2. PUTTING THE CYBERMEDIA MODEL INTO EDUCATIONAL PRACTICE

EXPANDING THE FRAMEWORK

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ABSTRACT

In this paper, we build on an earlier operationalization of Aarseth and Calleja's cybermedia model for an interdisciplinary evaluation of games as potential tools and objects for teaching and learning. Here, we critically develop the model and original template, and expand its four dimensions with two additional layers. We then use the expanded framework on concrete examples to illustrate how the overall suitability of specific game titles can be evaluated before these are applied in educational contexts.

KEYWORDS

cybermedia model, games and education, narrative, mechanics, materiality, players, ideology, critique, political economy, game production, *The Walking Dead*, *Frostpunk, Survive the Century*

INTRODUCTION

This paper presents, and further develops, an interdisciplinary template for the evaluation of videogames as potential tools and objects for teaching, as initially introduced in Pötzsch, Hansen & Hammar (2023a). Operationalizing Espen Aarseth and Gordon Calleja's (2015) game ontological cybermedia model, Pötzsch, Hansen, and Hammar have identified key aspects for critical inquiry along the dimensions of sign system, mechanics, materiality, and player. Based on their framework, we develop the model further and expand the layers of materiality and players before proposing additional dimensions of institutional frames and interferences to account for both logistical and contextual aspects of game-use in schools, and enable attention to possible interrelations across the five components of the model. The findings are systematized and summarized in the form of tables to increase accessibility and thereby facilitate critical and reflected uptake in the educational sector. The developed template is meant as a heuristic guide that teachers can turn to when planning teaching sessions that include videogames. We point to salient aspects in need of critical interrogation that often remain below the radar of subject-focused planning endeavors.

BACKGROUND

Digital games have developed into the dominant medium of contemporary culture in an era that has been termed a "ludic century" (Zimmermann, 2013). Being perceived as more than mere entertainment, games are today widely seen as suitable media to approach serious issues in a critical and reflective manner from varying disciplinary

vantage points (Bogost, 2007; Sicart, 2013; Flanagan & Nissenbaum, 2014; Jørgensen & Karlsen, 2018). This includes the use of games for educational purposes (Apperley, 2010; Linderoth, 2010; Staaby, 2015, McCall, 2016; Burn, 2022; Pötzsch, Hansen & Hammar 2023a, 2023b). In educational discourse, games are often regarded as media objects with inherent didactical affordances, particularly in relation to fostering motivation and engagement (Annetta 2008; Plass et al. 2015). However, the educational value of games is not inherent in the designed artifacts, but emerges in socially, culturally, and institutionally situated processes (Marklund & Alklind-Taylor 2015; Staaby 2021) and specific modes of play (Jensen & Skott 2022).

We identify a series of both textual and contextual factors in need of critical consideration before the use of games in subject-specific educational practices. Drawing on these insights, this paper builds on Aarseth and Calleja's (2015) game ontological framework and Pötzsch, Hansen, and Hammar's (2023a) earlier advances to develop a systematic interdisciplinary framework to evaluate the usability of specific game titles prior to possible application in educational settings.

Scholars rooted in the theoretical tradition of critical literacy and critical media literacy, such as David Buckingham (2003), Alan Luke (2012), Douglas Kellner (1995), and Hilary Janks (2009, 2014), direct attention to teaching about the biases and ideologies inherent in cultural expressions. Their aim is to empower learners to actively resist and subvert these influences. As a result, education about games drawing upon this critical tradition emerges as a vital element in contemporary education, fostering the development of critical, self-reflective, and confident citizens. This article distinguishes three ways of applying games in education: 1) Teaching *with* games, 2) teaching *through* games, and 3) teaching *about* games (Pötzsch, Holt Hansen & Hammar, 2023b). Type 1 – teaching with games – employs educational titles to reach pre-defined learning goals in specific subjects. Type 2 – teaching through games – looks at how off-the-shelf commercial titles can be made use of in classrooms. For the sake of this article, we disregard the distinction between type 1 and 2 and combine them under the heading of teaching with games.

Finally, type 3 – teaching about games – focuses on videogames in general as objects of critical scrutiny rather than treating them as supposedly neutral instruments to improve teaching and learning. We argue that, given their rapidly growing economic, societal, political, as well as cultural salience (Kerr, 2017), this last aspect merits increased attention. We argue that there should be more education *about* games, i.e. they must be seen not only as tools for, but also as objects of education (Zagal and Bruckman, 2008). This aspect of teaching about games from various disciplinary vantage points has, so far, received too little attention in studies about game-use in education.

