

# Clashing and Emerging Genres: The interplay of knowledge forms in educational gaming

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*Based upon a series of design interventions with the educational computer game series Global Conflicts at various secondary schools, this article explores how educational gaming can be understood as a complex interplay between four knowledge forms – i.e. students' everyday knowledge (non-specialised knowledge), the institutionalised knowledge forms of schooling, teachers' subject-specific knowledge (specialised knowledge forms), and game-specific knowledge forms such as professional journalism, which is one of the inspirations for the game scenario. Depending on how the GC series was enacted by different teachers and students, these knowledge forms were brought into play rather differently. More specifically, several students experienced genre clashes in relation to their expectations of what it means to play a computer game, whereas other students experienced emerging genres – e.g. when one student was able to transform the game experience into a journalistic article that challenged her classmates' understanding of journalistic writing.*

## INTRODUCTION

It is often argued that computer games hold a large and untapped potential for learning. Thus, several researchers assume that computer games provide an engaging way to actively create new knowledge, which surpasses the learning activities that occur through "traditional" forms of schooling (Gee, 2003; Shaffer, 2006). One approach to integrate games and learning is to teach with commercial off-the-shelf games (COTS games) such as *The Sims* or *World of Warcraft*, which can be pedagogically re-designed in order to "fit" with existing curricular aims, pedagogical practices, time tables, evaluation criteria etc. (Squire, 2004; van Eck, 2009; Wiklund & Ekenberg, 2009). Another approach, which is the focus of this article, is to teach with games, which have been specifically designed for the educational demands of a school context. Educational computer games do by no means represent a new genre and can be traced back as early as the release of the quest game *Where in the World is Carmen Sandiego?* (1985). What is common to educational computer games – which are also known as learning games, children's software, serious games, edutainment etc. – is that they have been designed in order to combine game dynamics with educational content. Many of these games have often been criticised for being no more than simple drill-and-skill exercises with poor learning

potential that have merely been wrapped in appealing graphics (Egenfeldt-Nielsen, 2005). However, as game technologies are getting cheaper and more accessible, game companies and researchers are continually trying to develop and study new types of educational computer games that seek to create engaging educational experiences (Ito, 2009). Parallel to this development, the field of educational game research has also been growing steadily. Still, the field has had a strong tendency to over-emphasise the potential of specific game design features and suffers from a lack of empirical studies that describe how particular games are enacted in pedagogical settings (cf. Arnseth, 2006; Hanghøj, 2008).

#### AIM AND SCOPE OF THE STUDY

In this article, I will describe what happens when educational computer games are taught and played in a classroom context and analyse how this implies an interplay of different knowledge forms, which may both result in genre clashes as well as emerging genres. More specifically, I have studied the use of different games in the *Global Conflicts* (GC) series, which lets the student/player explore different 3D worlds that represent various aspects of particular regional conflicts – i.e. illegal border crossings between Mexico and USA, the use of child soldiers in Uganda etc. The studies form part of a larger research project entitled “Serious Games on a Global Marketplace” (2007-2011), which seeks to explore the value of educational games in various contexts.

The methodological approach of the studies are based upon a series of design interventions, where I and my fellow researchers intervened in local settings in order to explore how teachers and students would enact the GC game series (Hanghøj & Meyer, 2010; Hanghøj & Brund, 2010). In this way, the studies tried to *introduce* new game designs in various educational contexts in order to describe how such new designs were able or unable to become integrated with existing pedagogical practices. None of the teachers and students had any previous experience with the GC games. In this sense, this article primarily describes how teachers and students respond to a new educational game as *first-time users*. Thus, the focus of the interventions was relatively open-ended and aimed to understand whether a new type of educational games could be appropriated by teachers and students in a meaningful way. The studies involved a total of ten game sessions, which were conducted at three Danish schools (six sessions), one English secondary school (two sessions) and a Norwegian school (two sessions). In four of the Danish game sessions, the GC games were used as a part of a cross-disciplinary course between social studies and Danish as a subject, where the teachers facilitated the GC games and guided the students in order to transform their game experiences into journalistic articles such as news articles or features.

