

Crisis Simulations and Sociological Insights

Using Digital Games for Future Scenarios in Higher Education

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Game-based learning and scenario planning offer powerful tools to address complex crises and counter fatalistic narratives in higher education. This paper explores their integration into interdisciplinary teaching to enhance critical thinking, develop self-efficacy, and foster solutions-oriented mindsets among students. By engaging with digital games, students analyze crisis narratives, identify systemic interdependencies, and experiment with strategic responses. Science fiction, used as a critical theory framework, provides a lens for sociological reflection, while hands-on experimentation with Makey Makeys and Calliope microcontrollers strengthens their sense of agency. Though no formal evaluation exists, student feedback consistently highlights increased preparedness for real-world challenges and a strong desire for broader curricular integration of such methods. This paper argues that incorporating scenario planning and interactive learning approaches equips students with essential skills to navigate future crises, making them proactive agents of change rather than passive observers of global uncertainties.

Keywords: game-based learning, scenario planning, technology assessment, crisis simulation, higher education

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Introduction

Crises, whether environmental, political, or technological, often evoke a sense of inevitability and helplessness (Mohanty et al. 2015). These perceptions not only influence public discourse but also shape policy-making and societal responses. Higher education has a responsibility to challenge such narratives by equipping students with the tools to critically analyze and engage with complex issues across all disciplines. This paper argues that digital games provide an effective medium for this purpose, offering interdisciplinary applications that extend far beyond social sciences (Jenkins & Squire 2004; Prensky 2003)

By simulating crisis scenarios, games encourage active learning, fostering a deeper understanding of systemic interdependencies and human behavior. Unlike traditional case studies or theoretical models, digital games immerse players in dynamic, interactive narratives that require them to make decisions, weigh ethical considerations, and experience the consequences of their choices in real time. This makes them particularly effective in disciplines such as public health, environmental sciences, political studies, business management, and even the arts and humanities, where understanding crisis dynamics and decision-making processes is crucial (Pivec 2004; Klimmt 2005).

The power of digital games also lies in their ability to tell compelling stories. Narratives in games provide an emotional and experiential learning process that is difficult to achieve through traditional educational methods. Players are not merely passive recipients of

information but active participants in evolving storylines, allowing them to engage with complex social, political, and economic dilemmas from a first-person perspective. This unique approach fosters empathy, ethical reflection, and critical engagement with global issues—an invaluable pedagogical tool for higher education (Bopp 2007; Gee 2003).

Through this lens, we explore the potential of digital games to transform both educational practices and societal attitudes toward crises. By integrating game-based learning into diverse academic disciplines, educators can cultivate a generation of students who are better equipped to navigate uncertainty, analyze multifaceted global challenges, and actively contribute to the development of innovative solutions.

The paper is structured as follows: The next section situates digital crisis simulations within the broader context of wicked problems and the psychological dynamics of helplessness. This is followed by a discussion of game-based learning and the narrative mechanisms that foster engagement and ethical reflection. Subsequent sections present specific examples of digital games as analytical tools and outline the integration of scenario planning as a didactic method. The paper then explores how these approaches counter fatalistic narratives and strengthen students' sense of agency. A final section reflects on the implementation of the project, including interdisciplinary components such as science fiction analysis and hands-on experimentation, before concluding with implications for broader educational and societal contexts.

Crisis and the Perception of Helplessness

Many of the crises we face today can be classified as "wicked problems"—complex, multifaceted issues that lack clear solutions and involve multiple interdependent factors. Wicked problems, a term introduced by Rittel and Webber (1973), are characterized by their resistance to resolution, their evolving nature, and the competing interests of stakeholders involved. Examples include climate change, global health crises, artificial intelligence ethics, and economic instability. These crises defy simple solutions and require systemic thinking and collaborative approaches to address them effectively.

