Games and Learning: What's the Connection?

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Abstract

This article reviews how the relationship between computer games and learning has been conceptualized in policy and academic literature, and proposes a methodology for exploring learning with games that focuses on how games are enacted in social interactions. Drawing on Sutton-Smith's description of the rhetorics of play, it argues that the educational value of games has often been defined in terms of remedying the failures of the education system. This, however, ascribes to games a specific ontology in a popular culture that is defined in terms of its opposition to school culture. By analyzing games produced in school by 12- to 13-year-olds in the context of a media education project, the article shows how notions of what a game is emerge from conventionalized and historical relations within a setting, and that the educational value of games can therefore be re-thought in terms of the situated signification of "game" rather than games causing learning. The students' production work is analyzed using a discursive, semiotic methodology and focuses on changing principles of design across time. Changing notions of "game" and "play" are therefore highlighted and analyzed in terms of how students position themselves in relation to the teacher, researchers, and their peers. The significance of the study for conceptualizing the relationship between games and learning is reviewed in the conclusion.

Introduction

In *The Ambiguity of Play*, Sutton-Smith (1997) examines the ideological values that underpin theories of play. He distinguishes between a number of rhetorics of play theories, including the rhetoric of "play as progress," in which play is seen as a source of moral, social, and cognitive development; the rhetoric of "play as frivolity," which is applied to describe the activities of the idle or the foolish who rebut the classical work ethic; and the rhetoric of the self, in which play is about individual desires and feelings such as fun and relaxation, rather than about any external consequences. Different rhetorics predominate in different disciplines. In education, positive accounts of play have often drawn on the rhetoric of play as progress, in which "the main concern is to show that increases in the complexity of play skill—physical, mental, imaginative, or social—lead to increases in some parallel kind of human growth or adaptation" (p. 18). This rhetoric tends to emphasize play's intrinsic motivation, whereas in disciplines such as history or anthropology, for example, play is usually portrayed in terms of its extrinsic functions. Sutton-Smith's argument is that each rhetoric, each theoretical construction of play, functions by excluding certain aspects of play. The rhetoric of play as progress, for example, tends to omit the nasty, brutish, frivolous, conflictual, and instrumental aspects of play, in order for teachers, therapists, and developmental psychologists to demonstrate more clearly that play develops skills for cognition and education.

In the wake of policy and research interest in digital game play for educational purposes, it is enlightening to return to Sutton-Smith's analysis of play theories, if only to note that many of the claims concerned with the beneficial and benevolent relationship between digital games and learning have been made before, in relation to other forms of play. Sutton-Smith does not argue that there is a single superior perspective from which to study play. However, his descriptions of the rhetorics suggest the importance of a degree of reflexivity in educational research on digital games, to recognize the ideological values of various constructions of play as well as the exclusions necessary to uphold those values in generating accounts of educational game play.

One of the ideological premises of much research on digital games and learning is the belief that education institutions are failing—failing to adequately prepare students for the demands of the digital age, failing to engage students in the curriculum, and failing to make best use of the digital technologies now available. The ideological consequences of framing the education system as "failing" have been explored elsewhere (Rancière 1991; see also Pelletier in press), and can be understood in part in terms of ascribing to the education system an originating purpose from which it has been diverted, and under-emphasizing its institutional role in certifying the distribution of social functions. In the education and games debate, the presupposition of failure has tended to frame games as a kind of remedy, which can be brought into either education institutions themselves or the domain of educational theory to help understand and address the shortcomings of current educational practice. A consequence of this is that games and game play tend to be treated as "out there," beyond the school gate, in some better, more authentic, more democratic, more meaningful place, other than the current and failing educational regime. By bringing games into educational practice and theory, the hope is, it often seems, that the diseased, geriatric body of education can be treated through the rejuvenating, botox-like effect of educational game play.

This grants games a specific ontology: They come from "out there," from a popular culture that stops at the classroom door, or from the uniquely creative minds of professional game designers. The operation by which games are brought into the realm of education therefore splits games into two: their historical origins "out there" and their present educational value "in here." This very distinction in effect sustains the view that games can re-shape or re-work educational practice and theory. Another way of conceptualizing this distinction is in terms of form versus content, or, for semioticians, signifier versus signified. The distinction is one that allows for the discovery of an educational essence of games hidden behind a historical, popular, and playful appearance. This has made for a geological model of gaming, with surface features—for instance, what Sutton-Smith refers to as the "frivolity of play"—framed as relatively incidental manifestations of a deeper, more essential educational truth.