All of the game sessions were documented through video observations (approximately 20 hours of recordings) and field notes, which mainly focused on overall patterns of communication between the students and teachers in

relation to the game they were playing. Additionally, short pre- and post-interviews were also conducted with the participating teachers about their experience of the game sessions. This relatively comprehensive corpus of data has been analysed through an ethnographically inspired approach to discourse analysis, in order to map how various patterns of communication are related to local practices (Gee & Green, 1998). First, the video data, interview data, and field notes were coded and categorised through brief summaries, which helped identify *genre expectations* as an important overall analytical theme. Based upon this categorisation, I have chosen three “events” or examples to be subjected to further analysis in order to illustrate how the students both experienced clashing and emerging genres, and how the teachers responded to the students’ different approaches to the game. Thus, the main focus of the analysis is not on particular individuals or groups, but on the meaning-making *relations* between participants within the educational game settings (cf. Hanghøj, 2008: 148f).

#### THE KNOWLEDGE FORMS OF EDUCATIONAL GAMING

In order to understand how games are enacted in educational settings, I will argue that educational gaming can be understood as an interplay of various knowledge forms. This assumption is inspired by Hetmar’s work, which suggests that the theory and practice of teaching (“didactics”) may be understood as a relationship between three different cultural forms: 1) specialised cultural forms as represented by teachers and text books’ subject-specific knowledge, 2) students’ non-specialised cultural forms, which relates to their life worlds outside school, and 3) the institutionalised ways of “doing” school, which are represented by situated practices and forms of communication that are specific to school culture (Hetmar, 2004). In contrast to Hetmar’s term cultural forms, I prefer to use the notion *knowledge forms* and will consequently use the terms disciplinary knowledge forms, everyday knowledge forms, and “school-only” knowledge forms. In this respect, I follow the anthropologist Frederik Barth, who suggests that the broad and often biased notion of culture might be replaced by the notion of “knowledge traditions” (Barth, 2002). Moreover, Barth assumes that any tradition of knowledge can be described in terms of assertions, modes of communication, social forms of organisation, as well as particular criteria for validating knowledge. Following this line of thought, knowledge is a *pragmatic* and holistic entity, which is continually constructed, deconstructed and reconstructed through various forms of agency (Biesta & Burbules, 2003). This means that knowledge should first and last be understood as *knowing*, a process rather than a product, which primarily takes on meaning in relation to “how things are done”.

Moreover, in order to understand the meaning-making processes of educational gaming, it is also necessary to speak of a fourth knowledge form, namely *game-specific* forms of knowledge. Games represent a wide variety of different knowledge traditions – e.g. sports, board games, role-playing games, online

computer games etc. – which may exist more or less independently of formal education. Any game involves particular scenarios, conflicts, roles, rules, resources, goals, and outcomes to be enacted (Hanghøj, 2008). However, when speaking of educational gaming, it may be quite difficult to delimit game-specific knowledge from other knowledge forms. As an example, many students may be able to benefit from their more or less specialised game knowledge when playing a game in a classroom setting. Moreover, educational games may be designed on the basis of specialised knowledge, which relate to particular professions such as journalism that exist outside school. As these examples suggest, educational gaming involves interplay or *translations* between different knowledge forms, which differ across particular games, teachers and students. In this way, educational gaming may also be seen as a “boundary object”, as it may hold widely different meanings in widely different settings, but still be recognisable as the local practice of teaching and playing games in an educational context (Star & Griesemer, 1989). In the model below (cf. Figure 1), I have tried to show how educational gaming involves a series of translations or dynamic interplay between the four knowledge forms described above:

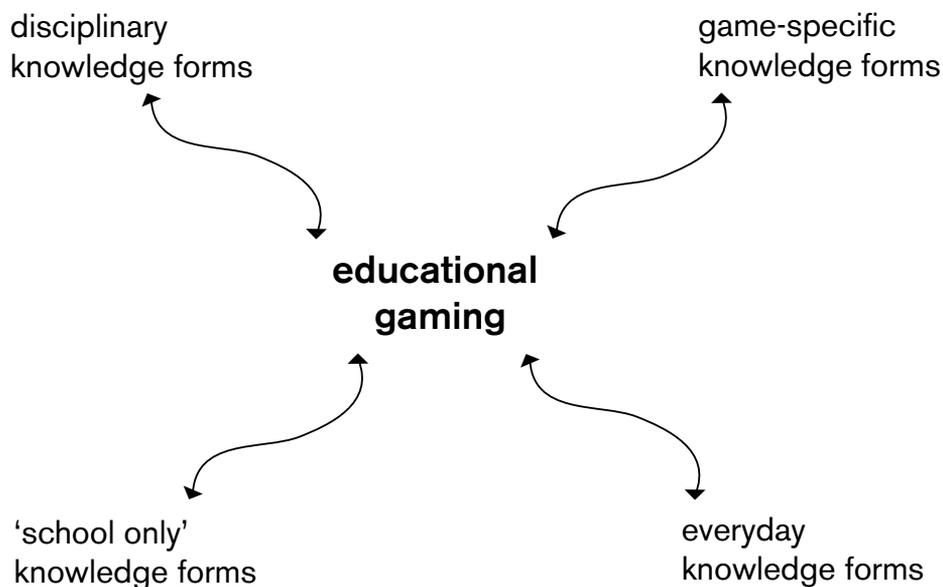


Figure 1. The knowledge forms of educational gaming.

The model is descriptive and assumes no *a priori* hierarchy between these four forms of knowledge when teaching and playing games. However, in practice teachers and students tend to value certain forms of knowledge, especially disciplinary and school-only knowledge forms, as being more valid or “serious” than other forms of knowledge (cf. Hanghøj, 2008).

In order to analyse the interplay between the four knowledge forms of educational gaming, I will use *genre* as a key analytical concept. The term *genre*, which literally means "kind" or "sort", often refers to particular aesthetic genres, which may be more or less stable – i.e. crime novels, horror films, adventure games, viking metal etc. Thus, the notion of genre is often used to create typologies that mainly refer to the *content* and *form* of a given mode of expression. However, genre may also be seen as a far more dynamic concept. Instead of reducing genres to a matter of form and content, genres can be defined in relation to their actual *use* within a given social context (Miller, 1984; Bakhtin, 1986; Kress, 1993; Ongstad, 1997). Following this pragmatic perspective, I will define genre as recurring and recognisable sets of expectations that accompany particular modes of communication, which both constitute and are constituted by social relationships. In this way, there may exist many different genres or recognisable ways of communicating within a given knowledge tradition (cf. Barth, 2002).

There are several reasons for choosing a genre analytical perspective when trying to understand educational gaming. First of all, it is difficult to avoid the importance of *game genres*, when describing what it means to play a computer game (Wolf, 2001; Apperly, 2006). Thus, there exists a huge variety of computer game genres, which are often based upon fundamentally different design principles – e.g. there are vast differences between playing a First-Person Shooter such as *Counter-Strike*, a massive multiplayer online role-playing game such as *World of Warcraft*, and the *Global Conflicts* educational game series, which I will return to later on. In this way, both teachers and students may have widely different game experiences and preferences, which will also influence the way that games can be taught and played in a classroom context. Secondly, formal education is characterised by an ecology of relatively stable genres, which I here will label pedagogical genres. Some pedagogical genres involve specialised forms of knowledge as represented by a teacher and his or her choice of learning materials. Other pedagogical genres are less related to subject-specific "content" and more related to the school-only practices whereby knowledge is being communicated between teachers and students – e.g. by maintaining an asymmetric relation between teachers and students when orchestrating classroom dialogue (Hetmar, 2004). Since games are often seen as rather ephemeral phenomena within the context of formal education, it is difficult and problematic to ignore this existing ecology of dominant and relatively stable school genres, when trying to understand educational gaming.