Empirical studies indicate that many individuals perceive technical innovations and crises as uncontrollable, akin to natural disasters (Acatech 2024). This deterministic view fosters inaction, as people often feel powerless in the face of seemingly insurmountable challenges. The complexity of wicked problems exacerbates this sense of helplessness, as individuals struggle to grasp their full scope and potential consequences. For example, the public response to climate change often oscillates between urgency and paralysis, driven by media narratives that highlight catastrophic consequences without emphasizing actionable solutions. Similarly, the rapid deployment of AI technologies has led to widespread anxiety about job displacement and ethical dilemmas, yet constructive public discourse on mitigation strategies remains limited (ibid.).

In higher education, this sense of helplessness can be addressed by reframing crises as complex systems that can be analyzed and influenced. By breaking down wicked problems into smaller, more manageable components, students can identify leverage points where intervention is possible. Digital games offer a platform for this reframing, enabling students to experiment with different approaches to crisis management. Many digital games incorporate complex decision-making mechanics that mirror the uncertainty and ethical dilemmas inherent in real-world wicked problems. Through iterative play and scenario analysis, students gain a deeper

understanding of how individual and collective decisions shape the trajectory of crises (Earle & Leyva-de la Hiz 2021).

By actively engaging with these scenarios, students can learn to move beyond fatalism and recognize the agency they have in shaping outcomes. Digital games thus provide a unique method for fostering problem-solving skills, ethical reasoning, and resilience in the face of seemingly intractable global challenges.

Game-Based Learning and the Power of Narratives

One of the key strengths of digital games as educational tools is their ability to engage students through narrative-driven experiences. Unlike traditional learning materials that present crises as abstract theoretical constructs, games place students in immersive environments where they must make choices and experience the outcomes firsthand. This interactive engagement with crises provides an unparalleled way to develop a nuanced understanding of social, political, and ethical dilemmas across disciplines (Bopp 2007; Friedmann 2021).

Game-based learning leverages storytelling to create emotionally compelling learning experiences. Games allow students to explore multiple perspectives by assuming different roles—whether as policymakers, survivors, scientists, or journalists. These roles help students grasp the complexities of crisis situations and consider the diverse factors influencing decision-making processes. For example, in *This War of Mine*, players experience the struggle of civilians trapped in war, highlighting ethical dilemmas that parallel real-world humanitarian crises. Similarly, *Detroit: Become Human* enables students to explore themes of social justice, technological ethics, and human rights by placing them in the role of sentient androids seeking autonomy in a world dominated by humans.

Furthermore, the branching narratives of digital games illustrate how different choices can lead to vastly different outcomes, reinforcing the idea that crises are not predetermined but shaped by decisions at individual and systemic levels. This understanding is critical for fields such as business ethics, law, public health, and governance, where students must learn to evaluate multiple possible future scenarios and adapt to rapidly changing circumstances.

By incorporating digital games into curricula, educators can offer students an experiential form of learning that enhances engagement, deepens conceptual understanding, and fosters interdisciplinary dialogue (Niedermeier & Müller-Kreiner 2016). The following section provides concrete examples of how specific games can be used to explore various crisis scenarios across multiple fields of study.

Digital Games as Analytical Tools

Digital games provide a versatile framework for examining crises through the lens of wicked problems, immersive storytelling, and decision-making mechanics. Their interactive nature enables students to analyze crises in a way that traditional case studies cannot. For instance, *Plague Inc.* illustrates the intricate dynamics of global health crises, where players must strategize to either prevent or exacerbate pandemics. This mirrors real-world challenges such as vaccine distribution and misinformation. *This War of Mine* immerses players in the ethical complexities of wartime survival, emphasizing civilian perspectives often overlooked in political discourse. Meanwhile, *Papers, Please* offers an incisive look at bureaucratic control

and its impact on immigration policies, helping students explore the human consequences of policy decisions.

In urban planning and resource management courses, *SimCity* allows students to experiment with infrastructure resilience, simulating the effects of zoning laws, natural disasters, and economic downturns. Similarly, *Frostpunk* challenges students to make ethically charged decisions about governance, resource allocation, and societal survival under extreme conditions.

Finally, *Detroit: Become Human* provides a futuristic lens on artificial intelligence and human-robot interactions. Students use its branching narrative to design future scenarios that explore AI ethics, labor market shifts, and the potential for systemic discrimination in technological societies.