EXPANDING UPON THE CYBERMEDIA MODEL AS EVALUATION TOOL

Achieving a viable understanding of what games are, how they involve players, and what wider implications they might have, is an inherently interdisciplinary endeavor and an important condition for the development of good practices for educational uses. Earlier research has proposed a series of different game definitions (Huizinga, 1938; Caillois, 1961; Salen & Zimmerman, 2004; Juul, 2005; Sicart, 2013). All of these have been haunted by, in particular, two factors; borderline cases as well as the indeterminate status of games as both objects and processes. In the present contribution, we use the game ontological approach by Aarseth and Calleja (2015) to circumnavigate such problems and prepare the grounds for the introduction of a template for the evaluation of possible game-use in upper-secondary education.[1] The template was originally devised by Pötzsch, Hansen & Hammar (2023a). In this paper, we expand upon the original version by adding new dimensions of critical inquiry that

1. We have developed the template in dialogue with teaching professionals working in upper-secondary education. However, the identified factors will retain relevance also for the planning of videogame use at primary and lower-secondary levels.

have emerged in critical discussions with colleagues and teaching professionals.

To recap that conceptual basis for the template, in Aarseth and Calleja's approach, the phenomenon game is divided into four separate but interrelated dimensions (Figure 1); 1) rules and mechanics, 2) sign system or representational layer containing characters, story, and game world, 3) materiality, i.e. the material components needed to play, as well as 4) players – or human agents – who activate, interpret, and potentially reconfigure the three preceding dimensions. Components 1-3 of the model constitute what Aarseth and Calleja term a static cybermedia object, while the fourth – human agents – adds a processual dimension. When interacting with cybermedia objects, human agents constantly create new configurations of the first three components, and in this way shape emergent cybermedia processes.

The model has been developed further into a meta-model by Aarseth and Grabarczyk (2018). For the sake of this paper, we opt for using the original version primarily due to its accessibility and ease of use. For the purpose of the template, we initially look at the four aspects of Aarseth and Calleja's (2015) original model before we expand it with two additional important areas of inquiry – institutional frames of game-use in education, as well as possible interferences between the five dimensions of the model.

Each of the five components we identify can be studied with the help of methods specific to the subfield in question. This makes the template an inherently interdisciplinary framework capable of highlighting meaningful ways to productively study the complex and contingent phenomena of game and play by combining a variety of different methods and scholarly vantage points predominantly from the Humanities and Social Sciences.

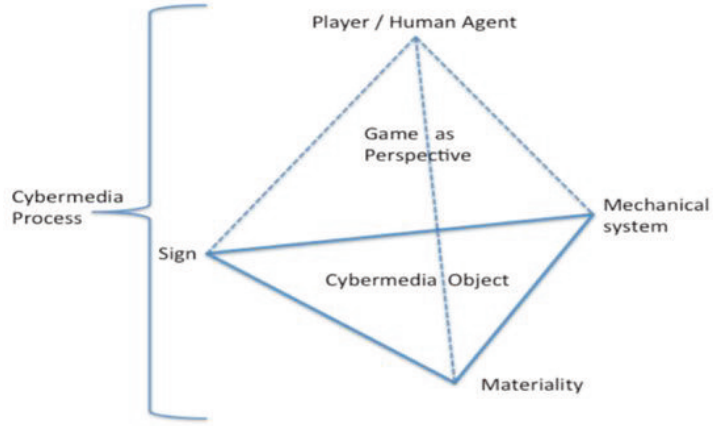

Figure 1: *The cybermedia model's four dimensions in Aarseth and Calleja (2015).*

The cybermedia model makes it possible to avoid the pitfalls of disciplinary containers and prolonged debates about game definitions, and instead enables us to disentangle a complex phenomenon and highlight specific aspects of games that are important for the planning and implementation of concrete educational endeavors. For instance, at the level of sign/narrative, questions of ideological bias, naturalized social roles, or blank spots in the presentation of historical events can be scrutinized, while the level of mechanics enables attention to issues such as opportunities for, and limitation of, player input into the game system, or possibilities for counter-play, or instances of deliberate transgressive play. All these issues are important factors to consider prior to introducing specific titles into the classroom to teach specific subjects, and can be studied from different methodological vantage points that can then be brought into dialogue to enable new insights.

