of critical thinking.

Educational Philosopher	Type of Critical Thinking Approaches	Overlap with ACER Framework
John Dewey	Active, persistent, and careful consideration of beliefs and knowledge	Aligns with ACER's emphasis on reflective thinking and analysis across all strands
Matthew Lipman	Philosophy for Children approach; emphasis on questioning and reasoning	Corresponds to ACER's Strand 2 (Evaluating reasoning) and aspects of Strand 1 (Knowledge construction)
John McPeck	Reflective skepticism	Relates to ACER's Strand 2 (Evaluating reasoning), particularly Aspect 2.2 (Identifies assumptions and motivations)
Harvey Siegel	Rational thinking	Aligns with ACER's overall approach, particularly Strand 2 (Evaluating reasoning) and Strand 3 (Decision-making)
Robert Ennis	Decision-making processes, including problem definition, criteria selection, solution formulation, and implementation monitoring	Closely aligns with ACER's Strand 3 (Decision-making) and aspects of Strand 1 (Knowledge construction)

Table 1. Synthesis of critical thinking approaches and the ACER framework

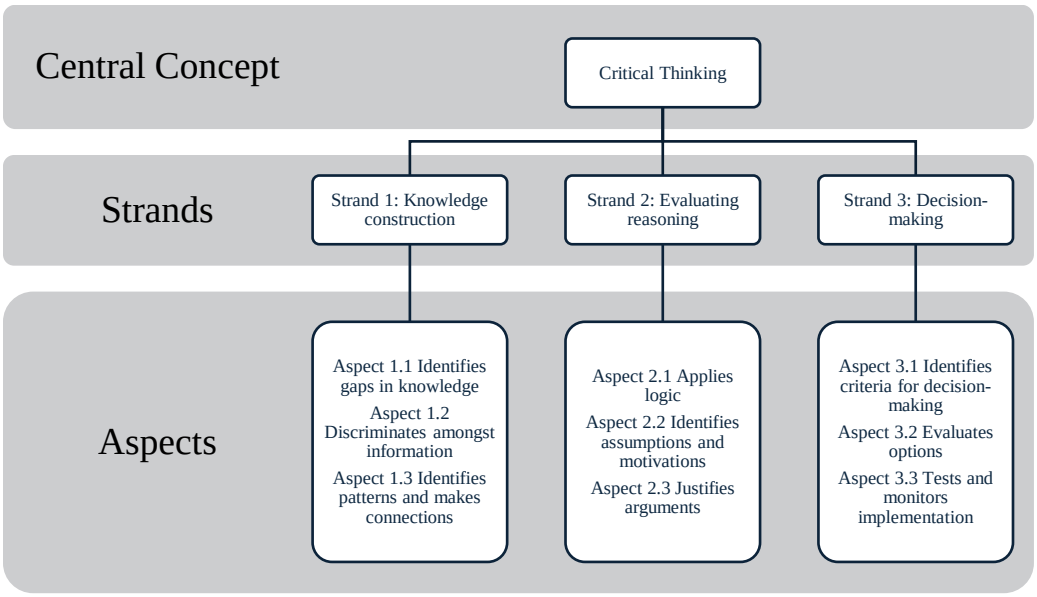

Figure 1. ACER's critical thinking skill development framework (Heard et al. 12)

Strand 1: Knowledge construction			
	Aspect 1.1 Identifies gaps in knowledge	**Aspect 1.2** Discriminates information	**Aspect 1.3** Identifies patterns and makes connections
High	Learners identify the knowledge requirements necessary to solve a problem, understand an issue or answer a question, and accurately evaluate the limits of their existing knowledge in relation to it. They can formulate and articulate their information needs as precise statements or questions for investigation. Learners can consider possible misconceptions in their understanding and can recognize the possible benefits of considering information from a diverse range of sources and perspectives.	Learners selectively apply the most pertinent criteria to evaluate sources of information depending on the information needed. They accurately compare the relative strength of different information as evidence for a given claim and can identify multiple valid reasons to accept or reject information. Learners can distinguish factual information from opinions and assertions while recognizing the potential value of each. They can accurately describe how elements of texts and information	Learners identify logical patterns and subtle connections within and across data and information from a range of sources. They find rational and useful ways of conceptually organizing information from different sources. Learners associate and integrate new and potentially conflicting information with their previous understanding. They form reasonable generalizations or hypotheses based on patterns in information. Learners recognize and consider the significance of data or

		can have a persuasive effect.	information that does not conform to identified patterns or conceptual categories.
Med	Learners are able to identify some of the limits of their existing knowledge relating to a problem, issue or question, with topics both familiar and unfamiliar to them. Within a constrained or familiar context, they can identify and distinguish pertinent from less-pertinent questions or information needs for a given inquiry purpose. In less constrained or familiar problems or contexts, they can articulate deficiencies in knowledge only in broad terms when undertaking investigation. Learners can recognize the benefit of investigating information from within the most salient fields or range of perspectives related to the problem, issue, or question.	In familiar, constrained contexts, learners can distinguish more reliable from less reliable information using objective criteria that are about evaluating quality. In less familiar contexts, learners rely on established reliable sources. They are aware of and apply – perhaps indiscriminately or rigidly – general criteria for judging the reliability or usefulness of sources. They can distinguish statements of fact from statements of opinion, and favor facts. Learners have an awareness that information may be biased, hyperbolic or misrepresent opinion as fact.	Learners identify plausible patterns and connections in data and information that are not obvious, and can do this using information from different sources. They can identify when new information confirms or accords with prior knowledge. Learners can form simplistic generalizations based on recognized patterns in information. They can recognize data or information that does not conform to identified patterns or conceptual categories.
Low	Learners are able to identify their existing knowledge relating to a problem, issue or question. With topics unfamiliar to them they acknowledge their existing understanding is insufficient. They can ask questions to gain information that will be useful within a simple, constrained problem.	Learners discriminate between information sources using subjective criteria such as familiarity, accessibility or alignment with their own views. In simple and familiar contexts, they can identify information inconsistent with other information and question its veracity and reliability. Learners	Learners make simple connections or recognize obvious patterns within data and information from a single source. They can derive inferences in the context of scaffolded tasks or content with obvious and explicit connections. Learners can organize explicitly stated information or

		can distinguish obvious or common knowledge facts from obvious statements of opinion.	data into simple categories.

Table 2. Levels of skill development for Strand 1: Knowledge construction (Heard et al. 17)

Strand 2: Evaluating reasoning			
	Aspect 2.1 Applies logic	**Aspect 2.2** Identifies assumptions and motivations	**Aspect 2.3** Justifies arguments
High	Learners can use deduction from premises to distinguish valid from invalid conclusions in arguments, or other deductive representations of reasoning. They can do so with arguments that may have the appearance of being sound. They use logic to identify subtle and unstated, or problematic and unintended, conclusions in arguments. They can apply logical deduction to complex, multi-faceted problems to arrive at correct solutions. Learners can distinguish correlation from causation and apply concepts of causality, contradiction and consistency as well as use prior knowledge to evaluate complex situations with conflicting or	Learners identify the assumptions that invalidate conclusions in arguments dealing with unfamiliar contexts. They can identify opaque, implied conclusions from sets of propositions. Learners can deliberately employ assumptions when required to progress an argument or problem-solving activity. They can identify when their own motivations cause bias in arguments and can identify the subtle (e.g., ideological/identity-related) motivations of others as potential bias.	Learners can construct cogent arguments for and against a proposition – or for competing propositions – with explanations, supporting evidence, rebuttal and counter rebuttal. They can use inference to develop multiple plausible interpretations.

	incomplete evidence, generate alternative explanations and make predictions about hypothetical situations.		
Med	Learners can identify valid arguments, or other deductive conclusions, even when they may be unsound. They can identify obvious implied conclusions from sets of propositions. They make and explain logical deductions used to identify a correct solution to a constrained problem with limited complexity. Within constrained contexts, they can apply concepts of causality, contradiction and consistency to evaluate situations with conflicting evidence.	Learners identify reasonable, common sense assumptions that underpin claims. They recognize logically invalid conclusions in arguments dealing with conventional wisdom when caused by a suppressed premise. They can identify the motivation for other's reasoning as bias when it reflects less obvious (e.g., indirectly beneficial) self-interest.	Learners develop structured arguments for or against a proposition with some reasons and explanations. They use inference to develop a plausible interpretation. They can reflect on and explain their reasoning for claims they make
Low	Learners can identify and explain when simple deductive arguments or other deductive conclusions, dealing with familiar, real-world contexts, are sound or unsound. Learners can develop basic strategies in problem-solving contexts that have simple objectives and limited variables.	Learners struggle to articulate the assumptions that underpin simple claims or arguments. Learners can identify the motivation for others' reasoning or actions – or understand these motivations as bias – when it reflects obvious (e.g. directly material) self-interest.	Learners construct simple arguments supported by subjective reasoning, or plausible reasoning, in familiar, concrete contexts. They tend to use induction from experience of the world rather than deduction from rules, conditions or premises, and reach naïve conclusions. They use circular logic to articulate an argument in more abstract contexts.

Table 3. Levels of skill development for Strand 2: Evaluating reasoning (Heard et al. 18)

Strand 3: Decision-making			
	Aspect 3.1 Identifies criteria for decision-making	**Aspect 3.2** Evaluates options	**Aspect 3.3** Tests and monitors implementation
High	Learners identify multiple criteria, across several different, and potentially competing, categories (e.g. time, costs, impact, effectiveness, reach, capacity, etc.), for a decision in a given problem context. They can prioritize criteria based on relative importance to achieving the desired outcome.	Learners evaluate each option against the full range of identified criteria. They can identify and compare multiple pros and cons of options against each other to determine which will – or is most likely to – deliver the most-desired outcome and most-satisfy the criteria as prioritized.	Learners apply fair and reasonable measures of the success of a decision to evaluate it. They can distinguish those results/outcomes – both positive and negative – that are a direct effect of the decision as implemented, versus those caused by unforeseen other conditions or circumstances. Learners can identify which conditions to adjust to improve the outcome.
Med	Learners identify several criteria against which to make a decision or conclusion in a given problem context. They can justify their choice of a most important criterion.	Learners evaluate each option and identify which options best satisfy each of the criteria. They can identify whether any of the criteria are unsatisfied by the options given. Learners are able to identify strengths and limitations of solution ideas specific to the features or the outcomes of those solutions.	Learners can explain through observation or data analysis whether a decision led to a desired or anticipated outcome. They can identify plausible explanations for why a desired or anticipated outcome was not achieved.
Low	Learners generate a simple criterion against which to justify their decisions. They can identify an appropriate single criterion from a range provided against which to make a decision in a problem context.	Learners rank solutions from best to worst against a given, singular criteria. They select an appropriate solution or simple conclusion that satisfies a singular criteria. Learners can identify a plausible strength and/ or	Learners correctly identify, from data or from observation of the decision being implemented, whether or not a desired outcome has been achieved.

		limitation of a solution at a generic level (i.e. that has limited specificity to the solution).	

Table 4. Levels of skill development for Strand 3: Decision-making (Heard et al. 19)

Defining SEL Competencies

SEL is an educational framework that centers on developing social and emotional competencies in individuals. This field recognizes that academic success is not the only indicator of a well-rounded education and emphasizes the significance of social and emotional skills for students' holistic development. SEL generally encompasses five broad interrelated core competency areas (CASEL 2). The first is self-awareness, which involves the "abilities to understand emotions, thoughts, and values and how they influence behavior across contexts" (CASEL 2). The second is self-management, which refers to the "abilities to manage one's emotions, thoughts, and behaviors effectively in different situations and to achieve goals and aspirations" (CASEL 2). The third is social awareness, which involves the "abilities to understand the perspectives of and empathize with others, including those from diverse backgrounds, cultures, and contexts" (CASEL 2). The fourth is relationship skills, which focuses on the "abilities to establish and maintain healthy and supportive relationships and to effectively navigate settings with diverse individuals and groups" (CASEL 2). Lastly, the fifth is responsible decision-making, emphasizing the "abilities to make caring and constructive choices about personal behavior and social interactions across diverse situations" (CASEL 2). SEL is understood as a process (CASEL 1), implying that these competencies are not fixed and

can be developed and nurtured over time. This process involves individuals actively engaging in experiences that challenge them to understand and manage their emotions, build relationships, and make responsible choices.

Creating a supportive and inclusive environment is vital for the successful development and application of SEL skills (Wisconsin Department of Public Instruction 7). Providing students with a medium to practice these competencies requires them to feel safe and valued. Strategies such as restorative practices, collaborative problem-solving, and community-building activities are recommended to foster this environment. TTRPGs are a prime example of an environment conducive to developing SEL skills because they allow players to experiment with different behaviors within the boundaries of a game that do not have real-life consequences attached that would induce fear of exploration but simulate situations enough to teach you lessons about how to interact with others.

Establishing a well-structured SEL framework is essential to assess the presence of SEL competencies in TTRPGs effectively. I am choosing to base my research on the SEL competencies presented in the SEL framework from *The Social and Emotional Learning Competencies* guide created by the Wisconsin Department of Public Instruction in collaboration with Collaborative for Academic, Social, and Emotional Learning (CASEL), who coined the concept of SEL (Wisconsin Department of Public Instruction 2). SEL is defined as the process through which individuals acquire and apply the knowledge, attitudes, and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions (Wisconsin Department of Public Instruction 5).

The framework outlined by the Wisconsin Department of Public Instruction categorizes SEL into three primary domains: emotional development, self-concept, and social competence (Wisconsin Department of Public Instruction 7). These domains are important because they encompass the essential areas of interpersonal growth that SEL aims to develop. Emotional development focuses on understanding and managing one's emotions, self-concept emphasizes developing a positive self-identity and lifelong learning mindset, and social competence involves establishing and maintaining positive relationships through respectful interactions and responsible choices.

The reason for using this framework is that it is well laid out and informed by a progression rubric, similar to the critical thinking rubric of high to low criteria. However, in this case, that translates to different age ranges having different expectations of the same criteria met with varying levels of complexity. I will use the ranges 6th – 8th grade, 9th – 10th, and 11th – adult to mirror a low to high adoption range to match the low, mid, and high adoption modeled in the critical thinking skills table.

Emotional development: Understanding and managing one's emotions			
CASEL Domain	**6th - 8th (Low)**	**9th – 10th (Med)**	**11th – Adult (High)**
Self-Awareness	Learners will be able to recognize and label a variety of complex graded emotions in self and others.	Learners will be able to recognize and label a variety of graded emotions in self and others as they occur and evolve over time.	Learners will be able to identify how the process of recognizing and labeling emotions informs thinking and influences relationships.
Self-Management	Learners will be able to express their emotions in an appropriate and respectful manner using a	Learners will be able to express their emotions in an appropriate and respectful manner in different environments, with different	Learners will be able to understand and explain how their expression of emotions can influence how

	variety of modalities (e.g., verbal and nonverbal).	audiences, using a variety of modalities (e.g., verbal and nonverbal).	others respond to them.
Self-Management	Learners will be able to identify what triggers a strong emotion and apply an appropriate calming or coping strategy to defuse the emotional trigger.	Learners will be able to consistently use appropriate calming and coping strategies when dealing with strong emotions.	Learners will be able to predict situations that will cause strong emotions, and plan and prepare to manage those emotions.
Social Awareness	Learners will be able to provide support and encouragement to others through perspective-taking, empathy, and appreciation for diversity.	Learners will be able to demonstrate empathy to others who have different views and beliefs.	Learners will be able to demonstrate connectedness, through empathy and engagement to their communities.
Social Awareness	Learners will be able to recognize expressions of empathy in society and communities.	Learners will be able to evaluate verbal, physical, and environmental cues to predict and respond to the emotions of others.	Learners will be able to evaluate verbal, physical, social, cultural, and environmental cues to predict and respond to the emotions of others.

Table 5. Social and Emotional Competencies: Emotional Development (Wisconsin Department of Public Instruction 19)

Self-Concept: Developing positive self-identity and recognizing self as a lifelong learner			
CASEL Domain	**6th - 8th (Low)**	**9th – 10th (Med)**	**11th – Adult (High)**
Self-Awareness	Learners will be able to use optimism and a "growth mind set" to	Learners will be able to set priorities to build personal	Learners will be able to maintain a "growth mindset" about their

	recognize strengths in self in order to describe and prioritize personal skills and interests they want to develop.	strengths, grow in their learning, recognize barriers, and employ solutions.	abilities to succeed and grow and will persist through challenges.
Self-Awareness	Learners will be able to self-reflect on their values and beliefs and how their behaviors relate to those values and beliefs.	Learners will be able to use self-reflection to determine if their behavior is reflective of their personal values and modify behavior to match their beliefs.	Learners will be able to use self-reflection to assess their behavior for authenticity, honesty, and respect and articulate how this impacts their greater community.
Self-Awareness Social-Awareness	Learners will be able to identify how family and culture impact their thoughts and actions.	Learners will be able to reflect on their own beliefs relative to different familial and societal norms.	Learners will be able to explain how their beliefs can impact their growth and success, and advocate for their beliefs.
Self-Management	Learners will be able to consistently set attainable, realistic goals, and persist until their goals are achieved.	Learners will be able to reflect on the progress of personal goals in order to adjust action steps and time frames as necessary.	Learners will be able to set short- and long-term group goals, and create a plan to execute those goals. They will be able to analyze progress and collaborate to adjust goals when needed.
Self-Awareness Self-Management	Learners will be able to identify successes and challenges, and how they can learn from them.	Learners will be able to recognize barriers to succeeding and identify supports to help themselves.	Learners will be able to demonstrate perseverance when dealing with challenges and adversity.