These examples demonstrate how digital games serve as sophisticated analytical tools that not only engage students but also deepen their understanding of global crises. By integrating these games into higher education curricula, educators can cultivate interdisciplinary dialogue, critical analysis, and a more proactive approach to crisis resolution (Plass et al. 2015; Vogel et al. 2006).

Scenario Planning as a Didactic Method

Scenario planning, originally developed in technology assessment, has been widely adopted as a method for anticipating and preparing for complex future developments. In higher education, this structured approach helps students explore uncertain futures by constructing and analyzing potential crisis scenarios. By identifying key uncertainties, mapping out alternative trajectories, and developing strategic responses, students learn to navigate global challenges in a systematic and proactive manner (Eimler & Hemminger 2022).

Games provide an ideal platform for scenario planning, allowing students to engage with future-oriented thinking in a risk-free environment. For example, *SimCity* enables students to experiment with urban resilience strategies, assessing the long-term impacts of zoning laws and infrastructure planning. Likewise, *Detroit: Become Human* encourages students to explore ethical dilemmas and policy considerations related to AI governance and human-robot coexistence. By integrating scenario planning into game-based learning, educators can equip students with practical skills for interdisciplinary problem-solving, fostering resilience and adaptability in the face of uncertainty (Eimler & Hemminger 2022; Hoblitz & Ganguin 2014).

Simulation-based learning has a long-standing tradition in education, ranging from policy-oriented foresight workshops to complex classroom games. A particularly relevant example is *The World Peace Game*, developed by educator John Hunter. Aimed primarily at younger students, the game tasks participants with resolving interconnected global crises—such as war, climate change, and economic instability—through collaborative decision-making and strategic negotiation. Despite targeting a different educational level, the game illustrates several key principles that also underpin the present project: systems thinking, empathy, and a shift from zero-sum to solutions-oriented approaches (Hunter 2013). Like digital crisis simulations in higher education, the World Peace Game emphasizes process over outcome. Its open-ended nature encourages experimentation and values failure as a source of insight. Drawing on such pioneering initiatives not only affirms the relevance of simulation-based learning but also offers a comparative framework to situate digital methods within broader

pedagogical traditions. Both approaches demonstrate that engaging with complexity through play can build cognitive flexibility, increase self-efficacy, and nurture a sense of agency—regardless of learner age or disciplinary background. This structured approach to future thinking naturally complements the goal of countering fatalistic narratives, as explored in the next section.

Countering Fatalistic Narratives

One of the most significant contributions of game-based learning and scenario planning is their potential to counter fatalistic narratives. When individuals are confronted with complex, global crises, they often experience a sense of helplessness, believing that their actions have little impact on the course of events. This perspective can lead to resignation, inaction, and a lack of creative problem-solving. However, through scenario planning and game-based learning, students are encouraged to think systematically about potential futures, experiment with alternative strategies, and develop the cognitive flexibility needed to address global challenges proactively (Earle & Leyva-de la Hiz 2021; Eimler & Hemminger 2022; Jenkins & Squire 2004).

Scenario planning helps learners recognize that the future is not a fixed outcome but a series of possibilities shaped by human decisions. This method, widely used in technology assessment and strategic forecasting, allows students to explore multiple pathways and consider the implications of different policy choices. For example, in environmental science courses, students might use scenario planning techniques to model the effects of climate change mitigation policies, testing how various strategies influence global temperature rise, economic stability, and social equity. By working through these exercises, students move from passive observers to active participants in shaping potential futures, reinforcing their sense of agency (Mohanty et al. 2015; Jenkins & Squire 2004).

Game-based learning further enhances this process by providing an interactive platform where players can experiment with decision-making in a risk-free environment. Unlike traditional simulations, which may present static models of crisis management, digital games allow users to dynamically test strategies, fail safely, and iterate on their approaches. For instance, in *Democracy 4*, players assume the role of a national leader tasked with managing policy decisions. By implementing policies and observing their effects on society, students learn how public responses, economic factors, and political dynamics interact in complex systems. This hands-on approach fosters a deep understanding of cause-and-effect relationships and underscores the role of agency in shaping societal outcomes.