We propose here an expansion of the dimension of player into human agents to also account for the significance of other actors than those directly engaging in play for the planning and implementation of teaching sessions. Beside players of the titles in question, also teachers, school owners, parents, and administrators retain agential capacities vis-a-vis the cybermedia objects under scrutiny. The

component of player/human agents allows for planning of actual game-use in terms of play skills, game literacy, accessibility, possible toxic group dynamics, gamer modes, as well as forms of exclusion and marginalization intentionally or unintentionally afforded by specific titles. All these issues need to be taken into consideration when pondering if and how a certain game title can be made useful for given educational objectives.

When adapting the cybermedia model as a tool for critical analysis of specific titles prior to their use in education, an expansion of the level of materiality that was originally conceived by Aarseth and Calleja (2015) as the machinery required for gameplay (screens, controllers, consoles, etc.) becomes necessary. Our expanded version of materiality now includes such aspects as the political economy of game production and play, labor relations in the industry, environmental sustainability of hardware and required cloud services, as well as questions of resource extraction and planned obsolescence (see also Hammar and Pötzsch, 2022). Such an extension in particular opens interesting venues for teaching about videogames and related industries.

When expanding upon the aspect of materiality, we draw upon insights of, among others, Hall (1977) and Mosco (2009: 223-24) who have directed attention to the significance of media production for recurrent biases in content. Through this move, among others, the following areas in need of sustained critical inquiry emerge: What technical infrastructure needs to be in place in schools to enable game-use in education, and how is this infrastructure funded and maintained? What are the business models behind free-to-play games? Do specific titles operate with clandestine advertising, in-game monetization strategies, or collection and sale of player data? How much energy and resources do these games, the consoles, and connected cloud services require, and how often does the hardware need to be replaced? These and other questions have emerged as key aspects of critical game research and are equally important for discourses about game-use in education (see Nieborg, 2015; Srauy, 2017; Johnson, 2018; Bulut, 2020; de Wildt and Aupers, 2018; Hammar,

2019; Hammar et al., 2023; Taylor, 2023). With this perspective, the cybermedia object emerges as a variable dependent upon additional material factors such as those outlined above. Knowledge about such wider contexts of game production and use constitute an important basis for reflected planning of possible adaptations for educational purposes, and can serve as focal points for sessions dedicated to teaching about games, game culture, or the games industry. So far, the cybermedia model has not sufficiently accounted for such factors at the level of political economy and ecology.

Investigating digital games with the help of a template developed on the basis of a thus expanded cybermedia model can help identify contingencies and possible pitfalls that need to be critically accounted for before using particular game titles for subject-specific purposes in class (see Tables 1 & 2). The model also shows that teaching *about* digital games can be decisive in processes aimed at engaging learners in critical reflections about the games industry, ideological biases in content, potentially toxic use, and the limited role models they offer.

Following Arnseth, Hanghøj, and Silseth (2018), we assume that no game has intrinsic educational qualities. Rather, the context they are used in, as well as the concrete plans and preparations by teachers, determine subject-specific educational values. Therefore, our template operates under the assumption that teachers have concrete plans regarding the overall objectives behind an incorporation of a specific game title into a particular teaching subject. As such, our template serves more as a structured guide to assist educators in discerning potential pitfalls beyond subject-specific considerations when they assess game titles against the criteria outlined in the framework.

To offer an example, it might well be that the content and setting of games such as those belonging to the *Assassin's Creed* series might yield subject-specific benefits in the teaching of history. However, the costs of acquisition of the game, the required technical infrastructure, processing power, as well as the violent content and challenging controls would make it difficult to use, despite some subject-specific

educational potentials. Our template facilitates identification of precisely such factors, including those pertaining to business models, sustainability, and data capture.