Thirdly, a pragmatic genre perspective is also important from a methodological perspective, as it conceptualises educational gaming as *processes* of meaning-making. Seen from this perspective, it is meaningless trying to understand the pedagogical value of computer games solely by focusing upon their representational aspects – e.g. the graphics or sounds in a given game.

Rather, the meaning of computer games should be understood in relation to how they are *enacted* – i.e. how they actually taught, played, and interpreted (Carr et al., 2006). By following the practices of educational gaming, it becomes possible to explore how particular games, teachers and students may be able to confirm existing genre expectations, create clashes between differing expectations, and/or allow new understandings of existing genres to emerge. This also marks a radical contrast to the widespread assumption that particular game designs hold specific learning potentials *per se* (Hanghøj, 2008). Thus, in order to understand educational gaming, it is necessary to take into account the design of the overall pedagogical activities, which may involve several different forms of learning materials, goals and subject matter content.

#### THE MIXED GENRE ASPECTS OF THE GLOBAL CONFLICTS GAMES

Before moving on to the analysis of how the *Global Conflicts* games were enacted, I will briefly describe the designed intentions of the game series. As interactive and multimodal texts, the *GC* series represent *mixed* genre aspects. Thus, each of the games both presents itself as an engaging 3D game, which can be sold for leisure use on a private market, and as a learning resource, which is intended to match curricular aims within the context of formal schooling.

Seen as a *game*, each title in the *GC* series represents a 3D role-playing adventure game, which offer a range of missions to be played that take place in many different parts of the world. Each mission is based around a particular regional conflict such as the Israeli-Palestinian conflict, border crossings between USA and Mexico, sweatshops in Bangladesh, the use of child soldiers in Uganda, etc. When playing a mission, the player must assume the role as an investigator (i.e. journalist or UN representative) in order to explore various aspects of the regional conflict. As shown below, the visual design of the game world to some degree resembles other forms of 3D environments such as *Grand Theft Auto* or *Second Life*. Similarly, when playing the *GC* games, the player must move through the game world environment and "interview" non-player characters as shown below (cf. Figure 2).

By "speaking" with the non-player characters of the game the player must collect statements and arguments to be used in the final confrontational interview with different "bad guys" such as the owner of the maquiladora factories, who must answer to their deeds and lack of responsibility. Once the confrontational interview is finished, the game is over and the player is presented with a pre-defined evaluation of his or her performance. At the same time, the website for the *GC* series also presents the games as a *learning resource*, which claims to cover particular curricular aims within social studies, geography, and history in secondary education (age 13-19) – e.g. in relation to human rights, global trade, source criticism etc. Each of the different missions have been designed to be played within approximately 40-60 minutes, which means that they are able to meet the time restrictions of most lesson plans. In this way, the game clearly differs from many leisure games, which can be played for hours

and hours on end. Furthermore, the game website also includes a web editor, where students may write and publish articles based upon their experience of playing the game.



Figure 2. Screenshot from Global Conflicts: Maquiladores

As these examples suggest, the GC games are not only designed as games, but also as pedagogical texts, which are intended to become integrated with the existing ecology of pedagogical genres within the context of formal schooling. This duality of genres is also reflected in the teacher manual:

*Educational computer games are a new medium in teaching and there might be students in your class with reservations about the whole thing. Maybe they end up playing the game as they would any regular game – as entertainment – because this is how they are used to play. You have to forestall this by making it clear for the students that this game is meant for educational purposes and should be played accordingly (SGI, 2008: 16).*

As this quote suggests, the process of bringing the GC games into the classroom is not unproblematic as students might not accept the mixed genre aspects embedded in the game.

#### GENRE CLASHES – TEACHING AND PLAYING THE GAME

Based upon analysis of the various data sources – video data, field notes and interview data – the teachers and students’ genre expectations was identified as an important analytical theme. In this section, I will describe this theme through two examples of *genre clashes*, which were both related to the teachers and students’ expectations of the GC games and the overall pedagogical activities involved in playing the games.