This distinction has been productive and generative in allowing researchers and policymakers to see the rich complexity of popular culture and children's play. But it also creates certain problems in how it carves out what is made visible and invisible in those domains.

In the first half of this article, I review some of the key literature on games and learning more closely and explore some of the problems caused by conceptualizing games and game play on the basis of a distinction between form and content. In the second half, I endeavor to put forward an alternative way of conceptualizing games, one which does not define them internally—for instance, in terms of their hidden "actual" educational content or their underlying systemic design—but rather in terms of their external relations. My interest is in seeing what happens to the educational argument on games when games are defined not so much as a substance (which can be imported into a domain of activity) but as a relation, as objects which are materialized in social interactions, including in education.

Finding the Kernel of Learning behind the Appearance of Play

Much of the policy interest in the relationship between games and learning has arisen due to the popularity of computer games among young people, and the perceived contrast between young people's enthusiasm for game playing and their lack of engagement with, or motivation for, schoolwork. This perceived contrast led in the first instance (between 2001 and 2003 approximately in the United Kingdom) to two kinds of endeavors: one that focused on identifying whether games could be used in schools to teach curriculum content and skills in a more motivating way, and another that attempted to identify successful game design patterns that could then be applied to educational software. Dawes and Dumbleton (2001) and McFarlane, Sparrowhawk, and Heald (2002), for example, examined a number of popular games in terms of their content and the processes involved in playing them, concluding that games such as *The Sims* and *Championship Manager* could teach competences such as budgeting and database handling. The U.K. government's Department for Education and Skills (2003), on the basis of these reports and others adopting a similar methodology, recommended that educational software developers and game designers collaborate in the development of new products, with a view to transferring game-based design patterns to educational software.

This model of how games become educational frames the relationship between a game's form and content or substance in a particular way. Games are educational insofar as they provide better, more en-

gaging, more "relevant" ways of teaching (the same) curriculum content. Significantly, Dawes and Dumbleton, in one of the earliest policy reports on games and education, describe games as an interface, a term that establishes a distinction between the attractive visuality of games and their "real" educational content:

> The games interface can be distracting for pupils working to achieve defined learning outcomes. Careful structuring by the teacher is required to ensure that pupils are not absorbed by game play.… Insisting that pupils break off from using the game to concentrate on other aspects of the lesson requires careful negotiation and a shared understanding of the purpose of game use in the classroom. (Dawes and Dumbleton 2001, p. 10)

In this description, games are mediating planes whose value lies in the way they facilitate access to the learning outcomes; these planes or interfaces can in fact also distract from attaining the desirable educational substance. A similar model of learning underpins claims that games develop specific skills such as strategic thinking, application of number, and communication (Kirriemuir and McFarlane 2004). Such a model frames games as a type of form behind which valuable content can be found, or indeed placed.

It follows, from this conception of games and gaming, that "realistic" simulations are the most appropriate of game genres for classroom use. The "realistic" appearance provides the least distraction from the kernel of learning that the game contains. In the TEEM report on learning and games, ludic simulations like *The Sims*, *SimCity,* or *Railroad Tycoon* are understood to have the greatest potential for teaching educationally desirable and generic skills such as budgetary management, whereas the presence of magic spells, for example, is said to make a game inappropriate in an educational setting (McFarlane, Sparrowhawk, and Heald 2002).