Table 6. Social and Emotional Competencies: Self-Concept (Wisconsin Department of Public Instruction 21)

Social Competence: Establishing and maintaining positive relationships by respecting others, practicing social skills, and making responsible choices while recognizing and connecting to the community at large.			
CASEL Domain	**6th - 8th (Low)**	**9th – 10th (Med)**	**11th – Adult (High)**
Social Awareness	Learners will be able to show respect for other people's perspectives.	Learners will be able to identify positive ways to express understanding of differing perspectives.	Learners will be able to demonstrate conversational skills to determine the perspective of others.
Social Awareness	Learners will be able to reflect how cross-cultural experiences can influence their ability to build positive relationships.	Learners will be able to support the rights of individuals to reflect their family, culture, and community within the school setting.	Learners will be able to support the rights of all individuals to reflect their family, culture, and community in society.
Social Awareness	Learners will be able to identify discrimination of individuals and groups based upon perceived differences.	Learners will be able to assess for personal bias and evaluate strategies to oppose stereotyping.	Learners will be able to develop ethical arguments from a variety of ethical positions to evaluate societal norms.
Relationship Skills	Learners will be able to recognize the emotional, physical, social, and other costs of negative relationships.	Learners will be able to independently seek and sustain positive, supportive relationships.	Learners will be able to maintain positive relationships and use effective strategies (e.g., boundary setting, stating your needs, and recognizing warning signs) to avoid negative relationships.
Relationship Skills	Learners will be able to use active listening and assertive, clear communication when expressing thoughts and ideas.	Learners will be able to use assertive communication, including refusals, to get their needs met without negatively impacting others.	Learners will be able to use assertive communication, including refusals, in a variety of settings and with a variety of audiences to get their needs met, without negatively impacting others.
Relationship Skills	Learners will be able to recognize and respond	Learners will be able to accept constructive feedback.	Learners will be able to evaluate constructive feedback

	appropriately to constructive feedback.		and provide constructive feedback when needed.
Relationship Skills	Learners will be able to work cooperatively and productively in a group and overcome setbacks and disagreements.	Learners will be able to formulate group goals and work through an agreed upon plan.	Learners will be able to recognize how each group member's skills contribute toward group goals.
Relationship Skills	Learners will be able to apply negotiation skills and conflict resolution skills to resolve differences.	Learners will be able to self-reflect on their role in a conflict to inform their behavior in the future.	Learners will be able to consistently resolve interpersonal conflicts across settings (e.g., school, work, community, and personal relationships).
Decision-making	Learners will be able to generate a variety of solutions and outcomes to a problem with consideration of wellbeing for oneself and others.	Learners will be able to apply steps of systemic Decision-making with consideration of well-being for oneself and others.	Learners will be able to consider a variety of factors (e.g., ethical, safety, and societal factors) in order to make decisions that promote productive social and work relations.
Social Awareness	Learners will be able to identify how social norms for behavior vary across different settings and within different cultures.	Learners will be able to identify the purpose of social norms for behavior across situations and how these norms are influenced by public opinion.	Learners will be able to evaluate the ways in which public opinion can be used to influence and shape public policy.
Decision-making Relationship Skills	Learners will be able to identify the impact of their decisions on personal safety and relationships.	Learners will be able to use negotiation and refusal skills to resist unwanted pressures and maintain personal health and safety.	Learners will be able to evaluate factors that impact personal and community health and safety, and apply appropriate preventative and protective strategies (e.g., health and wellness, sleep, healthy relationships).

Social Awareness Relationship Skills	Learners will be able to advocate for themselves.	Learners will be able to advocate for their needs and the needs of others by utilizing educational and community support networks.	Learners will be able generate positive choices and proactively advocate for themselves and others across settings (e.g., school, community, work, and personal relationships).
Decision-making Social Awareness Relationship Skills	Learners will be able to, with adult guidance, create an action plan that addresses a need in the classroom, school, or community.	Learners will be able to independently create an action plan that addresses real needs in the classroom, school, and community	Learners will be able to analyze opportunities to improve their community and engage in civic activities to influence issues impacting various communities.

Table 7. Social and Emotional Competencies: Social Competence (Wisconsin Department of Public Instruction 24-25)

Overlapping Competencies in Critical Thinking and SEL

This section explores the intersection of the competencies present in the aforementioned frameworks of critical thinking and SEL to inform the development of a rubric I will create for assessing the presence of the identified overlapping competencies in TTRPGs. Critical thinking is a vital skill in the 21st century (Heard et al. 1) for navigating the complexities of today's information-rich environment (Chen and Wu 3018). Central to this integration it is important to recognize that both critical thinking and SEL contribute to developing a holistic skill set that helps navigate the complexities of the information-saturated environment students live in today. Critical thinking encompasses inference, evaluation, analysis, interpretation, and self-regulation as

cognitive skills which enable individuals to make reflective and reasoned decisions (Heard et al. 5). This aligns with the psychological perspective of critical thinking, which emphasizes the importance of analysis and evaluation in problem-solving and decision-making (Heard et al. 2). On the other hand, the SEL framework prioritizes emotional and social skills as vital for the development of personal growth and interpersonal interactions. This includes competencies such as self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (CASEL 2). The convergence of critical thinking and SEL frameworks suggests that TTRPGs could be leveraged to teach and assess these overlapping competencies and could potentially offer a more holistic approach to education. Decision-making emerged as an overlapping skill where critical thinking's emphasis on reasoned judgment intersects with SEL's focus on responsible choices. Executing effective decision-making requires both analytical evaluation of one's options and consideration of the social and emotional impacts of those decisions. The rubric will assess if a TTRPG allows students to face complex scenarios that require strategic planning and ethical considerations in order to be deemed nurturing to both sets of competencies.

Similarly, information analysis aligns with perspective-taking. This highlights the importance of evaluating the reliability of information presented to a student and the bias of sources that provide that information while also, in tandem, fostering empathy and understanding of diverse viewpoints. TTRPGs may provide opportunities for players to practice these skills with their intricate narratives and diverse character interactions. The rubric will assess if a TTRPG requires students to critically analyze in-game information

and consider the motivations of other characters and if this enhances their ability to discern trustworthy information and empathize with others.

Self-reflection and metacognition are another area of overlap where both frameworks emphasize the importance of understanding one's own thought processes and emotional states. Critical thinking encourages individuals to identify and challenge their own assumptions, while SEL promotes self-awareness and emotional regulation. The rubric will assess if players engage in continuous self-reflection to adjust their strategies and manage their interactions, thereby strengthening both their cognitive and emotional intelligence.

Effective communication and argumentation further demonstrate the interconnectedness of critical thinking and SEL. The ability to construct well-reasoned arguments and articulating thoughts clearly is essential for both persuasive communication and building healthy relationships. The rubric will assess if TTRPGs require players to negotiate outcomes, present strategies, and resolve conflicts through clear and respectful dialogue, thereby reinforcing both of these competencies.

Lastly, pattern recognition and connections illustrate how identifying patterns in information and social behaviors can enhance both analytical skills and social awareness. The dynamic and evolving nature of TTRPGs may require players to recognize and adapt to patterns within the game's narrative and among fellow players. The rubric will assess if a TTRPG can foster a deeper understanding of both the game mechanics and the social dynamics at play.

In developing the rubric to assess TTRPGs, these overlapping competencies are the foundation for evaluating how effectively these games cultivate the overlap of critical thinking and SEL competencies. When developing this rubric, it is important to recognize that the nuanced nature of these competencies requires an emphasis on qualitative measures rather than stricter quantitative measures. A simplified three-point scale; required, optional, and absent, will provide a clear and adaptable framework for educators to assess the presence of specific competencies within a game's rulebook and gameplay mechanics.

The rubric can evaluate how specific actions and scenarios within TTRPGs encourage critical analysis, ethical decision-making, empathy, and effective communication by focusing on game mechanics and key terms related to critical thinking and SEL. For instance, scenarios that require players to weigh strategic outcomes against ethical implications can be assessed for their ability to foster responsible decision-making and social awareness.

Overall, this integrated framework facilitates a comprehensive assessment of TTRPGs as educational tools and highlights their potential to develop these dual skill sets in students. This type of approach ensures that the evaluation process captures the potential multifaceted benefits of students playing TTRPGs and ultimately supports their use in fostering resilient and developing emotionally intelligent individuals capable of thriving in today's complex social and informational landscapes.

Overlapping Competencies			
Critical Thinking Competencies	**SEL Competencies**	**Why they overlap**	**Rubric Criteria**
Strand 3 (Decision-making): "While related to problem-solving, decision-making is distinct in that it only necessarily requires the analytical and evaluative – rather than the generative or creative – aspects of problem-solving, thus aligning more neatly within a framework of critical thinking (Heard et al. 15)."	**Responsible decision-making**: "The abilities to make caring and constructive choices about personal behavior and social interactions across diverse situations (CASEL 2)."	**Both competencies:** • Emphasize identifying criteria for decision-making. • Focus on evaluating options against these criteria. • Stress the importance of considering the consequences of decisions.	**Create a category for "Decision-making and problem-solving"** to assess TTRPGs on their ability to: • Present complex scenarios requiring multi-faceted decision-making. • Provide clear consequences for decisions made. • Encourage players to articulate their decision-making process.
Strand 1 (Knowledge construction), Aspect 1.2 (Discriminates amongst information): "Discriminating amongst information and evidence includes identifying and evaluating factors such as the currency, reliability, relevance, authorship, completeness or	**Social awareness:** "The abilities to understand the perspectives of and empathize with others, including those from diverse backgrounds, cultures, & contexts (CASEL 2)."	**Both competencies:** • Emphasize evaluating the reliability of information sources. • Focus on understanding and considering diverse perspectives. • Involve recognizing biases in information and viewpoints.	**Create a category for "Analyzing information and perspectives"** to assess TTRPGs on their ability to: • Present information from multiple, potentially conflicting sources. • Encourage players to consider the motivations and biases of in-game characters.

veracity of it. It may include distinguishing fact from opinion, determining the strength of evidence provided for a given claim and discerning information that is directly useful for one's purposes from that which is not (Brookfield, 1997; Fisher & Scriven, 1997; Sternberg, 1986) (Heard et al. 13)."			• Require players to synthesize information from diverse perspectives.
Strand 2 (Evaluating reasoning), Aspect 2.2 (Identifies assumptions and motivations): "It involves identifying where certain conclusions are predicated on assumptions, what assumptions these are, and whether they are reasonable (Ennis, 2018; Glaser, 1941). Related to this, it entails the ability to think skeptically about opinions, explanations or propositions made, in order to identify possible biases	**Self-awareness:** "The abilities to understand one's own emotions, thoughts, and values and how they influence behavior across contexts (CASEL 2)."	**Both competencies:** • Focus on identifying personal assumptions and biases. • Emphasize understanding one's own thought processes and motivations. • Require reflecting on the impact of one's decisions and actions.	**Create a category for "Self-reflection and metacognition"** to assess TTRPGs on their ability to: • Prompt players to reflect on their in-game decisions and motivations. • Provide opportunities for players to recognize and challenge their assumptions. • Encourage players to consider how their actions affect the game world and other characters.

that may be governing the line of reasoning presented, and the values or beliefs that may be motivating these (McPeck, 1981; Mezirow, 2009) (Heard et al. 14)."			
Strand 2 (Evaluating reasoning), Aspect 2.3 (Justifies arguments): "Justifying arguments involves the ability to formulate one's ideas, and hold one's own claims and opinions to account by supporting them with evidence and sound reasoning, and avoid biases in one's own reasoning (Fisher & Scriven, 1997). It also demands the ability to predict, both accurately and logically, the consequences of what one is proposing. (Heard et al. 14)."	**Relationship skills:** "The abilities to establish and maintain healthy and supportive relationships and to effectively navigate settings with diverse individuals and groups (CASEL 2)."	**Both competencies:** • Emphasize constructing well-reasoned arguments. • Focus on clear and effective communication of ideas. • Consist of considering and responding to counterarguments.	**Create a category for "Effective communication and argumentation"** to assess TTRPGs on their ability to: • Provide opportunities for players to construct and present arguments in-game. • Encourage dialogue and debate between characters. • Require players to consider and respond to opposing viewpoints.

Strand 1 (Knowledge construction), Aspect 1.3 (Identifies patterns and makes connections): "This aspect refers to the act of reflecting on and organising information such as data, evidence, statements, questions, concepts, opinions, and other forms of representation, in order to create sense and meaning from it (Sternberg, 1986; Watson & Glaser, 1964). It requires the ability to analyse and sort information to find patterns and construct conceptual relationships within it (Fisher & Scriven, 1997) (Heard et al. 13)."	**Self-awareness:** "The abilities to understand one's own emotions, thoughts, and values and how they influence behavior across contexts(CASEL 2)." **Social awareness:** "The abilities to understand the perspectives of and empathize with others, including those from diverse backgrounds, cultures, & contexts (CASEL 2)."	**All three competencies:** • Emphasize identifying patterns in information or behavior. • Focus on making connections between different pieces of information. • Encourage applying recognized patterns to new situations.	**Create a category for "Recognizing patterns and making connections"** to assess TTRPGs on their ability to: • Present complex narratives or game mechanics with underlying patterns. • Encourage players to make connections between seemingly unrelated events or information. • Provide opportunities for players to apply recognized patterns to solve new challenges.

Table 8. Overlapping competencies between critical thinking and social-emotional learning (SEL) frameworks.

Literature Review: Research on Game-Based Learning

To develop an understanding of how TTRPGs can be used for learning, my thesis relies on answering a key question about game-based learning (GBL). What components of GBL can be leveraged to enhance critical thinking and SEL learning outcomes and skill development? The effectiveness of GBL lies in its ability to create immersive and engaging learning environments that foster active participation and motivation among players. Theoretical frameworks such as the Gamification Octalysis Framework have been instrumental in understanding how game mechanics can drive user engagement and facilitate deeper learning experiences. This framework emphasizes eight core drivers, three of which represent key components of GBL that can be leveraged to enhance critical thinking and SEL learning outcomes: unpredictability, curiosity, and player autonomy. These are all crucial elements in overcoming initial barriers to cognitive dissonance through play. A caveat to keep in mind is, regardless of the promising potential of GBL, there remains a gap in exploring how these frameworks specifically enhance critical thinking and social-emotional competencies, particularly within the context of TTRPGs.

TTRPGs have been increasingly recognized for their educational potential because they offer a unique platform for promoting collaboration, problem-solving, and creative thinking. Research indicates that TTRPGs facilitate experiential learning by immersing players in complex scenarios that require strategic decision-making and teamwork. Studies have shown that engaging in TTRPGs can enhance empathy, communication skills, and the ability to navigate diverse social dynamics. Additionally,

TTRPGs provide a safe space for students to experiment with different roles and perspectives, thereby fostering a deeper understanding of themselves and others. However, integrating TTRPGs into formal educational settings faces criticisms related to the need for experienced game masters, the time investment required, and the potential for unequal participation among players.

Through a comprehensive literature review of 17 sources[2], four recurring themes emerged as focal points for my research on the transformative power of tabletop role-playing games (TTRPGs) as pivotal tools in game-based learning (GBL) for enhancing social and emotional learning (SEL) competencies: 1) *Critical Thinking*, 2) *Social and Emotional Learning*, 3) *Engagement and Motivation*, and 4) *Collaborative and Cooperative Learning*. My thesis explores how TTRPGs can cultivate essential SEL skills, with a particular emphasis on how gameplay's critical thinking and problem-solving contribute to the development of empathy, collaboration, and emotional regulation. Using the evidence from the literature review of the sources identified in the table below, I have analyzed the key findings within each of the four major themes. These four recurring themes are subcategorized to provide organization for information based on common topics. A figure showing the breakdown of the four major themes and their subcategories is shown below in Figure 2. Detailed notes organized by each source that informs this literature review can be found in Appendix E.