	Teaching with	Teaching about
Materiality	• Commercial product: yes / no • Technical requirements: Hardware / software • Costs for schools / parents • Business model: Data collection / monetization / privacy • Lock-in / accustoming to specific corporate products • Educational version: yes / no • Educational resources: yes / no • Degree of ecological & societal sustainability (rate of obsolescence, working conditions in production)	• Economic conditions & implications: ○ Working conditions in games industry ○ Composition of development team (diversity) ○ Business model: Data collection / monetization / privacy ○ Distribution ○ Non-disclosure agreements (NDLs) • Ecological implications / sustainability ○ Energy & resource consumption / CO2 footprint (production & use) ○ E-waste & pace of obsolescence
Sign system / narrative / game world	• Ideological subtexts: subject-focused • Available roles & identities: subject-focused • Blank spots & invisibilities: subject-focused • Genre of game: content-based definitions • Provocative / toxic content: yes / no	• Ideological subtexts: general • Available roles & identities: general • Blank spots & invisibilities: general • Game genres: content-based definitions • Implied player of the game • Provocative or toxic content: yes / no
Mechanical system	• Procedural rhetoric: subject-focused • Goals & affordances: subject-focused / attention management • Levels of difficulty / accessibility • Required playtime • Access to saves / teacher access to all levels? • Genre of game: mechanics-based definitions • Affordances for toxic play?	• Procedural rhetoric: general • Goals & affordances: general / attention management • Game genres: mechanics-based definitions
Human agents	• Game competence & literacy: Teachers & students • Attitudes among school owners, administrators, parents • Player cultures, communities & discourses in class: Toxic & otherwise • Counter- / oppositional / toxic play in class • Accessibility: ○ a/v-triggers ○ language proficiency ○ interface design ○ offensive / provocative content ○ age restrictions ○ senso-motoric & neuro diversities	• Toxic player cultures, communities & discourses • Transmedia embedding • Game literacies • Transgressive / counter-play / toxic play • Modding / cheating • Attitudes towards games and play: moral panics, tech-utopianism, technological determinism, technological solutionism

Table 1: *Key aspects for the planning of teaching with and about games (expands upon Table 1 in Pötzsch, Hansen & Hammar 2023a)*

After the publication of the original version of the evaluation template (Pötzsch, Hansen, and Hammar 2023a), we have developed

the framework further to better account for institutional realities faced by teachers and school leaders when attempting to use games for educational purposes. These aspects were inadequately fathomed by the four existing variables. To resolve this, we introduced an additional fifth dimension of the model that we term *institutional frames*. Here various aspects pertaining to the institutional settings and preconditions in individual schools or classrooms can be problematized and made amendable to intervention (e.g., conditions in classrooms, available expertise, available teaching hours compared to play-time required, subject-suitability, and more). In addition, we reconceptualized the dimension of players as human agents to draw attention to the importance of established practices and attitudes towards games and play among fellow teachers, school leaders, and parents when planning for game-use in teaching.

Besides adding a focus on institutional embeddings, the template needed improvement with regard to how the five identified dimensions interact with one another. A model such as the cybermedia model that subdivides a complex phenomenon into minor components can be at risk of compartmentalizing different aspects, and overlook the various ways these interoperate and work for or against one another in different contexts. To alleviate this problem of multi- versus interdisciplinarity, we here introduce the sixth dimension of *interferences* to highlight how various aspects of the model can interfere with each other (Table 2). Thereby, we expand upon the dimension of representation / simulation conceptualized by Pötzsch, Hansen, and Hammar (2023a) to fathom interactions between the dimensions of sign system (story, characters, game world) and rules / mechanics as they, for instance, become palpable in cases of ludo-narrative dissonances (see Grabarczyk and Kampmann Walter, 2022). By these means, we can also expand upon Vangsnes and Økland's (2015) term didactic dissonance, and conceptualize a form of ludo-didactic dissonance that, for instance, explains interferences between a devised teaching plan and the game mechanics and/or narrative of a specific title and/or dissonant play practices these might invite.

	Teaching with	Teaching about
Institutional frames	• Classroom settings (lighting, room, display, ...) • Demands posed by school administrative systems and permissions • School regulations • National and local syllabi and other regulatory documents • Available teaching hours • Available expertise • Available funding • Clear teaching plan (pre-teaching, implementation, de-briefing) • Clear didactic objectives	• Institutional obstacles to / facilitators for game-use in education • Games in syllabi • Economic interests behind pushes for tech-use / game-use in schools
Interferences	• Explorable problem spaces / pre-determined storyline: Subject-oriented • Player freedoms / limitations: Subject-oriented • Selective reduction of complexity / blind spots: subject-focused • Ludo-narrative dissonances / consonances: Implications for subject taught • Influence of classroom settings on play practices • Influence of institutional frames on play perception and practices • Ludo-didactic dissonance / consonance • Transmedial aspects of play and player culture	• Explorable problem spaces / pre-determined storyline: General aspects • Player freedoms / limitations: General aspects • Selective reduction of complexity / blind spots: General aspects • Ludo-narrative dissonances / consonances: General aspects • Business models' impact on content, player perceptions, and play practices • Relations between biased content and biases in production teams • Games as transmedial phenomena

