



Content Analysis in the Research Field of Video Games

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1 Introduction

Video games have become a major leisure activity for users of all ages, genders, and social groups (ESA 2019). The diversification of the player population is closely associated with an increasing diversity of games themselves. Technological developments like smartphones, tablet computers, virtual, and augmented reality have created possibilities for new types of video games which also have implications for research on this medium. While much of the empirical research on video games focuses on (potential) effects on the players (for an overview, see Klimmt and Possler 2020), there is a comparably smaller number of studies analyzing their content. One reason for this scarceness is that video games have a set of specific characteristics which make it challenging to adequately select and analyze their content. This chapter provides an

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overview of common research questions and methods of content-analytic work on video games. We will discuss the particular challenges for this line of research and provide suggestions on how to address them. Building on the overview chapter by Breuer and Quandt (2014), we will also review recent work (2014–2019) and discuss methodological developments and trends that may facilitate and extend content analyses of video games.

2 Main Constructs & Topics of Content Analyses of Video Games

Overall, content analyses of video games have mostly focused on content that might have a negative or detrimental impact on players, such as **violence** (e.g. Hartmann et al. 2014) or **stereotypical depictions of female characters** (e.g., Lynch et al. 2016) or, to a lesser degree, ethnic minorities (Dill et al. 2005). As discussed by Breuer and Quandt (2014), the findings of these studies are generally consistent. Most studies looking at violent content find a substantial amount of it in the video games they analyzed (see, e.g. Smith et al. 2003). Similarly, content analyses of gender stereotypes consistently find underrepresentation and stereotypical (typically also sexualized) depictions of female characters (Downs and Smith 2009; Ivory 2006; Lynch et al. 2016).

While in research on the effects of video games, a majority of the work has also focused on negative aspects (chiefly violence and excessive use), over the last decade, there has been an increased interest in serious games, i.e., “games with a purpose beyond play” (Klopfer et al. 2009, p. 20) in communication research. Popular examples of such serious games include “*Darfur is Dying*”, “*Papers, Please*”, “*That Dragon, Cancer*”, or “*Re-Mission 2*”. However, to date there are only a few content analyses of serious games. One of the few examples is a study by Ratan and Ritterfeld (2009) in which the authors classified serious games based on their primary educational content (e.g., academic, occupation, or health), primary learning principle (e.g., practicing skills, cognitive or social problem solving), target age group, and game platform. More recently, Lu and Kharazzi (2018) analyzed the content of 1743 (serious) health games released between 1983 and 2016. In addition to attributes specific to this type of games, such as primary health topics and level of influence, they also looked at general characteristics, such as **genre**, character types, and setting. All in all, content analyses of the positive aspects of video games are still quite rare.

3 The Challenges of Doing Content Analyses of Video Games

Scholars aiming to content analyze video games are faced with particular challenges arising from the specific attributes of this medium. A key feature of video games that distinguishes them from other forms of media is their *interactivity* (Weber et al. 2014). Compared to linear media, such as movies, that can be described as pre-composed fixed messages, the

content of video games depends on the players' inputs which, in turn, are a function of various player-specific variables, such as skill, preferences (e.g., regarding the customization of their avatar), or playing style. Modern narrative games especially offer players large degrees of freedom and allow them to make decisions that have profound influence on the progression of the narrative. Hence, the content varies substantially between players and playing sessions. This challenge becomes even more pronounced for multiplayer games where in-game events depend on various players' decisions and skills. This can limit the generalizability of recorded content and may even result in biases (Schmierbach 2009). The research overview by Breuer and Quandt (2014) shows that considerable variation exists in the way content analyses of video games dealt with this issue. Especially the number of different players involved in such studies varies. Moreover, in some studies, players and coders of the material are the same person (e.g., Heintz-Knowles et al. 2001), while in other studies, players and coders are different people (e.g., Haninger and Thompson 2004).