[2] For a high-level overview of the sources used in the Literature Review, reference Table 9 starting on p. 34

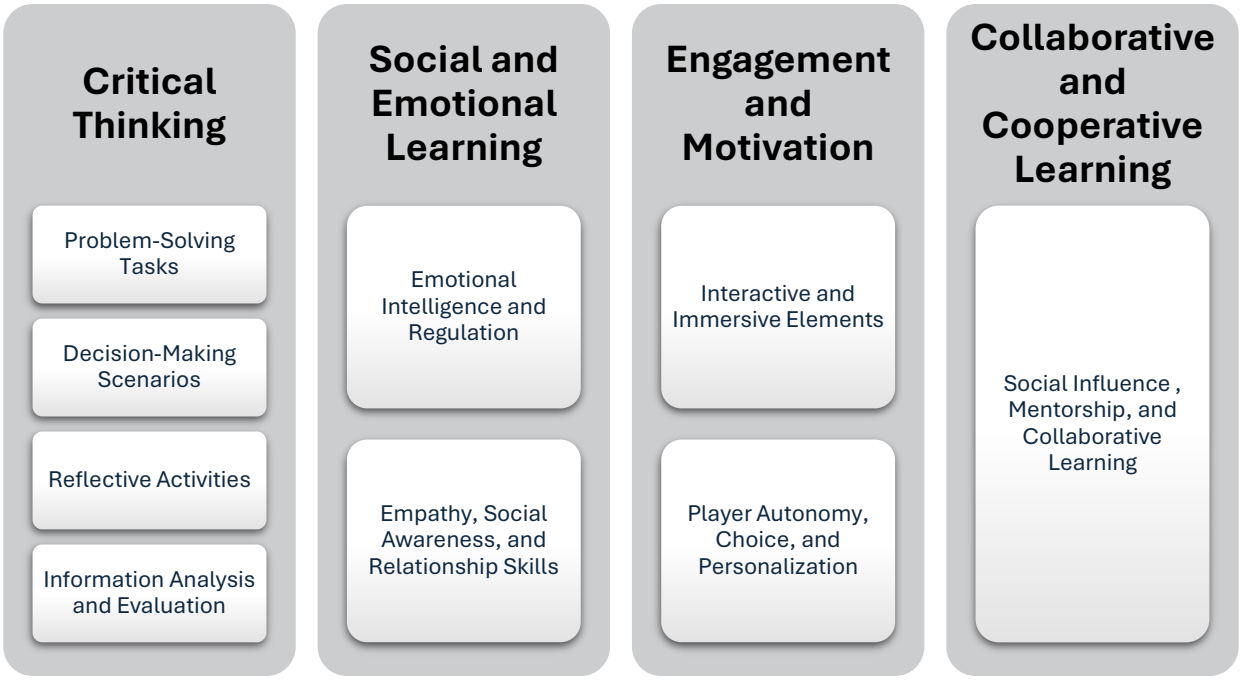

Figure 2. Literature Review Themes and Subcategories

Source ID	Source	Annotated Bibliography
1	Mohanty, Sattwik, and Prabu Christopher B. "A Bibliometric Analysis of the Use of the Gamification Octalysis Framework in Training: Evidence from Web of Science." *Humanities and Social Sciences Communications*, vol. 10, no. 1, Nov. 2023, pp. 1-5,10. https://doi.org/10.1057/s41599-023-02243-3.	This research paper conducts a bibliometric analysis of the Gamification Octalysis Framework in training, examining publication trends, leading nations, authors, and the most frequently used keywords from 2017 to 2023. It aims to provide insights into the framework's effectiveness and its growing influence in educational contexts.

2	Chen, Hsiu-Ling, and Cheng-Ting Wu. "A Digital Role-Playing Game for Learning: Effects on Critical Thinking and Motivation." *Interactive Learning Environments*, vol. 31, no. 5, July 2023, pp. 3018-3021,3023-3027. https://doi.org/10.1080/10494820.2021.1916765.	This research paper examines the impact of a digital role-playing game on high school students' critical thinking abilities and learning motivation. It demonstrates significant improvements in critical thinking performance, particularly in assumption identification and evaluation of arguments, following participation in a structured game-based learning environment.
3	De Vero, Ivo, and Matthew Barr. "A Historical Text-Based Game Designed to Develop Critical Thinking Skills." *International Journal of Game-Based Learning*, vol. 13, no. 1, May 2023, pp. 1-3,5,8-11. https://doi.org/10.4018/IJGBL.323138.	This research paper discusses the design and development of a text-based game aimed at enhancing critical thinking skills in the context of history by integrating Schon's reflective practitioner model with game-based learning principles. The game, titled Evenir Case Files, encourages players to engage in historical inquiry and source validation through interactive gameplay.
4	Cumming, Michelle et al. "Addressing Middle Schoolers' Disruptive Behavior: The Importance of Fostering Student Executive Functioning." *Teaching Exceptional Children*, vol. 55, no. 3, pp. 177,181-185. https://doi.org/10.1177/00400599221093393.	This research paper discusses the importance of fostering executive function (EF) skills in middle school students, particularly those with or at risk for emotional and behavioral disorders (EBD), by implementing strategies to reduce school-based stress and enhance supportive learning environments. It emphasizes the need for data-informed decision-making to assess the effectiveness of these interventions in promoting student success.
5	Goodsett, Mandi. "Best Practices for Teaching and Assessing Critical Thinking in Information Literacy Online Learning Objects." *The Journal of Academic Librarianship*, vol. 46, no. 5, Sept. 2020, pp. 1-6. https://doi.org/10.1016/j.acalib.2020.102163.	This research paper explores best practices for teaching and assessing critical thinking in information literacy online learning objects, guided by a thorough literature review. It aims to develop a rubric to evaluate the effectiveness of online tutorials in fostering critical thinking skills among students.

6	Foster, James et al. “Creating Conditions for Social-Emotional Learning: An Ecological Framework.” *Theory Into Practice*, vol. 61, no. 2, pp. 229-232, 225-226. https://doi.org/10.1080/00405841.2022.2036059.	This research paper examines how racist structures negatively impact students' social and emotional development and proposes an ecological framework to leverage social-emotional learning (SEL) across micro, meso, and macro levels to disrupt these structures. It emphasizes the importance of community involvement in implementing SEL effectively and with integrity.
7	Rouse, Rebecca, and James Malazita. “Critical Disciplinary Thinking and Curricular Design in Games.” *Design Issues*, vol. 39, no. 1, Jan. 2023, pp. 88,90-97,99. https://doi.org/10.1162/desi_a_00708.	This research paper discusses the implications of game design education on social consciousness, emphasizing the need to balance technological solutions with human-centered approaches to address social complexities and inequalities. It critiques the corporate influence on education and the potential pitfalls of prioritizing profit over public good in the context of game design and technology.
8	Marone, Mark. “Critical Thinking: The Essential Skill for Navigating the Future.” *Dale Carnegie & Associates, Inc*., 2020, pp. 2-6.	This white paper discusses the importance of critical thinking skills in the workforce, highlighting their role in effective problem solving, decision making, and organizational transformation. It emphasizes that strong critical thinking abilities are essential for individuals to navigate complex issues and contribute to their organizations' success in a changing environment.
9	King, Elizabeth M. “Designing After-School Learning Using the Massively Multiplayer Online Role-Playing Game.” *Theory Into Practice*, vol. 54, no. 2, 2015, pp. 128-134. https://doi.org/10.1080/00405841.2015.1010844.	This research paper discusses the design of after-school programs utilizing massively multiplayer online role-playing games (MMOs) as dynamic environments for fostering 21st-century skills among students. It emphasizes the importance of interest-driven learning, social engagement, and the role of teachers as co-learners in these gaming contexts.

10	Angelelli, Claudia Viviana et al. “Developing Critical Thinking Skills through Gamification.” *Thinking Skills and Creativity*, vol. 49, 2023, pp. 1-11. https://doi.org/10.1016/j.tsc.2023.101354.	This research paper discusses the development of a serious card-based role-playing game aimed at enhancing critical thinking skills among vulnerable communities in Brazil, particularly in the context of misinformation during the COVID-19 pandemic. It highlights the collaborative process of engaging with participants from various backgrounds to address their communicative needs and foster problem-solving abilities through gamification.
11	Mao, Weijie et al. “Effects of Game-Based Learning on Students’ Critical Thinking: A Meta-Analysis.” *Journal of Educational Computing Research*, vol. 59, no. 8, 2022, pp. 1682-1683,1685,1698. https://doi.org/10.1177/0735633211007098.	This research paper synthesizes research on the benefits and use of games, role-plays, and simulations in middle school U.S. history classrooms, highlighting their impact on student learning and skills development. It provides examples and discusses how these student-centered approaches can enhance critical thinking, problem-solving, and collaboration among students.
12	Worthington, Tracy Anne. “Letting Students Control Their Own Learning: Using Games, Role-Plays, and Simulations in Middle School U.S. History Classrooms.” *The Social Studies*, vol. 109, no. 2, 2018, pp. 136-146,148. https://doi.org/10.1080/00377996.2018.1460791.	This research paper synthesizes research on the benefits and use of games, role-plays, and simulations in secondary history classrooms, highlighting their positive impact on student learning. It discusses how these student-centered approaches enhance critical thinking, problem-solving, and collaborative skills through hands-on learning experiences.
13	Wu, Zezhen et al. “Measuring the Dosage of Brief and Skill-Targeted Social-Emotional Learning (SEL) Activities in Humanitarian Settings.” *Frontiers in Psychology*, vol. 13, 2023, pp. 1-4,10-13. https://doi.org/10.3389/fpsyg.2022.973184.	This research paper develops procedures to measure the dosage of brief and skill-targeted social-emotional learning (SEL) activities in humanitarian settings and explores their relationship with children's outcomes. The findings suggest promising strategies for improving the implementation and effectiveness of SEL programming, particularly in crisis-affected low-resource environments.

14	Corbitt, Alex. “Playing with Identities: Negotiating Coauthorship and Role-Playing Interactions across Game and Metagame Talk.” *Linguistics and Education*, vol. 80, April 2024, pp. 1,4-8. https://doi.org/10.1016/j.linged.2024.101293.	This research paper explores how youth participants in a role-playing game (RPG) utilize metagame talk to navigate between their character and player identities, impacting their collaborative storytelling and interpersonal relationships. It analyzes conversational shifts and their effects on co-authorship practices within the RPG context.
15	Hromek, Robyn, and Sue Roffey. “Promoting Social and Emotional Learning with Games.” *Simulation & Gaming*, vol. 40, no. 5, pp. 626-628,637. https://doi.org/10.1177/1046878109333793.	This research paper reviews the theoretical and practical literature on using games to promote social and emotional learning (SEL) in young people, arguing that games are effective tools for developing essential social skills. It emphasizes the role of facilitators in enhancing learning through collaborative game play and highlights the benefits of games in fostering emotional resilience and prosocial behaviors.
16	Ruiz-Ezquerro, Antonio. “Rolling dice and learning: Using role-playing games as pedagogy tools.” *The Journal of Campus Activities Practice and Scholarship*, vol. 3, no. 2, 2021, pp. 50–54. https://doi.org/10.52499/2021022.	This research paper explores the use of role-playing games (RPGs) as effective pedagogical tools in various educational settings, emphasizing their ability to enhance engagement and experiential learning. It suggests modifications to traditional role-play activities to create more realistic and impactful learning experiences.
17	Chen, Hsiu-Ling, and Yun-Chi Chuang. “The Effects of Digital Storytelling Games on High School Students' Critical Thinking Skills.” *Journal of Computer Assisted Learning*, vol. 37, 2021, pp. 265-274. https://doi.org/10.1111/jcal.12487.	This research paper discusses the use of a game engine, Ren'py, for designing digital storytelling (DST) games to enhance students' critical thinking skills through collaborative learning and interactive experiences. It highlights the benefits of non-linear storytelling and the development of problem-solving abilities among students.

Table 9. Annotated Bibliography of Literature Review Sources

Critical Thinking Theme

The *Critical Thinking* theme focuses on how TTRPGs effectively enhance critical thinking skills by presenting players with a diverse range of cognitive challenges embedded within gameplay. The integration of problem-solving tasks encourages strategic thinking and reflection-in-action because players must continuously adapt their approaches in response to new information and complex scenarios. Decision-making scenarios within TTRPGs present opportunities for players to engage with ethical considerations and real-world implications. This promotes the development of informed decision-making skills applicable to authentic situations. Incorporating structured reflective activities, such as debriefing sessions and facilitated discussions, further encourages players to analyze their in-game choices, which in turn fosters metacognition and self-regulation.

Moreover, TTRPGs provide a dynamic platform for information analysis and evaluation. Players are challenged to assess the reliability of sources, consider contextual factors, and identify potential biases while navigating complex information landscapes. Through the integration of these elements TTRPGs present a platform capable of cultivating critical thinking skills across various cognitive domains as well as creating an engaging and immersive learning experience that extends beyond the game itself.

Problem-Solving Tasks

De Vero and Barr emphasize the significance of reflection-in-action in TTRPGs by illustrating how players continuously adjust their strategies and reassess their

understanding as they encounter new information (De Vero and Barr 10). The persistent exposure to reflection-in-action through gameplay promotes ongoing adaptability. It allows the players to be constantly challenged and improve their thinking processes given an evolving stream of information.

Building on this concept of reflection-in-action, Marone provides a complementary framework for problem-solving in games, but with a greater emphasis on critical thinking. Marone introduces a five-phase model for problem-solving, which highlights the role of critical thinking in enhancing this process through phases 2, creative thinking, and 4, decision-making (Marone 3-4). The model highlights the need for TTRPGs that are being used to develop critical thinking skills to include intricate tasks that demand strategic thinking. This finding supports the integration of problem-solving elements within TTRPGs that are being used to develop critical thinking skills.

While De Vero, Barr, and Marone focus on the cognitive processes involved in TTRPG problem-solving, Ruiz-Ezquerro examines the specific game elements that facilitate these processes. In order to create immersive and challenging learning environments, Ruiz-Ezquerro argues that RPG elements, such as dice rolls and game masters, create immersive and challenging learning environments (Ruiz-Ezquerro 50-51). These elements require students to think critically and adapt to unforeseen situations, thus fostering the ability within players to consider diverse viewpoints from their own and modify their gameplay strategies accordingly.

Moving from theoretical frameworks to practical applications, Chen and Chuang provide empirical evidence supporting the effectiveness of game-based learning in

developing critical thinking skills. Chen and Chuang found that a digital storytelling game design process benefits high school students by enhancing critical thinking and problem-solving skills (Chen and Chuang 265). Through student interviews, their study demonstrated the perceived advantages of incorporating problem-solving tasks in game-based learning. Their findings, though qualitative in nature, reinforced the effectiveness of TTRPGs in developing these essential skills from the perceived perspective of students, indicating that the students involved in this study had a value-added experience.

Synthesizing these diverse perspectives, integrating problem-solving tasks in TTRPGs effectively enhances critical thinking by embedding complex, strategic challenges that require adaptive learning. These tasks compel players to engage deeply with content, which, in turn, fosters an environment where reflection-in-action becomes a natural part of gameplay. By drawing on diverse perspectives and encouraging strategic adjustments, TTRPGs establish an integral framework for cultivating critical thinking skills in educational settings.

Decision-Making Scenarios

Decision-making scenarios in TTRPGs provide valuable opportunities for players to engage in critical thinking. These scenarios can be designed to encourage players to consider multiple perspectives, identify potential biases, understand real-world implications, and weigh ethical considerations (Worthington 138, Ruiz-Ezquerro 50). This process is crucial for developing players' ability to make informed decisions and understand the consequences of their choices. TTRPGs can simulate real-world problems

in a safe, engaging environment where players learn by doing (Worthington 138, Ruiz-Ezquerro 50, Mao et al. 1683-1684).

Expanding on the foundational concepts of decision-making in TTRPGs, researchers have explored various approaches to enhance the learning experience. Incorporating real-world references into the game, particularly in critical thinking questions related to “assumption identification” and “evaluation of arguments”, has proven to be highly effective (Chen and Wu 3022, 3026-3027). This approach bridges the gap between game scenarios and real-life situations, making the decision-making process more relevant and impactful for players (Chen and Wu 3022, 3026-3027). For instance, a game could present players with a scenario involving a character making claims about a social issue. Players are then tasked with identifying the assumptions underlying the character's argument and evaluating its validity based on evidence presented in the game and their own real-world knowledge. This encourages players to apply critical thinking skills to real-world issues and to recognize the importance of evidence-based reasoning.

While Chen and Wu focus on specific critical thinking tasks, other researchers emphasize the broader benefits of realistic TTRPG scenarios. By designing TTRPG scenarios that mirror real-world complexities, players can develop a deeper understanding of complex issues (Worthington 138,140), learn to consider multiple perspectives (Worthington 138-139, Ruiz-Ezquerro 51), practice essential skills like communication, collaboration, and problem-solving (Ruiz-Ezquerro 50, Worthington 139, Angelelli et al. 2). This holistic approach complements the specific critical thinking

tasks proposed by Chen and Wu, creating a comprehensive learning environment that fosters both targeted and broad-based critical thinking skill development.

Reflective Activities

Reflective activities are crucial components of TTRPGs because they encourage players to analyze their gameplay and personal growth and promote metacognition, self-regulation, and critical self-reflection. These activities enhance the learning experience by encouraging players to think deeply about their actions and choices within the game (Ruiz-Ezquerro 50, 54). While Ruiz-Ezquerro provides a broad overview of reflective activities in TTRPGs, Cumming et al. offer a more focused perspective on self-regulation, particularly for at-risk students. Self-regulation is essential for developing executive functioning skills in TTRPGs, which are vital for managing emotions, thoughts, and behaviors (Cumming et al. 183). This is particularly important for middle school students at risk for emotional and behavioral disorders (Cumming et al. 183). TTRPGs can provide a structured environment for students to practice self-regulation skills (Ruiz-Ezquerro 50).