Table 2: *Additional dimensions relevant for the planning of game-use in educational settings*

The concept of video game literacies introduced by Bourgonjon (2014) as a special form of media literacy can illustrate a series of additional interferences between human agents and other dimensions of the cybermedia model. For example, Bourgonjon's concept of operational videogame literacy focuses on senso-motoric issues such as the ability to use controllers in an efficient manner. This form of game literacy, as such, concerns interferences between the player, aspects of materiality, and the mechanical system (see also Bogost's (2007: 256) concept of procedural literacy). Cultural videogame literacy, on the other hand, can be regarded as mainly an interference between players and the sign systems or game worlds, but also

extends into transmedial environments of player (sub)cultures. Lastly, critical videogame literacy can be conceived as an interference between players, materiality, and institutional frames, enabling reflective approaches to relations between human users and classroom settings as well as school regulations, and production context and socio-economic as well as ecological implications of game production and use.

Evaluating the applicability of specific titles for the purpose of teaching with and about games is a challenging task that requires serious, reflective, and critical interdisciplinary engagement of all dimensions of the model by teachers, pedagogists, administrators, and school owners. The template presented above can hopefully support such endeavors by highlighting a series of key aspects in need of critical interrogation prior to subject-specific uses of games in educational settings. It is not our intention to make teachers discard specific titles for teaching purposes altogether, but to help educators with critically assessing which games are suitable for precisely what types of teaching prior to use in school, and how potentials can be realized in classroom situations contingent upon a variety of contextual factors.

We will now present two examples of how the template can be used to evaluate specific titles – *The Walking Dead* (Telltale Games, 2012-19) and *Frostpunk* (11bit Studios, 2018). After discussing the potential value of teaching ethics with these titles, we move on to a third example showing that even though a game may be evaluated as not suitable for classroom use, it can still productively be taught about, with a departure point being specifically the weaknesses identified with the help of the template.

APPLYING THE CYBERMEDIA MODEL TEMPLATE

Digital games can be potentially useful educational tools for teaching and learning ethics (Schrier, 2021; Staaby, 2015, 2020), as they can be regarded as designed objects that can afford ethical experiences and challenges to playing subjects (Sicart, 2011, 2013). However, teaching

with games is not a simple matter, and there are not necessarily any clear-cut solutions that will be applicable in all settings. Even though different games can be used to teach the same set of skills (here: ethics and moral reasoning), using different titles for the same teaching objectives will most likely result in widely varying contextual requirements in terms of game literacy among teacher and students, available hardware and software, as well as necessary classroom configurations and resources. In addition, the institutional and individual context of each instance of educational use of these games will lead to different outcomes and results. The template can thus only be employed as a guiding light helping to identify salient areas for planning and implementation, and helping to avoid uses of unsuitable titles. Still, even though the template suggests that a certain title should not be used as a teaching tool, it might still be important to teach about a particular game or game franchise using the elements of the template for planning what to include, and where, in educational endeavors.

We will now demonstrate how our framework can be utilized on two titles that provide different affordances, and have different requirements for successful use. The two games discussed below are *The Walking Dead* (TWD; Telltale Games 2012-19) and *Frostpunk* (FP; 11bit Studios, 2018). Both are set in a post-apocalyptic world and require the player to solve a range of ethical dilemmas, thus making the games suitable for teaching ethical modes of reasoning. However, the games have a range of differences that provide both opportunities and challenges when applied as educational tools. Table 3 offers an overview of the cybermedia template applied to *The Walking Dead* and *Frostpunk*.