Defining games as a type of form, a type of appearance concealing a kernel of learning, has a number of implications, and hides from view certain aspects of gaming. It means that relatively little attention is paid to the contexts within which such forms appear and emerge as meaningful entities—in other words, to the social and institutional contexts of play. Methodologically, the focus instead is on the subject matter of the game. Yet it is questionable whether

games, and "realistic simulations" specifically, have the educational meanings researchers ascribe to them during social practices of play. For example, the idea that *The Sims* or *Railroad Tycoon* simulate managing a budget is dependent on how the game is played (for example, a popular way of playing *The Sims* is to use cheats that allow the player to have as much money as he or she wants). Similarly, the belief that games teach the skills that they represent or simulate (such as managing a theme park) equates the appearance of games with their symbolic meaning. However, when enemies are killed or theme parks managed in a game, it is dubious whether the player's identification is with the act of killing or managing theme parks, but rather, for example, with gaining points and beating a friend's score. This is problematic if games are to be used in an education institution in order to make curriculum content more motivating and engaging: Is a game such as *SimCity* likely to remain motivating and meaningful in the context of a lesson on budget management? Furthermore, the argument that there are "strategic thinking skills" or "information management skills" independent of what is to be thought strategically or what information is to be managed presumes the existence of generic skills separable from the domain of knowledge within which skills emerge and manifest themselves. Young (2008) critiques this belief in terms of genericism.

Attempts to treat as distinct and separable the form of a game from its (educational) content therefore create many problems in theorizing the relationship between games and learning. Although this literature has rightfully sought to counterbalance fears about the links between games and violent antisocial behavior, it is based on a similar model of learning, as Arnseth (2006) points out: Games are understood to have inherent effects on cognition independently from the meanings that play has to those engaged in it.

Games as a Metaphor for Learning in the Digital Age

Partly as a consequence of the practical difficulties of using computer games in education institutions, another type of argument about the relationship between games and learning has become more prominent in the last few years, in both policy and academic literature. This is the argument that games should not be conceived so much as a motivating delivery mechanism, but rather as a model for how people need to learn, or are learning, in the digital

age. One of the most elaborated examples of this line of argument is the work of Gee (2003, 2004, 2005), in which games are examined as an instance of a general theory of learning as well as a critique of traditional schooling. Gee does not advocate using games in school; rather, his rationale is that games are based on an implicit theory of learning that is very successful in games, and that, in the wake of the "No Child Left Behind" policy, contrasts with the shortcomings of approaches to teaching and learning in schools. Learning, in Gee's work, is not the outcome so much as part of the process of playing, and relates not so much to the representational content of the game (the setting, story line, or subject matter) as to the complexity of its design and the social practices this sustains. According to Gee, learning and playing are largely synonymous processes; the pleasures and frustrations of playing are akin to those of learning.

Gee's work is often said to address the shortcomings of more psychologically oriented "effects" literature by treating games as a sociocultural practice, rather than as a stimulus for cognitive states (Arnseth 2006). In this, Gee could be said to have collapsed the dichotomy between the form of a game and its meaning to players, by defining games as a social practice. However, one could argue that the distinction between form and substance remains in his work, while morphing into a different guise, as a consequence of the way he defines games and the practices within which they emerge.

One of the consequences of splitting games into two, albeit interrelated, components—"external" practices and "internal" systemic design spaces—is that the representational aspect of games is made largely superfluous to learning and to gaming as a social practice, with players perceived to engage largely with the mechanics of games, as they move progressively from "active" to "critical" learning. Although this acknowledges that the meaning of gaming visuals derives from a specific genre of interaction, it also effectively distinguishes learning from the practice of knowing, as Buckingham (2007) has pointed out. This means that some of the genericist claims found in the early policy literature also characterize Gee's work, with players said to engage in "active and critical learning" when they play games. What is the interpretative move from game playing to "active and critical learning" in Gee's analysis? Game playing appears to become an instance, or an exemplary illustration, of a specific category of learning (active and critical). This raises the question

of what other categories of learning there might be, and how they come about. Perhaps more importantly though, it creates a category of learning which stands independently of the specific domain in which this phenomenon appears. "Active and critical learning" thus becomes a generic abstraction which is independent of the principle of its recognition. This in effect reinstates the form/content dichotomy.