Another set of challenges arises from the fact that video games are *complex* with regards to their structural features. While newspaper articles only consist of written text and movies can be analyzed by focusing on the audio and visual signals, video games come with a variety (and multitude) of content consisting of audio (music, spoken language/voice, and ambient noises), visual (anything happening on the screen), haptic (physical feedback) and textual stimuli. One implication of this complexity is that codebooks have to deal with and measure the various structural features of video games. Another challenge is that modern games tend to be quite long. A full playthrough can take dozens of hours. As recording and coding that much footage would take an enormous amount of time (especially if researchers want to analyze multiple games), studies typically sample parts of a game. In practice, studies use recordings of playing sessions of various duration, ranging from 10 min (Lachlan et al. 2005) to 20 min (Beasley and Collins Standley 2002) or even 60 min (Haninger and Thompson 2004). However, with such an approach, it is likely that the selected parts are not representative of the game as a whole. Especially the first parts of a game may not contain the specific types of content that researchers are interested in (e.g., there is no violent content because the first 10 or 20 min do not feature combat). Accordingly, the selection of a sample of game content can have strong impact on the results of the respective analysis. Studies have used different approaches to tackle some of these challenges. We will discuss some of these solutions and additional suggestions inspired by recent methodological developments in the field of communication research in the following.

4 How to Address Challenges in Content Analyses of Video Games?

A viable way of addressing some of the challenges discussed in the previous section is to use other sources than the game itself as coding material. The range of alternative coding materials used in content analyses of video games includes cover art and booklets

(Brand et al. 2003), ads (Scharrer 2004), and professional journalistic as well as user-generated game reviews (Ivory 2006; Zhu and Fang 2015). In Table 1, we provide an overview of the different types of coding material used for content analyses of video games. While all of these alternative coding materials avoid the issues related with the use of in-game material, they each come with their own set of limitations.

One type of materials that have been used more frequently in recent studies (Hartmann et al. 2014; Lynch et al. 2016) due to their inherent advantages are video recordings of people playing the games from *YouTube*. Another relevant platform that features a lot of video game content but has not yet been used in content-analytic studies is the live streaming platform *Twitch*. Both types of video platforms provide content produced by various people with different demographic characteristics, skills, and playing styles for the same game(s). Thus, using material from such platforms might help to identify differences in content between players without the need to let multiple people play the game in a lab setting. A particular advantage of *Twitch* is that the content is recorded live, meaning that it is not post-edited (in contrast to many *YouTube* videos). While using such platforms can reduce the costs and effort of producing the coding material, this approach also has certain limitations. People who watch video game videos on *YouTube* or *Twitch* typically do so to be entertained (Sjöblom and Hamari 2017; Wulf et al. 2018). Hence, the people producing the videos might, e.g., play in a way that is particularly entertaining to receive approval and popularity among viewers. They may also play in a different way because they are observed while playing and—if the content is streamed live—may be distracted from playing by interactions with their viewers. Of course, such “meta-comments”, could also be of interest given that they can provide context for certain in-game decisions. Moreover, most streamers, many of whom make money with their videos, play popular “blockbuster” games (see for example, Wohn and Freeman 2020). Accordingly, there is less of this type of material researchers could use for analyzing more niche or serious games.

In general, when looking at the different options for coding materials, it is important to keep in mind that the quality of the material can differ largely and depends on their original purpose (e.g., advertising a game vs. critically reviewing it). We, therefore, suggest that researchers carefully evaluate which materials are most suitable for the specific research question(s) they are interested in. In addition, it may be advisable to systematically combine different materials in order to address some of the limitations of each individual type of material. For example, while *YouTube* footage may show how violence is visually represented in individual scenes, researchers may use additional material, such as a *Wikipedia* articles, walkthroughs, and strategy guides to get more information about, e.g., the narrative embedding of the violence (e.g., Hartmann et al. 2014).