	Sign	Mechanics	Materiality	Human agents
The Walking Dead	○ Post-apocalyptic setting caused by zombies ○ Character-focused dramatic narrative ○ Complex moral dilemmas with unclear consequences ○ Contains some normative statements concerning morals and ethics	○ Interactive narrative ○ Dialogue choices ○ Linear gameplay ○ Light puzzle mechanics, environmental navigation, and quick-time events	○ Relatively affordable commercial title (no educational version) ○ Available on several platforms ○ First episode free on iOS/Android ○ Teacher guide available in Norwegian ○ Suited to whole class play, lowering cost and logistical requirements ○ Short playtime (ca. 2 hours per episode)	○ Easy to play (apart from some quick-time events requiring fast reactions) ○ Bleak setting and narrative ○ Violence and jump-scares ○ Crowd play mode allows more players to participate in the same session
Frostpunk	○ Post-apocalyptic setting caused by climate change ○ Focus on a settlement of relatively anonymous survivors ○ Moral dilemmas related to settlement management and resource allocation; some consequences known up-front ○ Contains some normative statements concerning morals and ethics	○ City-building and resource management ○ Little dialogue ○ Complex city-building and resource management mechanics ○ Emergent gameplay ○ Some narrative events	○ Relatively affordable commercial title (no educational version) ○ Teacher guide available for use in Norwegian schools ○ Best suited to play in dyads or small groups, increasing cost and logistical requirements ○ Can be purchased directly from developers (or even received free of charge)	○ Difficult for inexperienced players ○ Bleak setting ○ Best played in small groups ○ Mechanical complexity might cause frustrations ○ Potentially invites 'gamer mode'

Table 3: *An overview of key aspects of The Walking Dead and Frostpunk related to teaching ethics (based on Table 2 in Pötzsch, Hansen & Hammar, 2023a)*

When adding the dimension of institutional frames and interferences to the template, additional salient points of inquiry regarding the suitability of TWD and FP come to the fore (Table 4).

	Institutional frames	Interferences
The Walking Dead	○ Content of syllabi for ethics education ○ Precisely planned session does not require many teaching hours ○ Access to locations with suitable lighting and sound ○ Access to necessary expertise	○ Player controls the story's protagonist ○ Interactive, linear narrative ○ Choices and dilemmas interspersed throughout the story ○ Some variety depending on player choice ○ General ludo-narrative consonance
Frostpunk	○ Content of syllabi for ethics education ○ Requires institutional support and long-term planning ○ Emergent gameplay makes estimating required play-time difficult	○ Player controls the faceless leader of a settlement ○ Several choices and dilemmas afforded to the player from the start ○ Dissonances between affordances for instrumental play (maximizing stats) and for narrative play (invested in characters and dilemmas)

***Table 4**: Additional aspects of The Walking Dead and Frostpunk related to teaching ethics*

Both *Frostpunk* and *The Walking Dead* present the player with difficult dilemmas related to surviving in a post-apocalyptic world. The dilemmas of *The Walking Dead* are intimately tied to the game's story, and show great variety in the values at stake, characters involved, and the context in which they take place (some examples are whether to lie, help someone end their own life, who to save in an emergency, whether to steal for survival, etc.). Dilemmas in *Frostpunk,* in contrast, are mostly tied to resource management and survival (like whether to allow child labor, have the adults work longer shifts, how to treat the sick and infirm, and what kinds of meals to serve hungry inhabitants). As a result, with the choices in *Frostpunk* being mostly focused on an abstracted world and anonymous characters as a means to achieve the game's win state, students can fall prey to "gamer mode" (Frank, 2014) where choices are made simply to win the game. Teachers might therefore face a more difficult task when helping students to keep the curriculum in mind while playing *Frostpunk,* compared with *The Walking Dead*.

Other important differences are how players are led to engage in the game, and the way dilemmas are spread across the play experience. While the *The Walking Dead* tells the story through the fate of individual characters, players are invited to engage both emotionally and rationally, while *Frostpunk* offers the more anonymous and less

emotionally engaging setting of a simulation and resource management game. Playing *The Walking Dead* is a mostly linear experience, with dilemmas appearing at set intervals in the story, which facilitates the planning of pedagogic and didactic interventions in class and does not require that the whole game be played to highlight specific ethical conundrums in a teaching session. In contrast, in the simulation game, *Frostpunk,* a set of specific dilemmas is known to the player from the start. This has implications for how classes using this game should be structured. Additionally, *Frostpunk* is a much more mechanically complex experience, which can be challenging for students and teachers alike. While some versions of *The Walking Dead* have a function called "crowd play," where several players can connect to the game session on their phones or laptops and vote directly on in-game dialogue and choices, thus making it suitable for whole-class play, *Frostpunk* is likely best played on single machines in small groups.