Another example is *Surviving Mars*, a simulation game that requires players to design and sustain a human colony on Mars. The game challenges users to balance technological innovation, resource management, and environmental unpredictability. By engaging in iterative problem-solving, students develop a mindset that values experimentation, resilience, and adaptation—essential qualities for tackling real-world wicked problems such as climate change and urban planning.

By actively participating in scenario development within digital games, students are not only exposed to the mechanics of crisis resolution but also cultivate self-efficacy. They learn that while crises may be complex, they are not insurmountable. Instead of viewing global challenges as inevitable catastrophes, students develop a nuanced appreciation for the interconnectedness of decision-making and long-term consequences. This transformation is

crucial in fostering a new generation of professionals who approach problems with confidence, creativity, and a solutions-oriented mindset.

Moreover, the application of these methods in higher education can extend beyond the classroom. When students internalize the value of scenario planning and game-based learning, they bring these skills into their future careers, influencing decision-making processes in policy development, urban planning, public health, and corporate strategy. This long-term impact highlights the role of higher education in preparing individuals not only to understand global crises but also to take active roles in addressing them (Sitzmann 2011).

Ultimately, integrating game-based learning with scenario planning is a powerful approach to countering fatalistic thinking. By equipping students with the ability to model, analyze, and adapt to complex challenges, these methods empower them to see themselves as agents of change rather than passive recipients of crisis narratives. As they develop the skills to construct viable future pathways, students emerge better prepared to contribute meaningfully to society, fostering a culture of proactive engagement rather than passive resignation. The question of transferability—whether and how skills, knowledge, and attitudes acquired through crisis simulations extend beyond the classroom—is central to the educational value of game-based learning. While digital games provide immersive environments for experimentation and ethical reflection, their long-term impact hinges on whether students can apply these experiences to real-world contexts. Research in educational science emphasizes the importance of “far transfer,” which refers to the application of learned principles in new, often unpredictable situations (Perkins & Salomon 1992; Sitzmann 2011). In this project, transferability is fostered through the integration of scenario planning and structured reflection. By developing and analyzing complex future scenarios based on game experiences, students learn to abstract general principles—such as strategic thinking, ethical reasoning, and systems awareness—and apply them to domains like policy analysis, technology assessment, and professional practice. This process is further supported by interdisciplinary dialogue, encouraging students to make connections between in-game decisions and societal challenges. While formal longitudinal data is lacking, student feedback suggests that participants increasingly view themselves as capable of engaging with crisis dynamics beyond the confines of the classroom. This perceived self-efficacy is a key indicator of successful transfer, pointing to the potential of game-based methods to shape resilient and adaptive mindsets.

Case Studies: Science Fiction, Critical Analysis, and Hands-on Experimentation

A central component of this project is the integration of science fiction as both a critical theory framework and a mass medium that critiques itself. Science fiction provides a unique analytical lens through which students can engage with speculative futures, ethical dilemmas, and societal transformations. As a genre, it often questions dominant ideologies, explores alternative social orders, and critically examines technological progress (Fuhse 2003). However, understanding these dimensions requires significant preparatory work, including extensive reading, theoretical discussions, and comparative media analysis.

The ability to analyze science fiction critically necessitates strong interpretive and discursive skills. Students must learn to differentiate between implicit and explicit critiques within narratives and understand how speculative settings reflect real-world concerns. This process fosters a sociological perspective that enables students to step back from their immediate emotional responses and engage with crises analytically rather than reactively. Achieving this

level of detachment is essential for scenario planning, where the goal is to consider multiple possible futures without defaulting to dystopian fatalism.