Table 1 Overview of coding materials used for content analyses of video game (own representation)

Material	Reference(s)	Strengths	Limitations
Video game recording (various length)	(Lachlan et al. 2005; Shibuya and Sakamoto 2005; Smith et al. 2003)	Actual audiovisual content from the game; visual and audio material can be coded	Content may vary across players; if content is sampled, the representativeness of the material for the whole game is unsure
Packaging of games	(Provenzo 1992)	No variation between players	Intended to advertise the product; only limited impressions of the game
Handbook(s) of the game	(Brand and Knight 2005)	Official material; no variation between players; focus on core elements of the story	Limited impressions of the game; today, most games come without classical handbooks
Ads (printed)	(Scharrer 2004)	Official material; no variation between players	Intended to advertise the product; limited impressions of the game; often no actual pictures of game content
Professional reviews	(Ivory 2006; Miller and Summers 2007)	Cover many different aspects of a game; typically standardized evaluations of specific game features (e.g., graphics or story)	Subjectivity of reviewers; specific focus by reviewers; often limited information about the story (to avoid spoilers)
User reviews	(Zhu and Fang 2015)	Focus on central features of the game	Subjectivity of reviewers; reflect subjective playing experience; of varying length/detail and quality
YouTube recordings	(Hartmann et al. 2014; Lynch et al. 2016)	No variation between players (if videos from the same person are used) or sampling of different players possible	Depend on skills and interests of particular players about whom researchers have no or only very limited information; content focus depends on video genre (e.g., speed run, walk-through, highlight video)
Pictures in print magazines	(Dill and Thill 2007)	Visual material; no variation between players	Only snapshot impressions of a game; contextual information (e.g., narrative) missing
Intro sequences	(Jansz and Martis 2007)	First impression of a game regarding the tone, story and aesthetics; no variation between players	Content can be quite different in the actual game; only non-interactive part of the game considered

(Fortsetzung)

Table 1 (Fortsetzung)

Material	Reference(s)	Strengths	Limitations
Wikipedia and other online encyclopedias (e.g., fan wikis)	(Breuer et al. 2012; Hartmann et al. 2014)	Often contain more detailed plot descriptions than reviews and provide structured factual information about a game	Degree of detail varies substantially across sources and individual entries

5 Research Desiderata and Outlook

Based on our review of the existing literature and in light of recent methodological developments in the field of communication as a whole, we identified several desiderata for future content analysis of video games. These include substantive as well as methodological aspects. On the substantive side, a step forward would be to broaden the topical scope and investigate aspects beyond the “negative content patterns” (Smith 2006, p. 57) of violence and sexism. Broadening the topical scope would also necessitate the inclusion of other types of games than the ones that are typically studied in analyses of violent or sexist content. While shooter or action games have been investigated in many existing studies, family-friendly and casual games, including popular titles, such as those from the “*Super Mario*” series, or successful mobile games, such as “*Pokémon Go*” or “*Candy Crush*”, have received considerably less attention so far. This is all the more remarkable as recent studies showed beneficial effects of such video games on well-being, recovery, and the fulfillment of psychological needs (e.g., Koban et al. 2019; Wulf et al. 2019). One potential reason why these games have been largely neglected in content analyses is that many of them feature less narrative content than, e.g., a role-playing or action adventure game. Importantly, however, the content of a video game is not just its narrative but also its playing mechanisms. Investigating these in content analyses may, e.g., help to better understand why people keep playing a particular game (which is also highly relevant for research on excessive use) or which particular features of a game can have a positive effect on well-being of their players. In addition to that, there are many topics which are neither clearly socially desirable (like learning or well-being) nor undesirable (like violence and sexism) that would be interesting to investigate in systematic content analysis. Content analyses of video games could, for example, look at portrayals of social concepts, such as politics, family, the role of science in society, or the portrayal of specific historical periods.

As stated before, another potential venue for content-analytic work on video games is to also look (more) at the structural and technological features of games instead of just focusing on the narrative content. Research of this type could, for example, look at differences and changes in interaction mechanisms (e.g., the number of players

involved, competition vs. cooperation), or the use of novel technologies, such as virtual or augmented reality in video games. In general, the rapid technological developments are something that researchers have to keep abreast of. These changes lead to coding schemes becoming quickly outdated. In practice, this means that it can become difficult to apply coding schemes from earlier studies to new analyses. While some consistency is desirable to allow for comparisons across time, the nature of the medium makes frequent adaptations necessary.