Expanding the focus from self-regulation to broader cognitive processes, Goodsett explores the role of metacognition in critical thinking development. Metacognition, the awareness and understanding of one's own thought processes, is crucial for developing critical thinking skills (Goodsett 3-4). Goodsett suggests that instructional strategies should encourage students to reflect on their thinking processes (Goodsett 3-4). Structured reflective activities in TTRPGs can help players analyze their decision-making and problem-solving strategies. For example, after a game session, players could discuss

the reasoning behind their choices, the factors they considered, and the outcomes of their decisions. Reflection questions could prompt players to consider alternative approaches they could have taken, the strengths and weaknesses of their strategies, and how their thought processes evolved throughout the game.

While Goodsett emphasizes individual metacognition, Worthington highlights the importance of group reflection through debriefing in role-playing activities. Debriefing and reflection are essential components of successful role-playing and simulation activities, especially TTRPGs. These activities encourage players to think critically about their in-game experiences, fostering personal growth and deeper learning. Worthington emphasizes the importance of debriefing and reflection in helping students process experiences, make connections to real life, and recognize the influence of their own perspectives (Worthington 136, 148). Debriefing sessions can be incorporated after significant in-game events or at the end of gameplay sessions. This allows players to discuss their thoughts and feelings, analyze their actions, and consider alternative approaches. TTRPGs offer a unique platform for integrating debriefing and reflection due to their interactive and collaborative nature. Players are actively involved in shaping the narrative, leading to more engaging and impactful learning experiences.

Complementing Worthington's focus on the general importance of debriefing, Hromek and Roffey delve into the specific role of facilitators in this process. Effective facilitation and debriefing are crucial for maximizing the SEL benefits of TTRPGs. Hromek and Roffey highlight the role of the facilitator in creating a safe environment where players feel comfortable sharing their thoughts and emotions (Hromek and Roffey

626, 637). Facilitators should guide players through structured reflection activities, prompting them to consider the ethical implications of their choices, develop empathy for others, and practice conflict resolution skills. They should also be prepared to address emotional crises, offering support and guidance when needed (Hromek and Roffey 637). This helps ensure that the game remains a positive and enriching experience for all players.

Building on the importance of facilitation, Chen and Wu highlight the benefits of collaborative reflection. Collaborative reflection, where players share their perspectives and learn from one another, has been shown to enhance critical thinking skills. Chen and Wu's research on digital storytelling games supports this notion (Chen and Wu 3018, 3024). They found that students who engaged in more in-depth discussions while designing a game demonstrated improvements in critical thinking. This finding can be applied to TTRPGs through group debriefing sessions where players can discuss the choices they made, the factors they considered, and the outcomes of their decisions. Facilitators can guide these discussions to help players identify biases, recognize assumptions, and explore alternative perspectives. This approach can also be extended to collaborative problem-solving activities within TTRPGs, which often involve situations that require players to work together to overcome challenges.

Information Analysis and Evaluation

TTRPGs offer a unique platform for players to analyze and evaluate information from various sources, requiring them to consider the reliability of sources, context, argumentation styles, and potential biases. This process helps players develop critical

thinking skills and media literacy, which are crucial for navigating the increasingly complex information landscape of the real world (De Vero and Barr 10, Rouse and Malazita 92, Mao et al. 1684). Players frequently encounter incomplete information, conflicting accounts, or biased perspectives during TTRPGs (Mao et al. 1684). To make sound decisions in the game, players must learn to evaluate the trustworthiness of sources, consider the context of the information presented, and identify potential biases (De Vero and Barr 9-10).

De Vero and Barr provide a detailed examination of how players evaluate information in historical TTRPGs, offering insights into the specific strategies players use. Their research serves as a foundation for understanding the cognitive processes involved in information analysis within TTRPGs. Evaluating sources and analyzing context are key aspects of information analysis in TTRPGs, particularly in historical settings (De Vero and Barr 9-10). De Vero and Barr's research on a text-based historical TTRPG emphasizes the significance of evaluating source reliability and context in historical analysis (De Vero and Barr 5, 9-10).

Building on their initial findings, De Vero and Barr elaborate on the specific criteria players use to assess source reliability. Their research found that study participants considered certain sources more reliable based on their closeness to the events in question and the lack of potential personal gain for the source's author (De Vero and Barr 9). For instance, they viewed the testimony of a village elder as more reliable than documents from the Royal Palace because the elder was closer to the event and had no incentive to manipulate the truth (De Vero and Barr 9). TTRPGs often present players

with a variety of sources, ranging from official documents and eyewitness accounts to rumors and legends. Players must learn to weigh the strengths and weaknesses of each source to determine its reliability (De Vero and Barr 9).

While De Vero and Barr focus on historical analysis in TTRPGs, Rouse and Malazita expand the scope to include critical analysis of societal structures, demonstrating how TTRPGs can be used to examine broader social issues. Rouse and Malazita argue for the development of games that challenge players to analyze and critique power structures, social norms, and the influence of technology on society (Rouse and Malazita 92, 102). This perspective aligns with the principles of evaluating potential biases in information sources, as information is often produced and disseminated within specific societal contexts that influence its content and presentation (De Vero and Barr 6, 10). For example, a TTRPG set in a fantasy world with a strict social hierarchy might present information about certain events differently based on the social standing of the source. Players would need to factor in the source's place within the hierarchy to assess the potential for bias. By participating in this kind of analysis, players gain a deeper understanding of how societal factors shape the creation and dissemination of information, both in the game and the real world.

Moving from theoretical frameworks to practical applications, Angelelli et al. offer evidence of how RPGs can foster critical evaluation skills across various topics. Their work complements the theoretical foundations laid by De Vero and Barr and Rouse and Malazita by providing empirical support for the effectiveness of TTRPGs in developing critical thinking skills. In addition to historical settings, RPGs can explore

many topics that require critical evaluation of information. Games dealing with social issues such as poverty, discrimination, or climate change can challenge players to consider various viewpoints and evaluate the validity of claims made by different interested parties (Angelelli et al. 10). Angelelli et al. highlight how an RPG enabled participants to demonstrate an increased ability to analyze and evaluate information, make real-world connections, and engage in respectful dialogue to reach shared solutions (Angelelli et al. 1, 10). Participants in the study emphasized the importance of listening to different viewpoints and using dialogue to reach decisions (Angelelli et al. 10). They were able to connect the allegorical game scenario to the real-world COVID-19 pandemic, demonstrating an ability to transfer their understanding to different contexts (Angelelli et al. 10).

While the previous researchers focus on the content and outcomes of TTRPGs, Corbitt takes a different approach by examining the mechanics that facilitate effective information analysis and evaluation. Clear and accessible game mechanics are essential for supporting effective information analysis and evaluation for players of all experience levels. Corbitt's work examines how “metagame talk” in tabletop RPGs allows players to clarify information, ensure fairness by discussing rules, and maintain out-of-game relationships (Corbitt 1). This “meta-level communication” demonstrates how thoughtfully designed game mechanics can help players develop information analysis skills while creating an inclusive and engaging gameplay experience (Corbitt 1). For instance, players can use metagame talk to clarify ambiguities in the game's rules or to negotiate how to apply those rules in specific situations (Corbitt 7). This process of open communication helps players understand the game's mechanics and ensures that

everyone is playing on a level playing field. Corbitt's focus on game mechanics complements the content-focused approaches of the other researchers, providing a more comprehensive understanding of how TTRPGs facilitate information analysis and evaluation.

Social and Emotional Learning Theme

The *Social and Emotional Learning (SEL)* theme emphasizes how TTRPGs can be powerful tools for developing emotional intelligence, empathy, social awareness, and relationship skills. TTRPGs provide a safe and structured environment for players to explore complex social situations and practice interacting with others in a meaningful way. By engaging in interactive scenarios and collaborative tasks players have the opportunity to develop a deeper understanding of their own emotions and the emotions of others. They also learn valuable skills for building and maintaining healthy relationships. For instance, as players work together to achieve a common goal in a TTRPG, they cultivate teamwork and communication skills that are essential for navigating social interactions.

Facilitators play a key role in maximizing the SEL potential of TTRPGs by modeling appropriate behavior, creating a positive learning environment, and mediating potential conflicts that arise during gameplay. They can further enhance SEL by incorporating structured reflective activities to encourage players to analyze their choices and connect their in-game experiences to real-life situations. These include activities such as debriefing sessions and facilitated discussions. In addition to facilitated discussions, research suggests that integrating a variety of brief SEL activities throughout gameplay,

such as mindfulness exercises and collaborative problem-solving scenarios, may be more effective than relying on a single approach.

TTRPGs can also promote empathy and perspective-taking by allowing players to assume the roles of characters with diverse backgrounds and experiences. This process encourages players to analyze social dynamics from multiple viewpoints which in turn challenges them to step outside of their comfort zones and consider perspectives different from their own. Players gain a deeper understanding of the complexities of human experience and develop a greater appreciation for diverse perspectives through these experiences.

Emotional Intelligence and Regulation

Emotional intelligence and regulation enhance the gameplay experience by promoting emotional awareness, expression, regulation, and stress management, while also addressing pre-existing classroom social dynamics. Players must consider the emotions of their characters and their fellow players to navigate social interactions and make decisions within the game (Hromek and Roffey 626). By integrating emotional intelligence into gameplay, TTRPGs encourage players to analyze emotional subtext (Hromek and Roffey 627-629).

Cumming et al. emphasize the importance of fostering executive functioning skills and reducing school-based stress, particularly for middle school students at risk for emotional and behavioral disorders (Cumming et al. 181). Building on the concept of self-regulation, Cumming et al. propose specific mindfulness techniques that can be

incorporated into gameplay (Cumming et al. 183). For example, the game master can lead players through brief breathing exercises before or after emotionally charged scenes. Mindfulness techniques play a vital role in promoting emotional regulation and stress management. Cumming et al. recommend teaching specific strategies like the STOP (Stop, Take a breath, Observe, Proceed) technique to help students manage stress and improve overall well-being (Cumming et al. 184).

Complementing Cumming et al.'s focus on specific techniques, Hromek and Roffey emphasize the importance of the overall gaming environment and the role of the facilitator in fostering SEL. Hromek and Roffey discuss how games can create safe and fun environments for practicing social and emotional skills (Hromek and Roffey 626). They argue that the facilitator plays a key role in modeling appropriate behavior, creating a positive learning environment, and mediating potential conflicts (Hromek and Roffey 626, 637).

Hromek and Roffey argue that a key element of successful SEL implementation through games is facilitation and debriefing (Hromek and Roffey 637). They stress that facilitators should foster positive relationships, address conflicts immediately, encourage reflection, and connect in-game experiences to real-life situations (Hromek and Roffey 637,640-641). This approach, according to Hromek and Roffey, helps to create a nurturing community where players feel comfortable exploring emotions. Hromek and Roffey also argue that games offer an ideal setting for children to learn how to regulate emotions (Hromek and Roffey 626). The structured nature of games provides a

framework for practicing SEL skills (Hromek and Roffey 631). The playful and interactive nature of games can also make learning more engaging and enjoyable.

Wu et al. offer a different perspective on SEL implementation. Their research discovered that a variety of brief SEL activities, rather than a single prolonged activity, correlated with more prosocial behavior among children (Wu et al. 1,12). This finding suggests that incorporating diverse SEL techniques throughout TTRPG gameplay may be more effective than a single approach. **This** finding suggests a potential strategy for TTRPG design, where game masters could incorporate diverse SEL techniques throughout gameplay, such as brief mindfulness exercises, facilitated discussions about character emotions, and collaborative problem-solving scenarios. This varied approach could help players engage with SEL dynamically and effectively.

Empathy, Social Awareness, and Relationship Skills

TTRPGs provide opportunities for practicing empathy and understanding diverse perspectives (Hromek and Roffey 627-629). Worthington's article highlights how TTRPGs, including games, role-plays, and simulations, can promote empathy and perspective-taking by allowing players to take on the roles of characters with diverse backgrounds and experiences (Worthington 141-147). Through various classroom activities students assumed the roles of historical figures or created characters within specific historical contexts, reflecting on complex social issues and historical events (Worthington 145-146). Students reflected on the difficulties faced by immigrants, the complexities of social and economic disparities, and the impact of historical events on individuals' lives (Worthington 147). Worthington emphasizes these experiences can help

students develop “soft skills” such as empathy, flexibility and teamwork (Worthington 139). By interacting with others in these roles, students gained a deeper understanding of different perspectives and developed a greater appreciation for the complexities of human experience (Worthington 139).

Expanding on her initial examples, Worthington elaborates on how role-playing can enhance historical understanding and critical thinking. Worthington also discusses how the process of researching and embodying a character encourages students to analyze historical events and social dynamics from multiple viewpoints (Worthington 142-144). For instance, in the Revolutionary Perspectives role-play, students researched the views of patriots and loyalists, leading to a more nuanced understanding of the tensions and motivations that fueled the American Revolution. (Worthington 142-144). Although Worthington focuses on educational contexts, her principles apply broadly to TTRPGs by challenging players to step outside their comfort zones to consider diverse perspectives.

Engagement and Motivation Theme

The *Engagement and Motivation* theme highlights how various elements within TTRPGs can contribute to a highly engaging and motivating learning experience. There is an emphasis on novelty and unpredictability as key factors in capturing and maintaining player interest. Unpredictability can be achieved through both narrative and mechanical means. Narrative elements like surprise rewards and hidden quests are identified as effective ways to pique players' curiosity and encourage them to explore further. Mechanical unpredictability, introduced through elements like dice mechanics,

similarly contributes to engagement by introducing an element of chance and challenging players to adapt to evolving situations. Player agency is also consistently mentioned as an effective mean through which to foster a more meaningful and memorable learning experience. By allowing players to create their own characters, make impactful choices within the game world, and experience the consequences of their decisions, TTRPGs cultivate a sense of ownership and control over the learning process.

Cognitive curiosity is specifically highlighted as a driving force in player engagement. Cognitive curiosity is defined as “a desire to bring better form to one’s knowledge structures”. TTRPGs can stimulate this curiosity and motivate players to actively seek out new information and develop their own understanding by presenting information that challenges players' existing knowledge and revealing information in parts. The value of supportive game environments is noted as aiding in maximizing the benefits of TTRPGs for learning. Such environments are characterized by clear guidance, emotional support, and strong player-facilitator relationships which provide a safe space for exploration and decision-making.

Interactive and Immersive Elements

In their paper “A Bibliometric Analysis of the Use of the Gamification Octalysis Framework in Training: Evidence from Web of Science,” Mohanty and Prabu discuss the importance of incorporating game design elements to increase user engagement and motivation in training programs (Mohanty and Prabu 2). The concept of unpredictability is discussed in the context of using surprise rewards and hidden quests to maintain learner engagement (Mohanty and Prabu 4). Mohanty and Prabu suggest that introducing

elements of surprise can excite users and encourage them to explore new learning opportunities (Mohanty and Prabu 4).

Like Mohanty and Prabu, De Vero and Barr emphasize the role of novelty in engaging players, but they focus more on cognitive curiosity as a driving force. Incorporating elements of surprise and novelty can significantly increase engagement by stimulating players' curiosity (De Vero and Barr 4). De Vero and Barr outline three key concepts for engaging players: goals, fantasy, and curiosity (De Vero and Barr 4). Cognitive curiosity is defined as "a desire to bring better form to one's knowledge structures," which De Vero and Barr claim is a powerful intrinsic motivator that game designers can leverage by presenting information that challenges players' existing knowledge (De Vero and Barr 4). By revealing information in parts, the game challenged players to seek out additional evidence and develop their own arguments (De Vero and Barr 10). This approach fostered a more active and engaged learning experience.

While Mohanty, Prabu, De Vero, and Barr focus on unpredictability through narrative elements, Ruiz-Ezquerro introduces mechanical unpredictability through dice mechanics. Ruiz-Ezquerro advocates for incorporating dice mechanics into role-playing activities to introduce unpredictability and challenge participants to adapt to evolving situations (Ruiz-Ezquerro 53-54). This element of chance encourages critical thinking and more realistic scenarios that better reflect real-world experiences (Ruiz-Ezquerro 53-54).

Upon reflection, De Vero and Barr's description of cognitive curiosity, Mohanty and Prabu**'s** unpredictability, and Ruiz-Ezquerro's dice rolls share characteristics of

enhanced value-add elements for players by introducing novel situations and information that can pique players' curiosity and motivate them to explore further. These overlapping themes highlight how different aspects of game design, whether narrative or mechanically driven, can collectively enhance player engagement by fostering a sense of exploration and discovery.

Player Autonomy, Choice, and Personalization

Cumming et al. emphasize the role of positive experiences and supportive environments in developing executive functioning (Cumming et al. 181). Students who are provided with clear guidance and emotional support in classrooms with strong teacher-student relationships tend to have better executive functioning outcomes. In the context of player autonomy, this can be translated into games that offers players a supportive framework where they feel safe to explore and make decisions. A structured learning environment that incorporates opportunities for student autonomy can reduce stress and enhance learning (Cumming et al. 181). This balance allows players to feel autonomous while still benefiting from a clear path that supports their development and engagement. Cumming et al. also notes the malleability of executive functioning and the effectiveness of targeted programming in improving these skills in students (Cumming et al. 181).