The first example, or “event”, is taken from one of the three Danish schools with an 8<sup>th</sup> grade social studies class. The game session took place in the schools’ computer room, and the students had just logged on to the game and started exploring the 3D game world. One student, Victor, was particularly impressed by the sound and graphics of the game, and compared the game with the 3D action-adventure game *Grand Theft Auto*, when speaking with his classmates: “Wow! It looks a bit like *GTA*! This is cool!” However, within a few minutes of play, Victor would complain to the same classmates that he was unable to accomplish all those actions, which he could do in *GTA* – i.e. being able to shoot other characters in the game, being run over by cars, and being able to freely explore a 3D game world. Disappointed, Victor gave up on reading the dialogue boxes and turned to disruptive forms of play, which diverged from the educational aims of the game. Instead of carefully reading the game text and making decisions that could be used for collecting arguments, Victor started exploring the rules of the game by clicking randomly on the dialogue boxes as fast as possible. This tactic had no fatal consequences within the game, since the GC games are designed in a way, which prevents the players from being expelled from the game. Instead, Victor ended up with a mediocre score, which was comparable to several of his classmates’ results, even though some of them had spend far more time on reading the dialogue boxes and making actual decisions within the game.

This pattern of play was quite common across the ten game sessions as several of the students, predominantly boys, would play the GC games in a similar way. As mentioned, this approach was not “punished” by the game. Instead, the consequences would follow after having played the game, where the students were supposed to write journalistic articles based upon their game experience. Thus, those students, who had simply clicked though the dialogue boxes and only had taken very few notes during the game sessions, were often stuck with an assignment, which they could not solve in a meaningful way.

All of the teachers became aware of the disruptive ways of playing the GC games and commented upon it in the post-game interviews. However, only one of the teachers directly responded to this approach during the game sessions, which is the focus of the next example. After having introduced the

game, Mark, who was one of the teachers at the English secondary school, began observing how three-four of the boys in his 8th grade ICT class started clicking frantically on dialogue boxes in order to finish the *GC* game as quickly as possible. After a few minutes of observing this, he promptly interrupted their game activities: “Stop it! You’re turning the game into a click-a-thon!”. In order to prevent these students from “racing” through the game, Mark then re-organised them into groups with mixed girls and boys. However, one boy, Kieran, kept on doing the click-a-thon, and was eventually expelled from the classroom for not playing the game appropriately.

As these two examples illustrate, several of the students in the ten game sessions experienced *genre clashes* when enacting the *GC* games. This was only confirmed in the post-game classroom discussions, where the students often criticised the game for having “too much text”. In the post-game interviews, the teachers also mentioned this as a problematic aspect of the game, especially in relation to “weak students”, who had difficulties with “reading large amounts of text”. Similarly, when asked to compare the game session with other teaching activities, one of the teachers from the Norwegian school described how the game most of all resembled “reading a book”. Moreover, several of the teachers had expected that the games, being computer games after all, would appeal mostly to game savvy boys. However, as the examples above suggests, some game savvy boys were, in fact, put off by the *GC* games, when they learned that they were playing a “school game”, which required a lot of reading within a relatively small 3D world that only offered limited modes of interactivity. As a consequence, students like Victor and Kieran simply rejected the *GC* games as valid pedagogical texts and turned to disruptive forms of play, which had questionable educational value. In this way, the game sessions involved a series of genre clashes between the students’ non-specialised knowledge forms, which were based on leisure gaming, and the school-specific knowledge forms offered by the game design.

#### EMERGING GENRES – WRITING UP THE GAME EXPERIENCE

Having described how the game sessions created clashes between different sets of expectations, I will now turn to another aspect of genre expectations, namely how the game sessions also allowed new understandings of existing genres to *emerge*. As mentioned, four of the game sessions focused on how the students’ game experience could be transformed into journalistic articles. After playing the game and taking notes from the in-game “interviews”, the students were asked to write a feature or a news article that illustrated the problems they had encountered in the game scenario.