Regarding the methods employed in content analyses of video games, we would like to encourage researchers to further explore and exploit the potentials of alternative coding materials (i.e., materials other than actual in-game footage). The use of reviews of video games seems especially promising as these are available for almost all games and from a huge variety of players. Moreover, researchers may address some of the limitations listed in Table 1 by using multiple instances of the same type of coding material for the same game. For example, while one user review may be heavily distorted due to the individual preferences of the author, several hundreds of reviews on the very same game should offer a much more diverse perspective. In order to collect and analyze such large data sets, researchers may use computational methods (van Atteveldt and Peng 2018). To gather large amounts of material from online sources, researchers can use automated procedures, such as crawling and scraping techniques or make use of the application programming interfaces (APIs) provided by some gaming websites (Possler et al. 2019). For example, Zhu and Fang (2015) collected nearly 700,000 user reviews from three gaming websites using a web crawler. Subsequently, scholars can apply several forms of automated content analysis methods to analyze the gathered (textual) data (Grimmer and Stewart 2013), such as text mining, natural language processing, and supervised (e.g., Naive Bayes classifier) and unsupervised (e.g., Topic Models) machine learning (ML) techniques. In a recent study, Wang and Goh (2020) used topic modeling — an unsupervised ML method to uncover the thematic structure of texts (Blei 2012) — to identify central topics in a collection of more than 9,300 user-generated game reviews published on amazon.com. While the main aim of this study was to present a general overview of the topics of reviews, the method could also be used to uncover and compare the most prominent topics in discussions about specific games. So far, automated procedures have mostly been used to analyze user reviews. However, we suggest that they may also be useful when working with other textual material describing video game content, such as (online) encyclopedia entries, walkthroughs or strategy guides. Moreover, audio tracks of game recordings could be transformed to texts and subsequently analyzed by using automated transcription tools (e.g., the YouTube captioning engine; Bokhove and Downey 2018). Finally, researchers could also make use of recent methodological developments for the automated analysis of visual content (for an overview, see Geise et al. 2016). At least for still images there are many ready-to-use implementations of computer vision libraries (e.g., for object or facial recognition) for commonly used programming languages like Python or R. Large-scale analysis of screenshots or ads could make use of such techniques as well. It should be kept in

mind, however, that all of these automated methods have their own pitfalls. Concerns exist regarding the completeness and potential biases of computational data gathering techniques (Possler et al. 2019) as well as the validity of automated content analysis (e.g., Grimmer and Stewart 2013). Therefore, we, suggest that scholars carefully evaluate the individual benefits and weaknesses of these methods for their respective research question(s) and ideally combine different methods of gathering and analyzing data.

Altogether, we believe that using a combination of (a) different coding materials (e.g., professional and user reviews or reviews and wiki entries) and (b) different analysis methods (e.g., supervised machine learning approaches and topic models) is an approach that has great potential to further advance the field of content analyses of video games. Studies combining different sources can also be used to systematically compare the potentials and limitations of the respective types of coding materials.

Summing up, there is no single “best practice” for content analyses of video games. The specific characteristics of the medium, namely its interactivity and structural complexity, as well as its rapid technological development make it especially difficult to identify or define standards for content analyses of video games. In practice, this means that content analyses of video games vary substantially with regard to the sampling strategies, coding materials, coding schemes, and analysis methods they employ. Unlike the methodological approaches, the topical foci have been surprisingly consistent across the decades (from the earliest works in the 1980s until today). The large majority of content analyses of video games have focused on what Smith (2006) has called “negative content patterns” (p. 57), most commonly violence and sexism. The advent of research on so-called serious games from the mid-2000s onwards has also brought about some content-analytic work in that area. However, those studies are still few and far between. Broadening the thematic scope of content analyses of video games is an important desideratum for future research.

Given the substantial challenges that arise if researchers want to produce their own coding materials from the games themselves, we believe that the use of external sources of coding material is an especially useful approach. In addition to materials that have been used in previous studies, such as magazine articles or ads, reviews from players are a very promising source of coding material as they are widely available online and can be analyzed using computational methods. Finally, we suggest that future content-analytic research on video games could also make use of video material from streaming platforms like *Twitch* and automated analysis of visual (image) content.

Relevant Variables in DOCA—Database of Variables for Content Analysis

Violent acts: <https://doi.org/10.34778/3d>

Video game genre: <https://doi.org/10.34778/3f>

Sexualization: <https://doi.org/10.34778/3e>

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