To develop an initial sense of self-efficacy before engaging with complex digital simulations, students work with *Makey Makeys* and *Calliope* microcontrollers—tools designed to introduce basic interactive programming and tangible computing concepts. Makey Makeys enable users to turn everyday objects into touch-sensitive interfaces, fostering creativity and problem-solving skills. Calliope microcontrollers allow students to design simple interactive systems, offering an introduction to computational thinking and basic electronics. These activities serve as a bridge to game-based learning by providing hands-on experiences in designing simple interactive environments before engaging with more abstract digital scenarios.

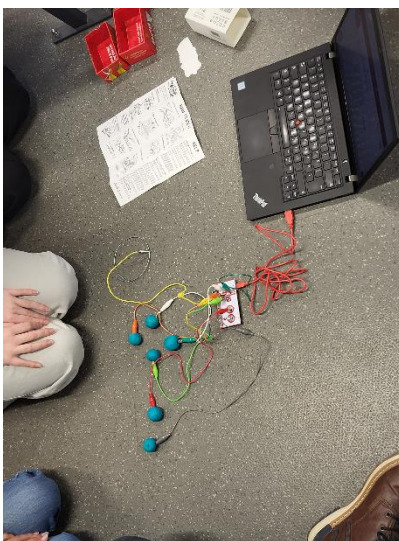


Figure 1. Students working with Makey Makeys.

Following these initial exercises, students transition into analyzing digital games as representations of crisis scenarios. They engage with titles such as *This War of Mine*, *Detroit: Become Human*, and *Frostpunk*, applying their theoretical knowledge to dissect narrative structures, game mechanics, and underlying ideological assumptions. Through comparative analysis, students examine how each game frames crisis management, ethical dilemmas, and systemic power structures, reinforcing their ability to identify and critique fatalistic narratives.

Building on their game analyses, students employ scenario planning techniques to construct alternative future pathways. This process involves mapping key uncertainties, generating multiple plausible futures, and assessing potential interventions. For instance, after analyzing *Detroit: Become Human*, students might construct scenarios where AI-human relations evolve under different regulatory, economic, and ethical conditions. By engaging in this form of structured speculation, students not only sharpen their analytical skills but also cultivate a solutions-oriented mindset.

By integrating science fiction analysis, hands-on experimentation, and digital game-based learning, this approach enables students to transition from abstract critique to active problem-solving. They develop a structured yet flexible methodology for approaching complex crises, equipping them with the cognitive tools necessary for both academic inquiry and real-world decision-making. This holistic approach ultimately reinforces the core objective of countering

fatalistic thinking—helping students see crises not as inevitable endpoints but as dynamic, malleable challenges shaped by human agency and collective decision-making.



Figure 2. Students presenting a future scenario based on theories on transhumanism.

Countering the Apocalypse Through Applied Learning

By actively participating in scenario development within digital games, students are not only exposed to the mechanics of crisis resolution but also cultivate self-efficacy. They learn that while crises may be complex, they are not insurmountable. Instead of viewing global challenges as inevitable catastrophes, students develop a nuanced appreciation for the interconnectedness of decision-making and long-term consequences. This transformation is crucial in fostering a new generation of professionals who approach problems with confidence, creativity, and a solutions-oriented mindset (Wouters et al. 2013; Wouters & Van Oostendorp 2013).

The project aimed to achieve several key objectives:

- Enhancing critical thinking by integrating interdisciplinary approaches, including sociological analysis, scenario planning, and game-based learning.
- Developing self-efficacy by engaging students in hands-on experimentation with interactive tools like Makey Makeys and Calliope microcontrollers before progressing to digital simulations.
- Encouraging analytical depth through the study of science fiction as both a medium of critique and a mass-cultural artifact that reflects and challenges societal structures.

- Fostering solutions-oriented thinking by guiding students through structured scenario planning exercises that push them to consider alternative futures and intervention strategies.