At the level of institutional frames, teachers need to consider problematic and/or offensive content in both games, and check potential age ratings. In addition, in both cases hardware needs to be in place and permissions need to be acquired to install and run the titles on school hardware in line with existing rules and regulations. In both cases, the strategic built-up of in-house expertise in schools will improve the applicability of the titles as potential tools for teaching and learning.

Both *Frostpunk* and *The Walking Dead* have educational potential. However, as has been shown here, they vary significantly across the aspects of the cybermedia model, having strengths and weaknesses relative to the six dimensions of the template, which teachers should take into account when planning to use these games in classes.

Having dealt with the various contingencies of teaching ethics with *The Walking Dead* and *Frostpunk*, we will now turn to the issue of teaching about games using the template to identify salient issues for discussion in class. When doing so, we use critical media literacy and show how both content and context of digital games can be made the object of critical inquiry in the contemporary upper-secondary class-

room. We apply our template and evaluate the game *Survive the Century* for teaching, where the game is treated as an object of critique rather than an apparently neutral educational tool.

Scholars such as Hall (1997) or Kellner (1995) have alerted to the inherently political nature of representation that both reflects and reproduces dominant ideologies prevalent at certain times. As Der Derian (2002: 110) notes with reference to the wider implications of narratives of conflict and war, "more than a rational calculation of interests takes us to war. People go to war because of how they see, perceive, picture, imagine and speak of others; that is, how they construct the difference of others as well as the sameness of themselves through representation." Popular cultural representations apparently matter for politics and society, and this insight retains its validity when pondering the use of cultural expressions – including videogames – for educational purposes.

As Adrienne Shaw (2017, p. 595) points out, videogame "designs and environments like media representations do not tell us what to think or do, but they do shape what we think with." As a consequence of this, the ability to teach critically about the products of mass culture and their potential implications becomes an important responsibility of contemporary schools and other educational institutions. The ability to critically reflect, question, and challenge the media images and narratives surrounding us is a key component of so-called 21st century skills (Pötzsch, Hansen & Hammar, 2023b). We now move on to apply the template to assess ways to use the game *Survive the Century* as an object for education. The critique of the game as a potential teaching tool is based on the analysis conducted in Pötzsch, Hansen, and Hammar (2023a: 361-363), but has been actualized and expanded to include the new dimension of institutional frames, as well as new aspects in the dimension of interferences.

Survive the Century (STC) is a browser-based game about climate change developed as a freely accessible educational resource by the National Socio-Environmental Synthesis Center at the University of Maryland. STC has a branching narrative with the development of the story being contingent upon player input that is limited by pre-set

choice alternatives. Due to its accessibility as a browser game, it does not require installation on school hardware or large amounts of energy. As such, the game is easy to apply in classroom settings and can be played both on available individual devices or on a classroom screen. Public funding and a non-profit developer suggest an absence of tacit data mining and corporate lock-in strategies.

In STC, players take the role of an editor-in-chief of "the world's most popular and most trusted news organization" with the "enviable power to set the news agenda and thereby shift the zeitgeist" (STC website), and are presented with a variety of global challenges such as the Covid-19 pandemic or a green shift in the economy. Players make choices on how to react, and the game then reveals the effects of these decisions in short pieces of creative writing. Even though the game requires good English language skills, factors such as the thematic frame, the game's accessibility, and low requirement of player skill make STC appear an almost ideal candidate for classroom sessions aimed at teaching about climate change.

Treating STC as a seemingly neutral tool to teach students about climate change might, however, prove problematic once the dimension of sign / narrative is subjected to closer scrutiny. As Table 5 shows, the game has a series of implicit ideological biases and blank spots that need to be critically addressed during teaching hours. These include assumptions about simple and straight-forward media effects, a prioritization of market-based solutions, and an inherently colonialist outlook on the Global South (for further details, see Pötzsch, Hansen, and Hammar 2023a: 361-363). This does not, however, mean that the game should be discarded with regard to educational endeavors. Rather, we argue for the necessity to teach critically about this game (and others similar to it) and draw the critical attention of learners to how STC issues its implicit messages and conveys ideological positions and content.