Similarly, Worthington advocates for a shift from teacher-centric to student-centered learning environments that emphasize the importance of autonomy and agency in learning experiences. Worthington strongly advocates for this shift in learning environments because it gives students greater agency and control over their learning

experiences (Worthington 136, 148). According to Worthington this shift can lead to improved critical thinking, collaboration, and problem-solving skills (Worthington 149). Worthington stresses the importance of student participation and teacher guidance in games and simulations (Worthington 139-140). Successful simulations involve students as active participants who must utilize their knowledge, critical thinking, and collaborative skills to navigate complex scenarios. Teachers act as facilitators, guiding and supporting students as they take ownership of their learning (Worthington 141).

In line with Cumming et al.'s focus on supportive environments, King discusses how aligning game-based programs with participant interests can enhance engagement and exploration. King discusses the benefits of identifying and following participant interests in game-based programs. Kind argues that educators can create more relevant and engaging learning experiences that encourage deeper exploration and understanding by understanding and incorporating students' interests (King 132, 134).

Across these perspectives, there is a repeated emphasis on the effectiveness of games in developing critical thinking skills, illustrating a consensus on the educational value of game-based learning environments. This consensus highlights how game environments can present players with challenging scenarios that require analysis, evaluation, and decision-making (De Vero and Barr 1,4, Chen and Wu 3018-3021, 3024-3028, Angelelli et al. 2,4,8, Mao et al. 1684-1686, 1700-1701, Chen and Chuang 267, 272, Ruiz-Ezquerro 50). Games, particularly collaborative RPGs, can act as “flight simulators” where players can explore and grapple with complex social issues in a safe and controlled environment (Angelelli et al. 4). Players actively participate in shaping the

narrative, making choices, solving problems, and collaborating with others which actively fosters a sense of ownership and control over the learning process (Worthington 139, Corbitt 1).

Collaborative and Cooperative Learning Theme

The Collaborative and Cooperative Learning theme explores how TTRPGs can effectively foster collaboration and cooperation among players. TTRPGs often present players with challenges and objectives that require teamwork and communication to overcome. This necessitates players to actively engage with one another, share knowledge and strategies, and work together towards common goals. By participating in these collaborative experiences, players can develop essential social skills, enhance their communication abilities, and learn the value of teamwork.

Social Influence, Mentorship, and Collaborative Learning

Mohanty and Prabu identify social influence and relatedness as a core driver within the Gamification Octalysis Framework (Mohanty and Prabu 1,3). Mohanty and Prabu argue that this core driver is connected to a person’s natural need to receive mentorship, approval from peers, and find friends (Mohanty and Prabu 3). This aligns with King's emphasis on mentorship, where more experienced players can guide and support newer players to foster a sense of community and shared learning (King 130). In addition to mentorship, Mohanty and Prabu highlight how competitive elements like leaderboards motivate players by creating challenges and a sense of accomplishment (Mohanty and Prabu 4-5).

Building on these concepts of social influence and mentorship, Angelelli et al. highlight the importance of relational learning in collaborative environments. They point out that participants develop communication and cooperation skills by working together towards common goals (Angelelli et al. 4). To support this relational learning clear expectations for respectful communication and collaboration are crucial (Angelelli et al. 4, 10; Chen and Wu 3019, 3025). In addition, clear communication channels help address conflicts and ensure all players feel heard, while giving players a voice in shaping the game fosters ownership and belonging (Angelelli et al. 10).

King further illustrates these dynamics through the use of guild structures in MMO environments, which naturally incorporate mentorship roles. Guilds facilitate collaboration by providing direct communication between members. This allows experienced players to guide newer ones and create a collaborative learning environment (King 128, 130). This organic mentorship can be encouraged by creating opportunities for players to share their knowledge and skills with one another (King 130).

Together, these perspectives emphasize the value of structured group tasks in fostering team dynamics that enhance both individual learning experiences and collective achievements. By integrating elements such as social influence, mentorship, relational learning, and structured collaboration through guilds or similar mechanisms, games can effectively support player development in communication, cooperation, and leadership skills.

Rubric Implications Based on Literature Review Findings

Subcategory of Four Major Themes	Criteria	Source of Criteria
Decision-Making & Problem-Solving	Presents challenges that require players to gather information, analyze options, and develop strategic solutions.	The *Problem-Solving Tasks* section emphasizes the importance of incorporating complex problem-solving tasks into TTRPGs to foster critical thinking.
Decision-Making & Problem-Solving	Encourages players to consider multiple perspectives and potential biases.	The *Decision-Making Scenarios* section highlights the value of presenting players with decision-making scenarios that have ethical considerations and real-world consequences.
Decision-Making & Problem-Solving	Encourages players to weigh the potential consequences of their choices.	The *Decision-Making Scenarios* section highlights the value of presenting players with decision-making scenarios that have ethical considerations and real-world consequences.
Analyzing Information & Perspectives	Requires players to evaluate the reliability and bias of sources.	The *Information Analysis and Evaluation* section stresses the importance of teaching players to critically evaluate information sources.
Analyzing Information & Perspectives	Encourages players to consider the context in which information is presented.	The *Information Analysis and Evaluation* section stresses the importance of teaching players to critically evaluate information sources.
Effective Communication & Argumentation	Provides structured opportunities for players to work together to achieve common goals.	The *Social Influence, Mentorship, and Collaborative Learning* section emphasize fostering collaborative problem-solving and communication skills.
Emotional Intelligence and Regulation	Provides opportunities for players to practice self-regulation skills, like managing stress or	The *Emotional Intelligence and Regulation* section suggests incorporating mindfulness techniques like breathing exercises into gameplay, especially before or after emotionally charged scenes.

	frustration during gameplay.	
Empathy, Social Awareness, and Relationship Skills	Encourages players to create characters with diverse backgrounds and experiences.	The *Empathy, Social Awareness, and Relationship Skills* section provides specific examples of how role-playing activities can be used to foster empathy and understanding.
Empathy, Social Awareness, and Relationship Skills	Presents scenarios that require players to consider different perspectives and understand the motivations and challenges of others.	The *Empathy, Social Awareness, and Relationship Skills* section provides specific examples of how role-playing activities can be used to foster empathy and understanding.
Empathy, Social Awareness, and Relationship Skills	Aids in dentifying potential biases and examining how social structures and power dynamics influence individuals' experiences.	The *Empathy, Social Awareness, and Relationship Skills* section highlights the importance of encouraging players to analyze social dynamics from multiple viewpoints.
Interactive and Immersive Elements	Incorporates elements of surprise, such as unexpected rewards or hidden challenges.	The *Interactive and Immersive Elements* section highlights the role of unpredictability in maintaining player engagement.
Player Autonomy, Choice, and Personalization	Provides meaningful choices that allow players to influence the narrative and shape the game world.	The *Player Autonomy, Choice, and Personalization* section emphasize the importance of player agency in fostering engagement and a sense of ownership over the learning process.

Table 10. Rubric implications Based on Literature Review findings.

Rubric Development for Assessing TTRPGs

Through the integration of the findings in Table 8 and Table 10, a rubric was created that can be used by educators to assess a TTRPG's value in addressing overlapping competencies in SEL and critical thinking. The rubric is divided into four assessment worksheets to assess different means of achieving the proposed criteria. These means are *Game Mechanics*, *Game Play (Rules-Based)*, *Game Master (Facilitator), Narrative Elements. Game Mechanics* refers to the inherent rules and systems of the TTRPG that directly influence player actions and choices. This includes elements like dice rolls, character stats, and turn-based actions. *Game Play (Rules-Based)* encompasses the overall player experience within the TTRPG and focuses on how the rules and mechanics shape interactions and scenarios. *Game Master (Facilitator)* highlights the active role of the game master or facilitator in guiding the TTRPG experience, setting the scene, moderating interactions, and prompting reflection. *Narrative Elements* refers to the story, setting, and characters presented in the TTRPG, which can be designed to evoke specific emotions, encourage certain choices, and prompt critical thinking. This category is distinct from "*Game Play (Rules Based)*" as it emphasizes the story and thematic elements of the game rather than the direct influence of rules.

In Appendix A, resources for educators can be found to help explain what the rubric is and how to use it as well as how educators can find and assess game guides using the rubric. The rubric template can be found in Appendix B. The first worksheet, named "Introduction" of the Excel workbook, contains an introduction stating the definitions of the means of achieving criteria along with a table of the point system for

assessing the presence of criteria in TTRPGs. Two points are rewarded if the criteria are required, one point if the criteria are optional, and zero points if the criteria are absent. The second worksheet contains an overview of the assessment points, which are auto-calculated based on the inputs in the four following rubric worksheets. The points scored for each of the four means of achieving criteria are then compared to the possible points, given two points are the most achievable for each criterion, and then a percentage score is calculated. The goal of this breakdown is for the educator to be able to assess the level of control they have over the shaping of TTRPGs through the *Game Master (Facilitator)* and *Narrative Elements* means of achieving the criteria against how much the *Game Mechanics* and *Game Play (Rules-Based)* shape the gaming experience. The seventh worksheet in the workbook contains the master list of criteria in which the source of each criterion used in the rubric is detailed, which means of achieving criteria to which they apply, and the reason for those selections.

By focusing on game mechanics and key terms related to critical thinking and SEL, the rubric can evaluate how specific actions and scenarios within TTRPGs encourage critical analysis, ethical decision-making, empathy, and effective communication. For instance, scenarios that require players to weigh strategic outcomes against ethical implications can be assessed for their ability to foster responsible decision-making and social awareness.

This rubric primarily focuses on assessing the presence of critical thinking and SEL elements within TTRPGs. Educators can gain valuable insights into a game's potential for educational value by carefully considering the different “means of achieving

criteria" and evaluating the presence of specific criteria within a game. However, please note that this rubric may not fully capture the nuances of how these competencies manifest during gameplay.

Case Study Analysis: Using Rubric on TTRPG Guides

This case study examines the application of the rubric developed for my thesis and applied to three different TTRPG guides: *Heart: The City Beneath, Micro Mysteries*, and *Lasers and Feelings*. The completed rubrics used to assess these TTRPGs can be found in Appendix C. The game guides used in this case study can be found in Appendix D.

The purpose of this case study is to assess the effectiveness of the rubric as a tool for evaluating the potential of TTRPGs to foster critical thinking and SEL competencies. This process revealed limitations in the rubric and areas for future research. The analysis showed that each game had unique strengths in fostering critical thinking and SEL competencies.

Heart: The City Beneath showcases decision-making and problem-solving elements through its "Resistance" system. Players face challenges in making choices while weighing the consequences. This demonstrates an opportunity for the development of critical thinking competencies. The subterranean city setting provides context for these decisions, enhancing the experience. The "Beats" system encourages self-reflection by prompting players to consider their character's goals at the start and end of each session. However, the game could improve in fostering metacognition. Incorporating reflection points after events or encounters could enhance this aspect. The game's emphasis on

uncovering hidden knowledge and navigating a fantastical city makes it particularly suitable for students with strong imaginations and curiosity for the unknown. Additionally, the “Resistance” mechanics could benefit students who need to develop impulse control and strategic thinking skills.

Micro Mysteries excels in decision-making and problem-solving through its dice-based mechanics and item usage. Also, the chance introduced by dice rolls forces players to adapt to situations that can help enhance critical thinking skills. The mystery-solving aspect reinforces these competencies. The game creates an experience by offering players choices that impact the narrative. However, it could benefit from prompts for self-reflection and metacognition. Encouraging players to analyze their decisions and consider approaches could enhance this aspect. The game's focus on solving mysteries through clue gathering and analysis would appeal to detail-oriented students who enjoy puzzles. Its relatively simple mechanics make it accessible to a wide range of students, including those new to tabletop role-playing games. The collaborative nature of the game could also benefit students who need to develop teamwork and communication skills.

Lasers & Feelings strength lies in its interactive elements. These elements are facilitated by rules that prioritize player agency and improvisation. Decision-making and problem-solving in *Lasers & Feelings* focuses on narrative-driven choices rather than strategic decision-making. This emphasis on character development and role-playing aligns with social-emotional learning competencies but may offer fewer opportunities for critical thinking. The game lacks mechanisms for self-reflection and metacognition as well. Incorporating discussions or reflection points could encourage players to analyze their decisions and consider approaches. The game's minimal rules and emphasis on

player agency make it well-suited for students who prefer a less structured, more free-flowing gaming experience. It is particularly ideal for students who enjoy improvisational role-playing.

In all three games, a thread of immersive elements and decision-making opportunities exists, but also areas for improvement in self-reflection and metacognition. The findings of this study suggest that TTRPGs possess inherent qualities that can foster critical thinking and SEL. However, to harness their educational potential, educators can leverage their influence as facilitators to incorporate additional design elements. This approach allows for a more personalized and effective learning experience for students engaging with these games.

When considering these games for educational purposes, educators should match game themes and mechanics to student interests for optimal engagement. It is crucial to select games that align with specific learning objectives, such as critical thinking, problem-solving, or social-emotional skills. Educators should also adapt their facilitation techniques to match student needs, providing more structured guidance or a more open-ended environment as appropriate. It is important to note that while these assessments are based on the game guides, the actual effectiveness of these games for specific student populations would likely require further observation and research in real-world classroom settings.

It is important to note that the assessment criteria used in this study were necessarily limited to findings that could be substantiated based on the game guide alone. However, educators implementing these games in their classrooms need not be constrained by these restrictions. The true potential of educator influence may extend far

beyond what has been documented in this case study, as my goal for this study is to demonstrate evidence to back up my argument for the presence of competencies to inform my thesis.

The rubric developed for this study serves as a starting point for educators to assess and enhance TTRPG experiences in their classrooms. By collaborating and sharing ideas, educators can explore a wider range of possibilities for integrating these games into their curriculum. The rubric is intended to be a dynamic tool that allows educators to identify the best fit for their educational objectives, estimate the degree of influence they can exert over various game elements and adapt and refine the assessment criteria based on real-world gameplay experiences. As educators test new ideas and strategies, they can continually update the rubric to reflect what works best in practice. This iterative process will lead to a more robust and effective framework for leveraging TTRPGs as educational tools.

Discussion: Rubric Development and Application

The case study analysis reveals a nuanced interplay between game structure and educator influence in fostering critical thinking and SEL competencies through TTRPGs. The application of the rubric to game guides emphasizes that TTRPGs possess intrinsic qualities that can cultivate critical thinking and SEL competencies, even without explicit educational design. The case study findings also helped me conclude that the educator's role as a facilitator emerges as a crucial factor in enhancing the learning experience. This finding suggests that the full educational potential of TTRPGs may extend beyond what is explicitly stated in game guides. Another key insight is that the rubric I designed allows

for flexibility in assessment, which enables educators to tailor their approach based on specific educational objectives and classroom dynamics.

This study contributes to the growing body of literature on game-based learning by proposing a novel framework for assessing the educational potential of TTRPGs. It challenges traditional boundaries between game design and educational facilitation by suggesting a more integrated approach to leveraging TTRPGs in educational settings. Future research and practical applications should focus on investigating effective facilitation strategies that maximize the development of critical thinking and SEL competencies within TTRPG contexts, examining the long-term impact of TTRPG-based learning on students' critical thinking and social-emotional development and exploring how TTRPGs can be effectively integrated across various subject areas to enhance interdisciplinary learning.

In conclusion, while the rubric serves as a valuable starting point for assessing the educational potential of TTRPGs, its true value lies in its adaptability and the opportunities it presents for educator creativity and innovation. This research lays the groundwork for a new paradigm in educational gaming that recognizes the synergy between game design, facilitation, and learning outcomes. As educators continue to explore and refine these approaches, TTRPGs have the potential to become powerful tools for developing critical thinking and social-emotional skills in an engaging and immersive learning environment.

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APPENDIX A

Explanation of the Rubric and Game Guides for Educators

What this Rubric Is and How to Use It.p

Game Guides-What They Are and How t

APPENDIX B

Rubric Template

Critical Thinking
and SEL_Rubric.xlsx

APPENDIX C

Case Study: Completed Rubrics

Lasers and Feelings_Critical Thi

Heart the City Beneath_SEL and CT

Micro Mysteries_SEL and CT_Rubric.xlsx

APPENDIX D

Game Guides

Lasers and Feelings.pdf

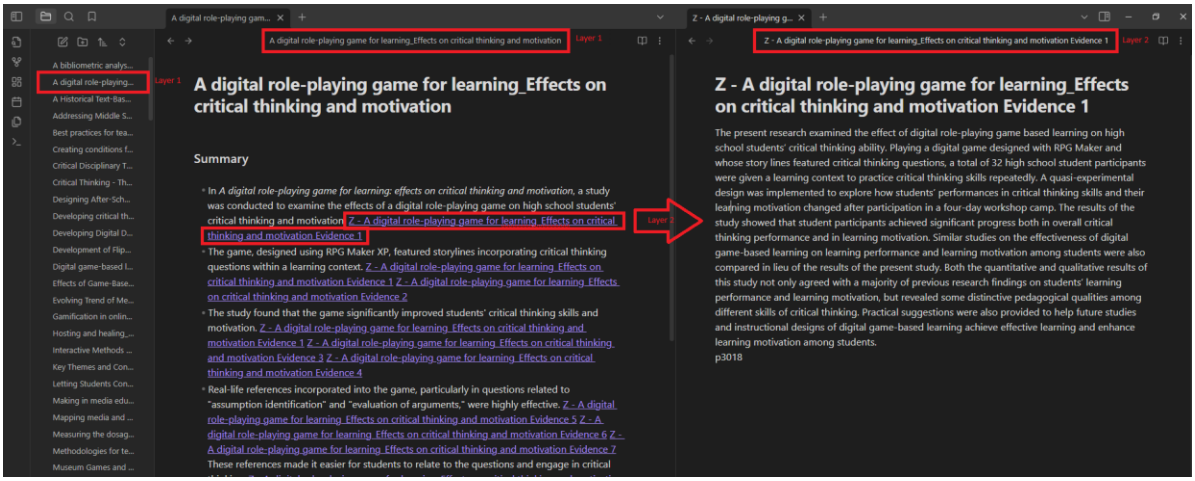
Heart The City Beneath.pdf

Micro mysteries.pdf

APPENDIX E

Detailed Literature Review Notes by Source

The following is a detailed account of the notes created and used as the basis for my literature review. I used the personal knowledge base software application Obsidian to track my research using a markdown file system. This means each item in double brackets accounts for a new page. In order to save resources of time and physical space, I have not added each individual page for each piece of evidence to the appendix. Below is a sample of the nested page layout of the double brackets, as is present in the detailed notes by source.