In summary, it was somewhat difficult to integrate the game activities with the process of writing journalistic articles. Several of the students did not have a clear understanding of the journalistic assignment they were given. As an example, two students working together decided to write a review of the game, which was far from the original intention of the assignment. A more common

approach among the students was to reproduce the extensive notes they had taken when “interviewing” the non-player characters of the game. In this way, many of the articles turned out to become detailed summaries of the game dialogue with little or no journalistic angle on the actual problems portrayed by the game. Thus, many articles turned out to represent “school only” forms of knowledge, which had few journalistic qualities.

At the same time, some students did manage to produce articles, which lived up to and even challenged the existing genre expectations of a “journalistic article”. In order to illustrate this point, I will now present a third example, which focuses on an article written by the 9th grade student Emilie. The article begins in this way:

**Maquiladora nightmare**

In the Northern Mexico lie a lot of the so-called maquiladora factories. The factories destroy their surroundings and make the surrounding citizens ill. I went to Xococ to explore things closer (...)

The interesting point here is that Emilie, as the only student in her class, is writing through a first person perspective. When giving response on the finished articles, the teacher Anette asked Emilie to read her article aloud and then asked other students to comment on the article. One student responded that it “seemed a bit strange” to “include what you experience” in an article. Another student followed up by saying that “I’ve never seen that before”. But this was contrasted by a third student, who commented that “you *can* actually do that”. This led to a teacher-guided discussion of whether or not it was legitimate “to bring yourself into” a journalistic article by “stepping into character”.

Prior to the game session, the students had not been given instruction on how to write a feature from a first-person perspective. Moreover, in the post-game interview, the teacher stressed how she was positively surprised that Emilie, who did not normally get high grades, had come up with the idea to write from a first-person perspective. Anette gave top grade for the article and praised it for being “clearly structured, very well written, and there is a great rhythm in it. Good thing that you let yourself be known to the reader (the I perspective)”. In this way, it can be argued that Emilie, who had been so engaged in the game that she also played it at home after school, that this led her to write the article more from the player’s journalistic perspective.

As this example indicates, the *GC* game sessions did not only result in genre clashes, but also allowed new understandings of existing genres to emerge. This shows how educational gaming may lead to the creation of texts, where students are able to experiment and play with game-based knowledge forms that can be used to challenge existing genre conceptions.

## DISCUSSION

As the analysis suggests, educational gaming may both result in clashes as well as the emergence of new understandings of genres. In this way, educational gaming always involves a dynamic interplay between different knowledge forms. This might have negative consequences, as when Kieran was expelled from his class when experimenting with the game in a way that was seen as illegitimate in relation to the educational task he was given. Thus, Kieran and Victor were unable to benefit from their existing knowledge of playing computer games. In this way, teachers and students' game expectations may easily turn into conflicts between different criteria for evaluating knowledge forms. On the other hand, the analysis also suggests how the player perspective of educational gaming may be used to create new understandings of existing genres such as a "journalistic article", which might be difficult to provide through everyday forms of teaching and learning. In this way, it is problematic to make *a priori* or final judgements on whether the GC games may – or may not – offer a particular "learning potential". Thus, exploring the educational value of games is ultimately an empirical task, which cannot be narrowed down to a set of design features.

The findings presented here also indicates that it is problematic to generalise on the preferences among students in relation to educational computer games, which represent a complex mix of game genres and pedagogical genres that can be taught, played, and interpreted in many different ways. As mentioned, the teachers in this study clearly expected that the GC games would appeal to the game savvy boys, who ironically often turned out to be quite critical of the game experience. This shows how a game that represents mixed genre aspects tends to provide mixed reactions. Moreover, it shows how the knowledge forms involving in playing computer games, which refer to well-established practices outside school, is difficult to recontextualise when being presented as an *educational* computer game with its own set of premises, goals and modes of communication.