While no formal evaluation study was conducted, student feedback was systematically collected through a multi-step reflection process at the end of each semester. This included three components: (1) a written reflection sheet (Reflexionsbogen) with open-ended questions designed to capture individual learning experiences and perceived skill development; (2) structured group discussions guided by prompts on the relevance, applicability, and emotional resonance of the methods used; and (3) a moderated feedback round where students were encouraged to articulate critical observations, suggestions for improvement, and connections to their broader educational and professional goals. These combined formats enabled both individual and collective insights and fostered a learning culture that values meta-reflection and participatory course design. Future iterations of the project could benefit from more formalized evaluation tools such as pre/post surveys or qualitative interviews to assess long-term learning outcomes. In the discussions, students consistently express the desire for such content to receive greater emphasis in the curriculum. They report that the methodology resonates strongly with them, making abstract theories tangible and equipping them with concrete strategies to approach complex problems constructively. Many students highlight that they feel better prepared to engage with future crises and uncertainties, demonstrating increased confidence in their problem-solving abilities.

These feedback rounds indicate the strong educational potential of game-based learning and scenario planning. A more formalized evaluation process would be valuable in systematically assessing learning outcomes and identifying areas for further development. This could provide deeper insights into how these methods shape students' long-term thinking and professional readiness. Moreover, the application of these methods in higher education can extend beyond the classroom. When students internalize the value of scenario planning and game-based learning, they bring these skills into their future careers, influencing decision-making processes in policy development, urban planning, public health, and corporate strategy. This long-term impact highlights the role of higher education in preparing individuals not only to understand global crises but also to take active roles in addressing them.

Ultimately, integrating game-based learning with scenario planning is a powerful approach to countering fatalistic thinking. By equipping students with the ability to model, analyze, and adapt to complex challenges, these methods empower them to see themselves as agents of change rather than passive recipients of crisis narratives. As they develop the skills to construct viable future pathways, students emerge better prepared to contribute meaningfully to society, fostering a culture of proactive engagement rather than passive resignation.

The use of scenario planning, simulation, and game-based methods is not limited to educational contexts. In fact, similar approaches have gained traction in professional settings, where they are employed to foster innovation, strategic foresight, and collaborative problem-solving. Corporate environments, public-sector organizations, and think tanks increasingly rely on formats such as design sprints, foresight labs, and serious play workshops to engage participants in complex scenario building and speculative prototyping (Brown 2016; Liedtka 2011; Schwartz 1997). These formats echo many of the didactic principles explored in this paper: embracing uncertainty, modeling alternative futures, and reframing problems through narrative immersion and role-based perspectives. Methods such as *Design Thinking* (IDEO), *LEGO® Serious Play*, and the *Futures Literacy Lab* (UNESCO) demonstrate how game-like

elements and scenario-based exercises can be applied to address strategic challenges in fields as diverse as urban planning, healthcare innovation, and corporate transformation (Camacho 2016; Kristiansen & Rasmussen 2014; Miller 2018). Like digital crisis simulations in higher education, these professional tools prioritize user-centered thinking, systemic analysis, and iterative exploration over linear problem-solving. The convergence of educational and professional simulation practices underscores the societal relevance of such approaches, revealing how playful, imaginative engagement with uncertainty can generate actionable insights across domains. By aligning educational practices with professional innovation cultures, higher education not only prepares students for academic analysis but also equips them with future-ready competencies that are in high demand across sectors (Rauth et al. 2010; Miller 2018).

About the Author

Dr. Elke Hemminger is a Professor of Sociology at the Protestant University of Applied Sciences in Bochum, where she has held this position since 2017. Her expertise lies in the sociology of technology, digital education, and social network analysis. Dr. Hemminger completed her interdisciplinary PhD in Game Studies in 2009, with research conducted at the University of Education Schwäbisch Gmünd and the University of Waikato in New Zealand. Dr. Hemminger is also passionate about science communication and storytelling, which she loves to integrate into her teaching and research.

Website: <https://www.evh-bochum.de/hauptamtlich-lehrende.html?show=615>

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List of Games

- This War of Mine** – 2014, 11 bit studios
- Detroit: Become Human** – 2018, Quantic Dream
- Frostpunk** – 2018, 11 bit studios
- Plague Inc.** – 2012, Ndemic Creations
- SimCity** – 2013, Maxis
- Democracy 4** – 2020, Positech Games
- Surviving Mars** – 2018, Haemimont Games