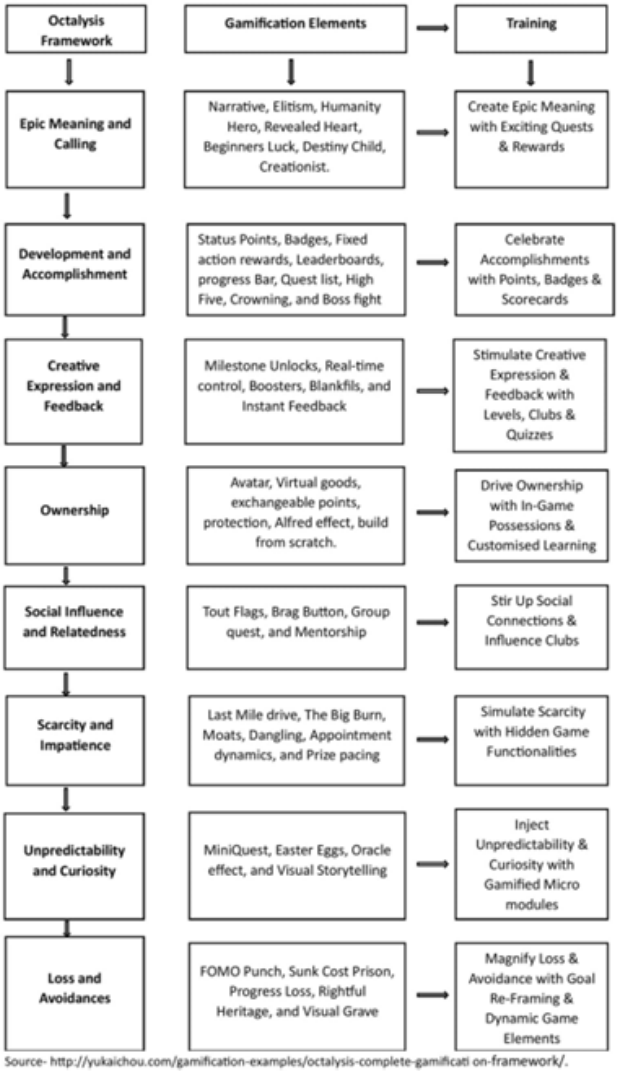
Source 1: A Bibliometric Analysis of the Use of the Gamification Octalysis Framework in Training: Evidence from Web of Science

Summary

- The Gamification Octalysis Framework is widely used in training and education to enhance engagement and motivation. [[Evidence 1]] [[Evidence 2]] [[Evidence 3]] [[Evidence 4]] [[Evidence 5]]

- Gamification, which involves applying game elements to non-game contexts, has proven effective in various fields, including healthcare, business, and education. [[Evidence 1]] [[Evidence 6]] [[Evidence 7]] [[Evidence 8]]

A



Source- http://yukaichou.com/gamification-examples/octalysis-complete-gamificati on-framework/.

The framework's effectiveness is rooted in its eight core drivers designed to motivate and

engage users: [[Evidence 9]]

- Connecting actions with a higher purpose.

- Providing challenges and opportunities for growth and progress.
- Encouraging creativity and providing feedback mechanisms.
- Fostering a sense of possession and control over experiences.
- Leveraging social dynamics like mentorship, competition, and collaboration.
- Utilizing scarcity and time constraints to increase desirability.
- Incorporating elements of surprise and novelty.
- Motivating users by highlighting potential losses or risks.

The framework has been successfully applied to various training scenarios. For example, it can enhance content learning by incorporating real-world benefits and charitable giving opportunities. [[Evidence 10]]

- Features like progress indicators, scorecards, badges, and awards can tap into the drivers of *Development and Accomplishment* and *Ownership*. [[Evidence 10]]
- Integrating rich media, surprise awards, and hidden quests can enhance *Unpredictability and Curiosity*. [[Evidence 10]]
- Streak rewards, leaderboards, and battles can motivate users by emphasizing potential losses and encouraging competition, tapping into *Loss and Avoidance* and *Social Influence*. [[Evidence 11]]

Limitations

This paper focuses on the application and analysis of the Gamification Octalysis Framework in training. It does not provide information about the framework's impact on critical thinking skills. However, the eight core drivers designed to motivate and engage users could be useful in designing engagement metrics in my rubric.

Source 2: A Digital Role-Playing Game for Learning: Effects on Critical Thinking and Motivation

Summary

- In *A Digital Role-Playing Game for Learning: Effects on Critical Thinking and Motivation*, a study was conducted to examine the effects of a digital role-playing game on high school students' critical thinking and motivation. [[Evidence 1]]
- The game, designed using RPG Maker XP, featured storylines incorporating critical thinking questions within a learning context. [[Evidence 1]] [[Evidence 2]]
- The findings were that the game significantly improved students' critical thinking skills and motivation. [[Evidence 1]] [[Evidence 3]] [[Evidence 4]]
- Real-life references incorporated into the game, particularly in questions related to “assumption identification” and “evaluation of arguments,” were highly effective. [[Evidence 5]] [[Evidence 6]] [[Evidence 7]] These references made it easier for students to relate to the questions and engage in critical thinking. [[Evidence 5]]

Key Findings of Study

Students demonstrated significant improvement in critical thinking skills, specifically in “assumption identification” and “evaluation of arguments”. [[Evidence 6]] [[Evidence 8]]

- The game proved effective in increasing students' learning motivation. [[Evidence 3]] [[Evidence 9]]

- The use of real-life references in the game significantly enhanced students' understanding and engagement. [[Evidence 5]]
- The findings suggest that incorporating real-life scenarios and references in digital role-playing games can effectively enhance critical thinking skills and motivation in high school students. [[Evidence 5]] [[Evidence 6]]

Source 3: A Historical Text-Based Game Designed to Develop Critical Thinking Skills

Summary

A Historical Text-Based Game Designed to Develop Critical Thinking Skills explores the design of a text-based game, Evenir Case Files, designed to improve critical thinking skills in the context of history. The game draws upon Schon's Reflective Practitioner model and game-based learning principles. The game's effectiveness was evaluated using qualitative data from questionnaires and analyzed through affinity diagramming.

[[Evidence 1]] [[Evidence 2]] [[Evidence 3]] [[Evidence 4]]

Critical Thinking

- The game focuses on developing critical thinking skills related to history, aligning with the understanding that effective critical thinking interventions are most successful when taught within a specific discipline. [[Evidence 5]]
- Evenir Case Files specifically targets the skill of internal criticism, which involves analyzing and interpreting historical documents, considering factors like author bias and the document's purpose. [[Evidence 6]] [[Evidence 7]]

- The game's design encourages players to think critically about the documents they encounter, prompting them to consider:
    - Players noted the biased nature of sources like the King's personal letters and official court histories, recognizing the need to approach them with skepticism. [[Evidence 8]] This reflects the importance of considering author bias and perspective in historical analysis. [[Evidence 6]]
    - Participants deemed the Village Elder's testimony more reliable due to their proximity to the historical event and lack of personal gain. [[Evidence 9]] This aligns with historians' preference for sources closer to the events being studied. [[Evidence 9]]
    - Participants desired more contextual information about the documents to make informed judgments about their reliability. [[Evidence 10]] They wanted to understand authorship, background, and potential motivations behind the creation of the documents. This highlights the importance of contextual understanding in historical analysis.

Game-Based Learning

The game incorporates elements of game-based learning to enhance engagement and motivation, drawing on concepts like:

- The game provides players with a clear objective from the outset—investigating the sealing of an ancient witch—which serves as an intrinsic motivator, aligning with game-based learning principles. [[Evidence 11]]
- The game's fictional setting, the kingdom of Evenir, enhances player engagement and allows for greater design flexibility. [[Evidence 12]]

- By gradually revealing information and challenging players to uncover the truth, the game leverages cognitive curiosity to encourage players to apply critical thinking skills. [[Evidence 13]] [[Evidence 14]]

Reflective Practitioner Model

- The game's design aligns with Schon's Reflective Practitioner model by providing a virtual world where players can practice the skills of a historian. [[Evidence 2]] [[Evidence 15]]
- Players demonstrated:
    - Reflection-in-action: Players adjusted their strategies and reevaluated their understanding of the game's objective as they encountered new information. [[Evidence 16]]
    - Seeing-as: By engaging in internal criticism within the game, players develop the ability to relate the experience to future situations where they need to analyze information critically, aligning with the Reflective Practitioner model's emphasis on drawing on past experiences to solve new problems. [[Evidence 17]] [[Evidence 18]]

Findings and Limitations

The study's findings suggest that Evenir Case Files effectively promote historical thought and critical thinking by providing a structured environment that simulates the work of a historian. [[Evidence 19]] Participants, new to university-level history, exhibited skills like assessing bias and considering source reliability, demonstrating an understanding of core critical thinking principles. [[Evidence 10]] They also showed a disposition towards critical thinking, adapting their approaches and reflecting on their

decision-making process as they played. [[Evidence 16]] However, the findings acknowledge sample size limitations, transfer of skills, and the game scope.

- The small sample size limits the generalizability of the findings.
- While the game shows promise in promoting critical thinking, further research is needed to determine if these skills transfer to real-world scenarios.
- The game currently focuses on internal criticism. Expanding the game to encompass other aspects of historical research, such as external criticism, would provide a more comprehensive experience.

Source 4: Addressing Middle Schoolers' Disruptive Behavior: The Importance of Fostering Student Executive Functioning

Summary

Addressing Middle Schoolers' Disruptive Behavior: The Importance of Fostering Student Executive Functioning focuses on the importance of fostering executive function (EF) in middle school students, particularly those with or at risk for emotional and behavioral disorders (EBD), to improve their academic and social skills. [[Evidence 1]] [[Evidence 2]] [[Evidence 3]] This approach aligns with the theme of interventions by offering tailored strategies to address the specific challenges faced by these students. [[Evidence 1]] [[Evidence 3]] This paper emphasizes that EF is crucial for academic success, social competence, and behavioral regulation, aligning with the themes of Middle School Education and Engagement. [[Evidence 1]] [[Evidence 2]]

To improve students' EF, the authors suggest a three-part plan: [[Evidence 4]]

- Proactively reduce sources of school-based stress.

- Employ strategies to foster EF skills.
- Implement procedures to assess the plan's effectiveness.

Key Findings

This paper highlights the importance of creating an emotionally supportive classroom to reduce stress and promote EF development, aligning with the Engagement theme by emphasizing positive interactions and a supportive learning environment. [[Evidence 5]]

This paper also recommends incorporating principles, such as self-awareness, self-management, social awareness, relationship skills, and responsible decision-making, to reduce stress and build skills that support EF development. [[Evidence 6]] [[Evidence 7]] This approach provides students with practical strategies to improve their social interactions and manage their emotions. [[Evidence 7]]

Teaching mindfulness and related coping strategies, such as the STOP technique, is presented as a way to manage stress and improve students' overall well-being. [[Evidence 8]]

This paper suggests actively involving families in reinforcing EF skills and creating a stress-free home environment, emphasizing the need for a holistic approach to support students' development. [[Evidence 9]]

The authors recommend using games and activities that engage EF, such as board games, team sports, and structured games like charades, to provide students with opportunities to practice and strengthen their EF skills in an engaging manner.

[[Evidence 10]] This suggestion highlights the importance of active learning experiences. [[Evidence 10]]

This paper also recommends using evidence-supported programs that directly target and enhance EF skills. [[Evidence 11]] One such program, I Control, specifically designed for middle schoolers with EBD, is highlighted for its effectiveness in improving self-regulation and EF skills and reducing maladaptive behaviors. [[Evidence 11]]

Source 5: Best Practices for Teaching and Assessing Critical Thinking in Information

Summary

This paper aims to identify best practices for teaching and assessing critical thinking in information literacy. The findings aimed to develop a set of best practices for teaching critical thinking in information literacy online learning objects, guided by existing literature, and to create a rubric to evaluate how well these best practices are followed. [[Evidence 1]]

- The findings emphasize the need for explicit instruction in critical thinking skills and diverse assessment methods in information literacy online learning objects. [[Evidence 2]] It highlights the lack of clear guidance in the Association of College and Research Libraries Framework for Information Literacy for Higher Education (ACRL Framework) on integrating critical thinking into information literacy, leaving it up to librarians to determine the extent and methods of incorporating critical thinking into their instruction. [[Evidence 3]]

Themes

Critical Thinking

- This paper emphasizes the importance of critical thinking as an essential outcome of higher education and acknowledges the need for librarians to promote it in information literacy instruction actively. [[Evidence 4]] [[Evidence 5]]
- It highlights the challenge of defining critical thinking and distinguishes it from related concepts like problem-solving and higher-order thinking. [[Evidence 6]]
- It presents definitions from various scholars, emphasizing the importance of reflective judgment, self-regulation, and the use of rational criteria in evaluating information and one's own thinking. [[Evidence 7]]
- It acknowledges the dispositional aspect of critical thinking, emphasizing the importance of cultivating a "critical spirit" characterized by a habitual predisposition to seek reasons and evidence. [[Evidence 8]]
- It also recognizes the role of metacognition in critical thinking, suggesting that instructional strategies should encourage students to reflect on their own thinking processes to improve their thinking habits. [[Evidence 9]]

Information Literacy

- This paper explores the relationship between critical thinking and information literacy, noting their similarities and the potential for integrating them in instructional settings. [[Evidence 3]] [[Evidence 10]] [[Evidence 11]]
- It observes that while all elements of information literacy (finding, evaluating, and using information) should be guided by critical thinking, information literacy itself is not always necessary for critical thinking. [[Evidence 12]]
- This paper highlights the evolution of information literacy from a focus on basic tool-based instruction to a greater emphasis on higher-order thinking skills, as

reflected in the ACRL Framework. [[Evidence 5]] [[Evidence 11]] It also introduces the concept of meta-literacy, recognizing the changing landscape of information used in the digital age and the need for learners to adapt their critical thinking and information literacy skills accordingly. [[Evidence 13]]

Key Findings

- This paper advocates for diverse and effective methods for assessing critical thinking, recognizing the challenges in measuring this complex skill. [[Evidence 14]]
- It explores various assessment methods, including standardized tests, multiple-choice questions, open-ended questions, and reflection. [[Evidence 15]]
- It emphasizes the importance of providing feedback, particularly in conjunction with reflection and other assessment strategies, to enhance the effectiveness of critical thinking instruction. [[Evidence 15]]

Methodology

- This paper used a thorough literature review, analyzing current teaching practices and assessment techniques for critical thinking, particularly in online learning environments. [[Evidence 2]] [[Evidence 16]]
- The literature review considered experimental evidence from various sources published after 1990, focusing on studies conducted with college and university students. [[Evidence 17]]
- The findings identified six critical thinking instructional strategies—discussion, inquiry-based learning, problem-based learning, concept mapping, reflection, and

practice/repetition—and mapped them onto a rubric for evaluating online learning objects. [[Evidence 18]] [[Evidence 19]]

- The rubric included additional criteria for assessing online learning design, such as instructor support, navigation, and interactivity. [[Evidence 19]]

Limitations

This paper primarily focuses on evaluating the potential of information literacy OLOs to teach critical thinking. It does not provide a definitive list of best practices for teaching and assessing critical thinking in all information literacy contexts. The rubric developed from the literature review, while potentially valuable for evaluating OLOs, may require further testing and refinement to ensure its reliability and validity as an assessment tool. [[Evidence 20]]

Source 6: Creating Conditions for Social-Emotional Learning

Summary

This article discusses how school districts increasingly recognize that academic success is not the sole indicator of a well-rounded education. In Washington state, for instance, the legislature emphasizes the need for education to cultivate "respectful global citizens," leading to adopting SEL standards alongside traditional academic ones. [[Evidence 1]] This highlights a growing awareness that social and emotional skills are crucial for students' overall development.

Key Findings

- The success of SEL hinges on creating an environment that fosters a sense of belonging and connection, as exemplified by Iris Elementary's journey.