The findings also underline the importance of the teacher in choosing, introducing, facilitating, and assessing the use of educational games, that is in *designing* the overall pedagogical activities. It is only by aligning the knowledge forms of particular games with students' genre expectations that teachers will be able to set and pursue desired educational goals, which again may ensure relevant ways of translating gaming experiences into meaningful knowledge production within a formal school context.

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## References

- Apperly, M. (2006). Genre and game studies: Toward a critical approach to video game genres. *Simulation & Gaming*, 37(1), 6-23.
- Arnseth, H. C. (2006). Learning to Play or Playing to Learn. A Critical Account of the Models of Communication Informing Educational Research on Computer Gameplay. *Game Studies*, 6(1), www.gamestudies.org.
- Bakhtin, M. (1986). The Question of Speech Genres in: *Speech Genres and Other Late Essays*. Austin: University of Texas Press.
- Barth, F. (2002). An anthropology of knowledge. *Current Anthropology* 43(1): 1-11.
- Burbules, N. C. & Biesta, G. (2003). *Pragmatism and educational research*. Philosophy, theory, and educational research. Lanham, MD: Rowman & Littlefield.
- Carr, D., Buckingham, D., Burn, A. & Schott, G. (2006). *Computer Games: Text, Narrative and Play*. London: Polity Press.
- Egenfeldt-Nielsen, S. (2005). *Beyond Edutainment*. PhD Dissertation. Copenhagen: IT-University of Copenhagen.
- Gee, J. P. (2003). *What Video Games Have to Teach Us About Learning and Literacy?* New York: Palgrave-Macmillan.
- Gee, J. P. & Green, J. L. (1998). Discourse Analysis, Learning, and Social Practice: A Methodological Study. *Review of Research in Education* 23: 119-169.
- Hanghøj, T. (2008). *Playful Knowledge. An Explorative Study of Educational Gaming*. PhD dissertation. Odense: University of Southern Denmark.
- Hanghøj, T. & Brund, C. E. (2010). Teacher Roles and Positionings When Facilitating Educational Games. Proceedings of *ECGBL 2010, 4th European Conference on Game-Based Learning*, 21-22 October, Copenhagen.
- Hanghøj, T. & Meyer, B. (2010). How to Study Something That Does Not (Yet) Exist? Making Design Interventions With Learning Games. Proceedings of *ECGBL 2010, 4th European Conference on Game-Based Learning*, 21-22 October, Copenhagen.
- Ito, M. (2009). *Engineering play: a cultural history of children's software*. Cambridge, MA: MIT Press.
- Kress, G. (1993). Genre as Social Process. In: B. Cope and M Kalantzis (ed.): *The Power of Literacy: A Genre Approach to Teaching Writing*. London: The Falmer Press.
- Miller, C. R. (1984). Genre as Social Action. *Quarterly Journal of Speech* 70(2): 151-67.
- Ongstad, S. (1997). *Sjanger, posisjonering og oppgaveideologier. Et teoretisk bidrag til et tverrfaglig, semi-otisk og didaktisk sjangerbegrep*. Afhandling. Norges teknisk-naturvitenskapelige universitet.
- Serious Games Interactive (2008): *Global Conflicts: Latin America – Teacher Manual*. www.globalconflicts.eu
- Shaffer, D. W. (2006). *How Computer Games Help Children Learn*. New York: Palgrave Macmillan.
- Squire, K. (2004). *Replaying history: learning world history through playing Civilization III*. Dissertation. Indiana University.
- Star, S. L. & Griesemer, J. R. (1989). Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. *Social Studies of Science* 19 (4): 387-420.
- van Eck, R. (2009). A Guide to Integrating COTS games in your classroom. In: R. Ferdig (ed.): *Handbook of Effective Electronic Gaming*, pp. 179-199. Hershey, PA: Information Science Reference Guide.
- Wiklund, M. & Ekenberg, L. (2009). Going to school in World of Warcraft. Observations from a trial programme using off-the-shelf computer games as learning tools in secondary education. *Designs for Learning* vol 2, nr. 1: 36-55.
- Wolf, M. J. P. (2001). *The Medium of the Video Game*. Austin: University of Texas Press.