	Sign	Mechanics	Materiality	Human agents
Survive the Century	○ Neo-liberal / capitalist bias ○ Colonial gaze on Global South ○ Assumes direct media impact ○ Naïve choice-alternatives ○ Unsophisticated good-bad distinctions ○ Problems can be made an object of inquiry when teaching about the game	○ Limited player freedom ○ Pre-set paradigm of choices narrows available alternatives for action ○ Selective reduction of complexity	○ Free, browser-based game ○ No installation ○ No costs ○ Usable on phones ○ Publicly funded	○ Requires good reading skills (English) ○ Easy to use ○ Requires low level of game literacy ○ Narrow paradigm of possible actions and blunt choice alternatives might have provocative effects

Table 5: *An overview of key aspects of Survive the Century (expands upon Table 2 in Pötzsch, Hansen & Hammar, 2023a)*

In relation to STV, the two additional components – institutional frames and interferences – play out as shown in table 6 below.

	Institutional frames	Interferences
Survive the Century	○ Content requires careful planning to instantiate transition from teaching with to teaching about ○ Can be played in prepared room (lighting) or on individual devices ○ Can be used 'below the radar' of school owners and administrators	○ Simple media effects paradigm might over-empower players and facilitate power fantasies ○ Choice alternatives invite reductive understandings ○ Player exploration limited to a few pre-set alternatives ○ Naïve good-bad distinctions as frames for choice alternatives ○ Connection between situatedness of developer team and neoliberal / colonial biases in content

Table 6: *Additional aspects of Survive the Century*

As digital games have become so widespread among young people, it is necessary for contemporary education to treat games as both tools and objects of teaching and learning. Teaching about digital games is key to the mandate of contemporary schools to prepare learners to the complex media and information environments they will have to fully master as adults. Developing students' ability to critically assess and evaluate both content and contexts of

digital games in a reflected manner is one salient aspect of these educational endeavors.

The template based on the cyber media model shows that even though STC is easily accessible, free of charge, and clearly has educational potential, it should not be used as a seemingly neutral tool for teaching. Rather it would be more valuable to use it as an object of critique to teach students to approach knowledge and representation – including such conveyed by means of games – in a reflected manner, thus enabling them to understand and critique not only STC but also other media products making similar implicit arguments about the world.

CONCLUSION

In this article, we have presented and expanded upon a template for the critical evaluation of potential benefits and pitfalls connected to the use of videogames in educational contexts. Building our argument upon the cybermedia model by Aarseth and Calleja (2015) as well as upon the original version of the template developed by Pötzsch, Hansen, and Hammar (2023a), we have reiterated salient areas of critical inquiry that need to be addressed prior to the use of videogames in teaching sessions. Our main contributions that point beyond the original framework by Pötzsch, Hansen, and Hammar are, firstly, the expansion of the category player into human agents, thereby accounting for the significance of other actors than those directly playing the game (such as teachers, school leaders, owners, and more). Secondly, we introduced the dimension of institutional frames as an additional component of the original template to enable critical attention to important contextual factors predisposing the efficacy and usefulness of specific videogames (classroom settings, available teaching hours, syllabi, school regulations, and more). Thirdly, we reworked the representation /simulation component of the original framework under the new heading of interferences to enable the conceptualization of interactions across all five dimensions of the template. Pötzsch, Hansen, and Hammar only directed

attention to interferences between sign system (story, characters, game world) and game mechanics, and therefore allowed a compartmentalization of the dimensions of materiality and players (human agents). We demonstrated the applicability of the expanded template by means of brief assessments of the applicability of the commercial titles, *The Walking Dead* and *Frostpunk,* for teaching ethics at an upper-secondary level in Norway. With reference to the free browser game *Survive the Century* we demonstrated possible merits of teaching about games in cases where the template suggests that teaching with them might lead to specific unintended challenges.

Our main objective has been to further improve the toolset for teachers to critically assess the applicability of particular game titles prior to implementation in subject-specific teaching sessions. In doing this, we distinguished between teaching with and teaching about games (see Pötzsch, Hansen, and Hammar, 2023b) and argued that even though the template should suggest the non-suitability of a specific title as a tool for teaching, the game in question can still productively be made an object of critical scrutiny in sessions teaching about the game. Future research aimed at further developing the ideas presented here can conduct more systematic empirical research on attitudes and existing skillsets among teachers to assess overall capacities to utilize the template for game evaluation, and establish necessary conditions for its efficient use. To enhance the template discussed here, feedback generated from our main constituency was gathered in an ad-hoc and heuristic fashion, but still yielded important insights that have facilitated an improvement of the overall framework.

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