[[Evidence 2]] The school's transition from isolated SEL lessons to integrating SEL throughout the school highlights the need to move beyond surface-level implementation. They achieved this through a community-driven approach involving school district leaders, teachers, staff, principals, families, and community members. Iris Elementary created a nurturing and healthy school community by flattening the hierarchy and promoting shared decision-making. [[Evidence 2]]

- Central to Iris Elementary's success was acknowledging the emotional weight of discussions on race and racism. [[Evidence 3]] The collaboration between the Race and Equity team and the SEL team highlights the interconnectedness of SEL and anti-racism initiatives. By recognizing that SEL cannot exist in a vacuum, particularly in racially diverse settings, Iris Elementary was able to tailor their approach to address the specific needs of its students and community. [[Evidence 3]] This approach, grounded in anti-racism and family funds of knowledge, emphasizes the importance of considering the cultural context when implementing SEL programs. [[Evidence 4]]

Themes

- While this article doesn't offer specific strategies for family engagement in SEL, it talks about the importance of a holistic and collaborative approach to SEL implementation. Iris Elementary's approach, which emphasizes community involvement in planning and decision-making, suggests that family engagement is likely a crucial element in their SEL program [[Evidence 5]] This suggests that

successful SEL initiatives view families as partners in fostering students' social and emotional growth.

- This article also highlights the potential synergy between SEL and academic learning but doesn't go into specific strategies for their integration. However, the emphasis on SEL as a process that develops competencies for navigating the world, including academic settings, implies its inherent connection to academic success. [[Evidence 6]] This suggests that SEL can indirectly contribute to a more conducive learning environment and potentially enhance academic performance by equipping students with social and emotional skills.

Source 7: Critical Disciplinary Thinking and Curricular Design in Games

Summary

This paper discusses how games can serve as valuable educational tools, extending beyond entertainment to encompass domains such as cultural heritage, fine art, public health, education, simulation, and modeling. [[Evidence 1]] Despite this potential, the integration of games into higher education curricula, particularly in a way that fosters critical disciplinary thinking, remains limited. [[Evidence 1]]

The authors of this paper argue for a shift in how game design is approached in educational settings, advocating for a move beyond a narrow focus on mechanics and systems design. [[Evidence 2]] They propose a fourth wave of game scholarship that emphasizes critical rigor and acknowledges the social and cultural contexts in which games are created and played. [[Evidence 2]] This perspective emphasizes the importance of developing games that encourage students to analyze and critique power structures,

social norms, and the influence of technology on society. [[Evidence 1]] [[Evidence 2]] [[Evidence 3]]

Key Findings

The authors present their experience developing a Critical Game Design program at Rensselaer Polytechnic Institute (RPI) as a case study of integrating critical disciplinary thinking into game design education. [[Evidence 1]] They faced challenges stemming from differing disciplinary perspectives on games, institutional constraints, and resistance to the term “critical”. [[Evidence 4]] [[Evidence 5]] [[Evidence 6]] Despite these hurdles, they advocate for the development of curricula that bridge the gap between critical games research and pedagogical practice. [[Evidence 7]]

The authors proposed curriculum, though ultimately revised due to institutional limitations, highlights key elements for integrating critical thinking into game design education:

- Integrating critical theory and practice: The authors emphasize a praxis-based approach, combining theoretical understanding with hands-on game design, enabling students to explore critical perspectives through creation. [[Evidence 8]]
- Vertical studios: Although not implemented, the authors' proposed model of vertical studios, where students at different levels collaborate on faculty research projects, exemplifies a structure for fostering in-depth critical engagement. [[Evidence 9]]
- Broadening the scope of game design education: The authors challenge the traditional, often fragmented, structure of game design programs, advocating for a

more holistic approach that connects game design to broader social and cultural issues. [[Evidence 4]] They suggest incorporating disciplines like science and technology studies to foster an understanding of the non-neutral nature of technologies. [[Evidence 10]]

- While the paper primarily focuses on curriculum design and the broader context of game design education, it implies that thoughtfully designed games can enhance student engagement. The authors argue that games should be designed not just for entertainment but for meaningful engagement with complex topics. [[Evidence 2]] By encouraging critical disciplinary thinking, games can become more than just interactive experiences; they can become tools for students to question assumptions, analyze perspectives, and develop a deeper understanding of the world around them.

Source 8: Critical Thinking: The Essential Skill for Navigating the Future

Summary

This whitepaper emphasizes that the fast-paced evolution of the world, characterized by an overwhelming amount of information, necessitates critical thinking as a crucial skill. [[Evidence 1]] It posits that success hinges on making sound decisions, which relies on evaluating information's credibility and accuracy. [[Evidence 2]] Critical thinking is a self-guided, disciplined approach to reasoning with fairness. [[Evidence 3]] A 2020 World Economic Forum report highlighted its importance, specifically with senior executives recognizing it as essential for workplace success. [[Evidence 3]]

This whitepaper also argues that individuals who engage in consistent critical thinking are better positioned for success. [[Evidence 4]] They are more capable of understanding themselves, fostering positive relationships, and becoming responsible citizens. [[Evidence 4]] Furthermore, it equips individuals to recognize simplistic explanations of complex issues, encouraging the examination of diverse perspectives without bias. [[Evidence 4]]

Critical thinking is presented as a tool to enhance problem-solving skills. [[Evidence 5]] This whitepaper outlines a five-phase model:

1) Problem identification

2) Creative thinking

3) Logical analysis

4) Decision-making

5) Coordination/Implementation

[[Evidence 6]]

Each phase encourages a structured approach to problem-solving, encompassing elements such as understanding perspectives, evaluating options, and making informed decisions. [[Evidence 7]]

The whitepaper highlights the importance of critical thinking in navigating a rapidly changing world. [[Evidence 1]] [[Evidence 2]] It suggests that this skill is essential for successful transformational change, which demands innovation and calculated risk-taking. [[Evidence 8]] The ability to adapt to new situations and

challenges is presented as a key benefit of possessing strong critical thinking skills. [[Evidence 4]]

It links critical thinking to adaptability by emphasizing its role in organizational transformation. [[Evidence 8]] It highlights that real transformation requires employees at all levels to embrace new mindsets and behaviors. [[Evidence 9]] This implies that critical thinking fosters adaptability by enabling individuals to adjust their thinking and approach to align with evolving circumstances.

Source 9: Designing After-School Learning Source

Summary

Massively multiplayer online role-playing games (MMOs) provide a dynamic environment for developing 21st-century skills. [[Evidence 1]] This article uses World of Warcraft (WoW) as a case study. [[Evidence 2]] WoW, with over 10 million subscribers, is cited as the world's most popular MMO. [[Evidence 2]] The article focuses on MMOs as a platform for learning rather than advocating for their direct integration into classrooms for content delivery. [[Evidence 1]] [[Evidence 3]] The MMO game space is characterized as an "always-on virtual game space" where players interact through avatars, engaging in individual or collaborative activities. [[Evidence 4]] A key feature of MMOs is the formation of guilds, which enable direct communication and collaboration among members. [[Evidence 4]] Players often assume mentorship roles within guilds, fostering a collaborative learning environment. [[Evidence 5]] Achieving high levels in MMOs necessitates teamwork, strategic thinking, and reliance on external resources. [[Evidence 5]]

Key Findings

This article highlights the potential of MMOs to facilitate the development of 21st-century skills, particularly when combined with connected learning. [[Evidence 6]] According to workforce studies, these skills are crucial for success in the modern workplace. [[Evidence 6]] The article provides a table (Table 1) illustrating the alignment of 21st-century workplace skills with research on MMOs and learning. [[Evidence 7]] This table highlights skills such as applied reading, writing and information literacy, critical thinking and problem-solving, computational literacy, creativity and innovation, leadership, collaboration and teamwork. [[Evidence 7]]

- Players often consult online resources, engage with live experts within the game, and analyze statistical models to enhance their in-game performance. [[Evidence 8]]
- They participate in discussions, debates, and critiques of the game's storyline, comparing it with published fan literature and illustrating applied literacy practices. [[Evidence 8]]
- As players progress to advanced levels, their engagement with fan communities exposes them to activities like reading and writing fan fiction, crafting role-playing scenarios, and designing game modifications. [[Evidence 9]]

This article emphasizes that these activities are not only encouraged within the gaming community but are also rich opportunities for developing valuable skills. [[Evidence 9]]

This article draws on a 2-year case's findings of the Casual Learning Lab (CLL), an after-school program designed for teenage boys using WoW. [[Evidence 2]] [[Evidence 10]] The program incorporated "lifeguarding" sessions where adult mentors (lifeguards), often novice gamers themselves, supervised and participated in gameplay alongside the students. [[Evidence 11]] This approach ensured online safety and fostered a collaborative learning environment where adults and students learned from each other. [[Evidence 11]] [[Evidence 12]]

The article highlights four key program design strategies:

- Encouraging extensive gameplay without overly structured activities. [[Evidence 13]]
- Identifying and leveraging participants' interests as they emerge during gameplay. [[Evidence 14]] [[Evidence 15]]
- Adults actively participate as co-learners, engaging in parallel play alongside students, fostering a collaborative learning environment. [[Evidence 15]]
- Integrating reflection activities to help students recognize the connections between their in-game experiences and the development of 21st-century skills. [[Evidence 16]]

The CLL emphasized student-centered learning, which allowed students to set goals and pursue their interests in the game. [[Evidence 14]] [[Evidence 17]]

Reflection activities, termed "after-action reports," were crucial in helping students connect their gameplay to developing 21st-century skills. [[Evidence 18]] The author

found that direct scaffolding from adults was often needed to bridge the gap between informal gaming experiences and formal learning. [[Evidence 19]]

Source 10: Developing Critical Thinking Skills Through Gamification

Summary

This study uses serious games, games designed with a primary purpose other than entertainment, to aid in developing and implementing an analog role-playing game (RPG) to teach critical thinking skills to vulnerable communities in Brazil, specifically individuals living in favelas, a recycling cooperative, and people experiencing homelessness (PEH). The researchers' decision to utilize a low-resource, culturally relevant tabletop RPG demonstrates a commitment to inclusivity and accessibility, considering the digital divide and varying literacy levels within these communities. [[Evidence 1]] [[Evidence 2]]

A mixed-methods approach was employed by combining ethnographic observations, surveys, semi-structured interviews, and focus groups to inform the RPG's design and implementation and assess participants' critical thinking skills and perceptions of the game. [[Evidence 3]] This comprehensive methodology allowed a nuanced understanding of the communities' needs and preferences, ensuring the game was tailored to their contexts.

Key Findings

The researchers uncovered several key findings that shaped the development of the RPG and shed light on the potential of serious games to foster critical thinking skills.

- Initial interviews revealed that broadcast television, particularly channels with differing political leanings, served as these communities' primary source of news and information. This discovery raised concerns about potential biases influencing participants' understanding of information. [[Evidence 4]]
- Community leaders expressed a preference for analog games over phone-based ones and highlighted concerns about potential associations with gambling addiction, necessitating a sensitive approach to game design. [[Evidence 5]]

- To mitigate potential conflicts arising from sensitive topics like the COVID-19 pandemic and to promote open dialogue, the researchers opted for an allegorical story centered around combating blight in the rainforest. This approach aimed to mirror real-world challenges while providing a safe space for critical thinking and discussion. [[Evidence 6]]
- The RPG, designed to complement critical thinking workshops ("conversation circles"), enabled participants to apply learned skills in a collaborative setting, encouraging negotiation, strategic planning, and problem-solving. [[Evidence 7]]
- Observational evidence suggests that the game effectively fostered critical thinking skills, with participants demonstrating an increased ability to analyze and evaluate information, make connections between the game and real-world situations, and engage in respectful dialogue to reach shared solutions. [[Evidence 8]]
- While the researchers acknowledge the need for further investigation into the long-term impact of the intervention, they suggest that the engaging nature of the game could serve as a form of "inoculation booster," reinforcing critical thinking skills over time, particularly if participants continue playing the game or engage in similar activities. [[Evidence 9]]

Themes

The researchers argue that RPGs emphasizing collaborative storytelling and problem-solving offer a unique platform for engaging learners in critical thinking processes. [[Evidence 10]] [[Evidence 11]] The collaborative nature of the RPG also fostered skills, such as empathy, communication, and perspective-taking [[Evidence 8]].

The importance of culturally relevant game design is emphasized. The researchers argued that incorporating familiar cultural elements, such as Brazilian folk heroes, into the game mechanics enhanced participants' engagement and facilitated a deeper understanding of the game's message. [[Evidence 12]] [[Evidence 13]] [[Evidence 14]]

The study also highlights the importance of equipping vulnerable communities with critical thinking skills to navigate the complexities of the digital age, particularly in the context of misinformation and fake news. [[Evidence 15]] [[Evidence 16]] By providing participants with a controlled environment to engage with and analyze potentially misleading information, the game aimed to promote media literacy and empower individuals to make informed decisions. [[Evidence 17]] [[Evidence 18]]

Limitations

The researchers acknowledge several limitations of their study, including snowball/convenience sampling, which may limit the generalizability of the findings to larger populations. The self-selection of participants could indicate a pre-existing interest in critical thinking, potentially influencing the observed outcomes. [[Evidence 19]] The study also experienced a 27% participant dropout rate, highlighting the importance of facilitator-participant rapport and suggesting that community involvement in facilitator selection or training could improve participant engagement and retention. [[Evidence 20]]

While understandable from an ethical standpoint, the decision to avoid potentially controversial topics related to the COVID-19 pandemic might limit the applicability of the findings to real-world scenarios where navigating conflicting viewpoints is crucial. [[Evidence 21]]

Future research could explore ways to address sensitive topics in a respectful and constructive manner within game-based learning environments. The study's findings on the game's potential to serve as an “inoculation booster” for critical thinking skills require further investigation through longitudinal studies. [[Evidence 9]]

Source 11: Effects of Game-Based Learning on Students’ Critical Thinking: A Meta-Analysis

Summary

This meta-analysis investigates the effects of game-based learning (GBL) on students' critical thinking skills and dispositions. It analyzes 21 effect sizes from 20 empirical studies that encompass 1,947 participants. The study aims to determine the overall impact of GBL on critical thinking and identify potential moderators influencing this relationship. The study focuses on digital games and includes studies exploring learning from game-playing and game construction. [[Evidence 1]]

Key Findings

- The meta-analysis revealed a significant positive overall effect of GBL on students' critical thinking skills. Role-playing games yielded the largest positive mean effect size, suggesting they may be particularly effective in promoting critical thinking. [[Evidence 1]]
- Significant heterogeneity among effect sizes [[Evidence 2]] indicated the presence of moderating variables influencing the relationship between GBL and critical thinking.
- GBL showed a stronger impact on critical thinking disposition than critical thinking skills. [[Evidence 1]] [[Evidence 3]] implying it might first influence

students' attitudes and openness towards critical thinking before impacting their actual skill application.

- GBL interventions demonstrated a larger effect on students in collectivistic countries than individualistic countries, [Evidence 1]] suggesting cultural factors may affect how students respond to and benefit from GBL.
- A positive association was found between publication year and effect size, indicating GBL interventions in later years tended to have larger effects on critical thinking. [[Evidence 4]]
- Studies published in journals demonstrated larger effect sizes than those published as theses, [[Evidence 1]] potentially reflecting more rigorous research designs or higher quality interventions in journal publications.

Themes

- This meta-analysis supports using GBL as an effective pedagogical approach for promoting students' critical thinking skills and dispositions.
- The study emphasizes the need to consider game type and design elements when developing GBL interventions for critical thinking. Certain game types, such as role-playing games, might be more conducive to fostering critical thinking due to their inherent game mechanics and learning experiences.
- The findings emphasize the importance of considering cultural factors in GBL implementation. Students from different cultural backgrounds might respond differently to GBL interventions, and tailoring game design to specific cultural values and learning styles could be crucial for maximizing impact.

- The positive association between publication year and effect size suggests that GBL interventions are becoming more effective over time, likely due to technological advancements, instructional design, and a better understanding of leveraging games for learning.

Limitations

- The meta-analysis included only 20 studies, which may limit the generalizability of the findings. More research on the relationship between GBL and critical thinking is needed to strengthen the evidence base and explore the nuances of this relationship.
- Although several moderators were identified, substantial heterogeneity within subgroups remained unexplained.

Source 12: Letting Students Control Their Own Learning: Using Games, Role-Plays, and Simulations in Middle School U.S. History Classrooms

Summary

Worthington's article advocates incorporating student-centered learning experiences like games, role-plays, and simulations into secondary history classrooms. [[Evidence 1]] The article challenges the traditional, chronological approach to teaching history, proposing that these interactive methods can enhance student engagement, critical thinking, problem-solving, and collaborative skills. [[Evidence 1]] [[Evidence 2]] Worthington emphasizes the importance of moving beyond rote memorization of facts and figures to foster a deeper understanding of historical events, motives, and perspectives. [[Evidence 3]] [[Evidence 4]]

The article distinguishes between games, role-plays, and simulations, highlighting their characteristics and potential benefits. [[Evidence 5]] Worthington argues that while simulations offer a high degree of student agency and can closely mirror real-life decision-making processes, all three methods can be valuable tools for history education. [[Evidence 6]]

To illustrate their practical application, Worthington shares five examples from their teaching experience, showcasing how they adapted and implemented these methods in their eighth-grade U.S. History classes. [[Evidence 7]] [[Evidence 8]] [[Evidence 9]] [[Evidence 10]] [[Evidence 11]] These examples range from a geography simulation to a month-long Civil War simulation, demonstrating the versatility of these approaches in addressing different learning objectives. [[Evidence 8]] [[Evidence 9]] [[Evidence 10]] [[Evidence 11]]

Key Findings

- Student-centered activities like games, role-plays, and simulations can significantly improve students' soft skills, including goal setting, flexibility, motivation, empathy, and teamwork. [[Evidence 12]]
- These activities enhance students' interpersonal and intrapersonal skills, including problem-solving, verbal communication, critical thinking, and resource management. [[Evidence 12]]
- Simulations, characterized by active student participation and consequential decision-making, provide a unique opportunity for students to engage with history as an active process rather than a passive collection of facts. [[Evidence 6]]

- While historical accuracy is important, games, role-plays, and simulations can still be valuable learning tools, even if they do not perfectly represent the past. [[Evidence 13]] The focus should be on the skills and processes of historical thinking rather than achieving absolute fidelity to historical events. [[Evidence 14]]
- Debriefing and reflection are crucial components of successful role-playing and simulation activities, allowing students to process their experiences, make connections to the historical context, and recognize the influence of their own perspectives. [[Evidence 15]

Themes

- The article strongly advocates shifting from teacher-centric instruction to student-centered learning environments where students have greater agency and control over their learning experiences. [[Evidence 1]] [[Evidence 4]] [[Evidence 6]] [[Evidence 16]] [[Evidence 17]]
- Worthington emphasizes the importance of engaging students in active learning through interactive and hands-on activities that require them to apply their knowledge, make decisions, and solve problems. [[Evidence 4]] [[Evidence 6]] [[Evidence 16]] [[Evidence 17]] [[Evidence 18]]
- The article promotes inquiry-based learning as a way to encourage students to ask questions, investigate historical evidence, and construct their own understanding of the past. [[Evidence 16]] [[Evidence 17]] [[Evidence 19]] [[Evidence 20]]
- Worthington highlights the value of collaborative learning experiences, noting that games, role-plays, and simulations provide opportunities for students to work

together, share ideas, and learn from one another. [[Evidence 6]] [[Evidence 12]] [[Evidence 21]] [[Evidence 22]]

- The article emphasizes the importance of developing students' historical thinking skills, encouraging them to go beyond memorizing facts to analyze sources, consider multiple perspectives, and understand the complexities of historical interpretation. [[Evidence 2]] [[Evidence 3]] [[Evidence 13]] [[Evidence 20]] [[Evidence 22]] [[Evidence 23]]

Limitations

- The article focuses primarily on the author's personal teaching experiences, which may not be generalizable to all classrooms or contexts. [[Evidence 7]]
- While the article provides a strong rationale for using games, role-plays, and simulations, it does not offer detailed guidance on designing or implementing these activities. [[Evidence 24]] Teachers are encouraged to adapt and modify existing resources to fit their students' needs and learning objectives. [[Evidence 24]] [[Evidence 25]] [[Evidence 26]]
- The article acknowledges that not all students may be comfortable with or benefit from these activities. [[Evidence 22]] [[Evidence 24]] Teachers need to be mindful of individual student needs and provide appropriate accommodations or alternative assignments as needed. [[Evidence 22]] [[Evidence 26]]

Source 13: Measuring The Dosage of Brief and Skill-Targeted Social-Emotional Learning (SEL) Activities in Humanitarian Settings

Summary

Wu et al.'s research explores the implementation and effectiveness of brief, skill-targeted social-emotional learning (SEL) activities within humanitarian settings. [[Evidence 1]] The authors argue that while traditional, comprehensive SEL programs face challenges in such settings, brief activities offer a more feasible and adaptable approach. [[Evidence 2]]

The study focuses on two sets of activities implemented in primary schools in Sierra Leone: Mindfulness activities aimed at stress reduction and self-regulation and Brain Games activities designed to enhance executive function. [[Evidence 3]] Wu et al. introduce a framework for measuring the "dosage" of these brief SEL activities, considering quantity, duration, and temporal pattern of implementation. [[Evidence 4]]

The researchers investigate the relationship between these dosage measures and student outcomes, specifically attendance and classroom adaptive behavior. [[Evidence 5]] They find preliminary evidence suggesting that higher dosage, particularly in terms of variety and specific repetition patterns, correlates with positive outcomes, though they acknowledge limitations and call for further research. [[Evidence 6]] [[Evidence 7]]

Key Findings

- Wu et al. find that the "dosage" of brief SEL activities, how much, how often, and for how long they're implemented, can influence their effectiveness. [[Evidence 8]]
- Implementing a wider variety of SEL activities was associated with fewer concentration problems and more prosocial behavior among students. [[Evidence 9]]

- The study found that repeating activities targeting specific Brain Games skills before moving on to other skills was linked to increased prosocial behavior. [[Evidence 10]]

Themes

- The research highlights the importance of adapting SEL interventions for humanitarian settings, acknowledging the limitations of traditional programs in such environments. [[Evidence 1]] [[Evidence 11]]
- Wu et al. advocate using brief, skill-targeted SEL activities as a feasible and potentially impactful approach in resource-constrained settings. [[Evidence 2]] [[Evidence 12]]
- The study emphasizes the need to move beyond simply measuring whether a program was implemented to understanding how the dosage of implementation influences outcomes. [[Evidence 3]] [[Evidence 12]]

Limitations

- The study's findings may not generalize to other contexts, populations, or SEL programs beyond the investigated activities and settings. [[Evidence 7]]
- The reliance on teacher-reported data for dosage measures and student outcomes introduces potential biases and limitations to the study's findings. [[Evidence 7]]
- The authors acknowledge that other components of the larger intervention, such as teacher training and material provision, could have influenced student outcomes, making it difficult to isolate the specific impact of the brief SEL activities. [[Evidence 7]]

Source 14: Playing With Identities: Negotiating Co-authorship and Role-Playing Interactions Across Game and Metagame Talk

Summary

This study examines the complexities of co-authorship in tabletop role-playing games (TRPGs), focusing on the conversational dynamics between "game talk" (in-character role-playing) and "metagame talk" (out-of-character discussions). Through a conversation analysis (CA) lens, the author analyzes how six adolescent boys in an online TRPG campaign led by a youth game master (GM) navigate these shifts in talk to shape the narrative collaboratively. The study focuses on how the participants transition from game talk to metagame talk and how those transitions function as co-authorship practices. [[Evidence 1]] [[Evidence 2]] The author argues that "metagame talk" is crucial in TRPGs for negotiating shared understanding and collaborative storytelling. [[Evidence 3]]

Key Findings

The study reveals that metagame talk serves several crucial functions in the collaborative storytelling process of TRPGs:

- Players transition to metagame talk to clarify information about the game world, game mechanics, or their characters' abilities, ensuring everyone is on the same page in terms of in-game knowledge and avoiding the introduction of out-of-character knowledge into the game. [[Evidence 4]] [[Evidence 5]] [[Evidence 6]] [[Evidence 7]] [[Evidence 8]] For example, a player might ask the GM, "Out-of-game, does my character know about this type of monster?". [[Evidence 5]]
- Metagame talk helps establish and maintain fairness by allowing players to discuss and clarify rules, challenge the GM's decisions if they seem unfair or

inconsistent, and ensure a balanced and enjoyable experience for all. This is especially relevant in moments of high stakes, such as character death or the distribution of rewards. [[Evidence 8]] [[Evidence 9]] [[Evidence 10]] [[Evidence 11]] [[Evidence 12]] For instance, if a player feels a rule was applied unfairly, they might say, “Hold on, out-of-game, how did you decide that? That doesn't seem like it’s following the rulebook.”

- TRPGs involve navigating both fictional relationships within the game and real-world relationships between players. Metagame talk enables participants to maintain their out-of-game relationships by addressing conflicts, managing disagreements, offering support, and ensuring that in-game actions do not negatively impact their real-world bonds. [[Evidence 13]] [[Evidence 14]] [[Evidence 15]] [[Evidence 16]] For example, a player might say, “Out-of-game, no hard feelings, right? It's just my character being difficult.” [[Evidence 15]]
- TRPGs manage both in-game time (the fictional timeline of the game world) and real-world time (the actual time spent playing). Metagame talk allows players to control the game's pace, speeding it up or slowing it down as needed to accommodate the group's preferences, time constraints, and the desired level of detail in the narrative. [[Evidence 17]]

Themes

- The study implicitly explores how the social interactions within TRPGs, especially through metagame talk, provide a space for learning and practicing social skills like negotiation, perspective-taking, and collaborative problem-solving, aligning with the core concepts of GBL.

- The research dives into the collaborative nature of storytelling in TRPGs, emphasizing that the narrative is not solely determined by the GM but emerges from the constant negotiation and co-creation between the GM and players through game talk and metagame talk. [[Evidence 1]]

Limitations

- The study focuses on a small, homogenous sample of six adolescent white boys, potentially limiting the generalizability of the findings to more diverse groups of players. The author acknowledges this limitation and suggests that future research should include more diverse participant groups to explore potential differences in how co-authorship and metagame talk function across various social and cultural contexts. [[Evidence 18]]
- The study acknowledges that while this research focused on a group with shared privilege, RPGs can be sites of trauma and injustice, particularly for historically marginalized communities. [[Evidence 18]]

Source 15: Promoting Social and Emotional Learning with Games: "It's Fun and We Learn Things"

Summary

This article, written by Robyn Hromek and Sue Roffey, explores the potential of games to be effective tools in promoting social and emotional learning (SEL) in young people. [[Evidence 1]] The authors thoroughly review existing theoretical and practical literature that supports the application of games in SEL and, using their collective experience as educational psychologists, offer insight into effective practices. [[Evidence 1]] Two specific methods for implementing games in SEL are highlighted: Circle Time, a

universal intervention that includes the entire classroom, and therapeutic board games, which are designed for targeted groups of students in need of additional support. [[Evidence 1]]

Key Findings

- Games are a natural and engaging way for children to learn SEL skills. The authors state: “The natural affiliation between children, play, and the desire to have fun with others makes games an ideal vehicle for teaching SEL.” [[Evidence 1]]
- Games provide a safe and structured environment where children can practice SEL skills like regulating emotions, turn-taking, cooperating, and resolving conflicts. [[Evidence 1]]
- Effective facilitation and debriefing are crucial for maximizing the SEL benefits of games. [[Evidence 1]] This involves creating a safe and supportive learning environment, modeling appropriate behavior, helping students to connect their experiences to real-life situations, and addressing emotional crises when they arise. [[Evidence 1]]

Themes

- The article argues for using games as tools for learning and emphasizes their capacity to engage students, encourage active participation, and provide meaningful learning experiences.
- The authors identify SEL as a critical aspect of child development and emphasize how games can effectively teach essential SEL competencies. The article lists several SEL competencies: recognizing and labeling personal feelings, regulating

emotions effectively, possessing a prosocial orientation towards others, and problem-solving. [[Evidence 2]]

- The article emphasizes the motivational power of games and their ability to create learning environments that are fun and engaging. This increased student engagement can lead to greater participation, enjoyment, and positive attitudes toward learning. [[Evidence 2]

Limitations

- The success of games-based SEL interventions depends heavily on the facilitator's skills and approach. [[Evidence 1]] [[Evidence 3]]
- More research is needed to fully understand how to implement game-based SEL sessions effectively and ensure they are sustainable in different learning environments. [[Evidence 1]]
- While the article addresses the potential risks of using games for SEL, it does not spend much time discussing strategies to mitigate them. [[Evidence 4]]

Source 16: Rolling Dice and Learning: Using Role-Playing Games as Pedagogy Tools

Summary

This article explores how role-playing games (RPGs) can be effective teaching tools, especially for student training. In this article, Ruiz-Ezquerro argues that traditional role-playing in education can be too predictable and doesn't have realistic consequences for student choices. [[Evidence 1]] He suggests using elements of RPGs, like dice rolls and game masters, to make the learning experience more immersive and challenging. He

believes this approach gets students more engaged and helps them think critically because it adds an element of uncertainty and requires them to adapt to unexpected situations. [[Evidence 1]]

Key Findings

The article's main points are drawn from the author's experiences as both a student and an educator, rather than formal research studies. Ruiz-Ezquerro shares anecdotal examples to back up his idea that RPG elements can improve role-playing activities for learning:

- The article distinguishes between two types of gamifications: structural gamification, which adds game-like features to existing courses, and content gamification, which uses game elements to change how the content is delivered. Ruiz-Ezquerro argues for RPGs as a form of content gamification because they significantly impact the learning experience. [[Evidence 2]]
- Ruiz-Ezquerro points out that traditional role-playing activities in classrooms tend to be predictable and do not have consequences that last beyond the activity. [[Evidence 3]] He says these factors make the experience less realistic and valuable for learning. He suggests that RPG elements can fix these issues by making the scenarios less predictable and making more impactful choices. This encourages students to think critically and engage more deeply with the material. [[Evidence 4]]
- The article highlights how uncertainty, created by using dice rolls, can increase engagement and critical thinking. When outcomes are less predictable, RPGs encourage participants to consider different viewpoints, think about potential

outcomes, and adjust their strategies based on how the situation unfolds. [[Evidence 5]] Ruiz-Ezquerro argues that this randomness can create a more dynamic and engaging learning environment than typical, predictable role-playing. [[Evidence 6]]

Themes

- Ruiz-Ezquerro presents RPGs as a valuable tool for game-based learning (GBL), especially because of their ability to create immersive and engaging educational experiences. [[Evidence 2]]
- The article stresses that RPG mechanics can significantly improve student engagement. [[Evidence 1]] The unpredictability introduced by dice rolls and the need to adapt to changing circumstances keep participants actively involved in the learning process. [[Evidence 7]]
- Ruiz-Ezquerro emphasizes how critical thinking is crucial for navigating the unpredictable situations that arise in RPGs. [[Evidence 7]] Participants are challenged to analyze situations, evaluate choices, and make decisions that can have significant consequences [[Evidence 8]], which are skills that mirror real-world problem-solving.

Limitations

- The author's claims about RPGs being effective in education are mostly based on personal stories and observations. [[Evidence 3]] [[Evidence 9]] While these insights are helpful, they are not based on rigorous research, which makes it harder to say if his observations would apply to other settings.

- While the article gives a simplified way to incorporate RPG mechanics into teaching activities, this simplified approach might not capture the full complexity of RPGs. [[Evidence 10]]
- The article mainly talks about using RPGs in student training settings. [[Evidence 4]] While Ruiz-Ezquerro mentions broader educational uses, he doesn't explain how RPGs could be adapted for different learning environments or age groups. [[Evidence 10]]

Source 17: The Effects of Digital Storytelling Games on High School Students' Critical Thinking Skills

Summary

This study investigates how effective digital storytelling (DST) games are at promoting critical thinking skills in high school students. [[Evidence 1]] The researchers, Hsiu-Ling Chen and Yun-Chi Chuang, created a thematic course called “Thinking Utopia,” which combined DST game design learning with civics education. [[Evidence 2]] Forty-six freshmen from two high schools in Taiwan participated in this 9-week course, where they collaborated to design DST games using Ren'py software. [[Evidence 1]] [[Evidence 2]] The study used the Critical Thinking Test, Level II (CTT-II) to measure students' critical thinking skills before and after the course. [[Evidence 3]] Although quantitative analysis didn't show significant improvements in overall critical thinking scores, qualitative analysis of student interviews showed a positive impact on their critical thinking processes and other valuable skills, including communication, problem-solving, and media literacy. [[Evidence 1]] [[Evidence 4]] [[Evidence 5]]

Key Findings

- The study didn't find any significant differences between pre-test and post-test scores on the CTT-II, suggesting that the intervention may not have directly improved test-taking abilities within the given timeframe. [[Evidence 6]]
- While there weren't significant changes in test scores, analyzing student interviews showed that many students felt the DST game design process was good for their critical thinking. [[Evidence 7]]
- Students who had more in-depth discussions while designing the game showed some improvement in certain critical thinking skills, but these improvements weren't statistically significant. [[Evidence 8]] This finding highlights collaborative learning is importance for getting the most out of these educational interventions. [[Evidence 8]]
- Students said they improved in communication, problem-solving, and media literacy, which shows that DST game design learning can have broader positive impacts on student learning and development. [[Evidence 9]]

Themes

- The study looks at how DST game design affects critical thinking skills, relevant to my thesis's investigation of how tabletop RPGs improve critical thinking as part of SEL competency development.
- The study found that collaborative discussions positively affect learning. [[Evidence 10]]

Limitations

- The 9-week course might not have been long enough to see big changes in critical thinking, a complex skill that takes time to develop. [[Evidence 1]] [[Evidence 11]]
- Only a small number of students from two high schools in Taiwan participated, so the findings might not apply to other groups or situations. [[Evidence 2]] [[Evidence 12]]
- The study relied heavily on qualitative data from student interviews, which, while offering insights, can be subjective and difficult to apply broadly. [[Evidence 1]] [[Evidence 5]]