The logic of this line of argument can be seen in the way gaming practices are depicted in Gee's work. Semiotic domains are said to sustain affinity spaces, a concept which Gee (2004) develops in order to address some of the limitations he notes with the concept of community in Lave and Wenger's work on communities of practice. However, as Whiteman (2007) argues, whereas Lave and Wenger focus on the realization of practices over time and across spaces, Gee's concern is with principles of recognition within a predefined space, such as the game *Age of Mythology*. This effectively involves treating practices as if they were static objects: stable over time, and defined in relation to objects/spaces (games) rather than groups of people or activities. The issue here is not whether games as objects/spaces change over time, but rather that practices are treated methodologically as emanating from such objects. The learning which is understood to take place in such affinity spaces is thus treated as an attribute of games. This is also why Gee makes the distinction between "good" and "bad" games, with "good games" facilitating learning. The contradiction here is that while learners are said to be "active," they are treated methodologically as "passive"—in the sense that active, critical learning is understood to happen because of the way in which games are good.

One consequence of defining affinity spaces as attributes of objects is that specific objects are understood to sustain specific affinity spaces. Game-based affinity spaces are thus depicted in terms of their difference from other kinds of social spaces: they are said to be characterized by a lack of hierarchy, in contrast to classrooms, and involve "porous leadership" and leaders who "don't and can't order people around" (Gee 2004, p. 87)—because of the specific nature of games. This notion of communities of practice contrasts with work which understands them to consist of negotiations about knowledge, shaped by the exercise of power, including for instance commercial influence. Empirical studies of game-based "affinity groups" such as online fan sites have suggested that they can be understood precisely as struggles over

knowledge and identity (Whiteman 2007), and in this respect are not unlike other social spaces, including classrooms. Game-based affinity groups are devoid of conflict, hierarchy, incomprehension or exclusion in Gee's work precisely because they are understood to be assimilated by the unity of games as objects of meaning. One problem with this is that it removes consideration of the disputed status of knowledge—of what a game "is"—from an analysis of what people are learning. This neglects many aspects of game play and gaming communities of practice (see, for example, Whiteman 2007; and Oliver and Carr in press).

This critique of the logic of Gee's argument is to some extent irrelevant or secondary to its stated goals, which are to highlight the shortcomings of current educational policy and to extol the dynamism of emerging media-based social spaces—and it is no argument against these goals. Using gaming to explore contemporary Vygotskian theory only becomes a problem when one's starting point is the former rather than the latter. In the second half of this article, I draw on a body of work with many similarities to Gee's own, namely social semiotic and multimodality theory. My argument is not therefore with Gee's approach in general, but with the consequences of trying to remedy formal education through a particular construction of games and gaming.

Games, Learning, and Theories of New Media

Conceptions of the relationship between games and learning can be situated within wider theories about the nature of cyberspace and its significance for education (Pelletier 2006). The two versions of games as educational media outlined above draw on contrasting traditions for theorizing digital culture. The policy literature draws on a concept of cyberspace as a deeply immersive experience that offers a stream of sensations, inhibiting more distanced forms of reflexive and critical thinking. This theory of cyberspace can be found in Baudrillard (Baudrillard and Glaser 1994) and Virilio (1999), and could also be said to characterize some of the fears regarding the loss of critical distance in online writing and learning, as found, for example, in Birkerts's *Gutenberg Elegies* (1994).

The literature that views games as emblems of a new kind of learning characteristic of the digital age tends to view cyberspace as a phenomenon that cancels or overturns hierarchical structures and bureaucratized institutions. According to this scenario,

cyberspace frees us from the authority of traditional social indicators and affiliations (such as patriarchy, the capitalist work ethic, the class system, ethnicity, etc.), and allows us to explore multiple and shifting identities. This vision of cyberspace is particularly developed in Turkle's (1995) exploration of identity on the Internet, in which identity becomes a playful activity, actively defined by individuals within much looser boundaries and no longer predetermined by social conventions.

Both of these conceptions of cyberspace tend to focus on the way in which digital media transform existing social arrangements. Consequently, they tend to frame digital media as a cause or explanation of changes in social arrangements, thereby erecting a questionable distinction methodologically between two kinds of phenomena—technology and society.

Although it is common to critique technological determinism, it nonetheless persists, as Selwyn (2008) points out, in many contemporary accounts of the significance of cyberspace for education: "rather than the internet improving learning, it [might] be said instead that it can *help* to improve learning—acknowledging the possible existence of other contextual influences, whilst retaining the notion of a technological effect." Selwyn points out that this way of theorizing digital technology in educational research tends to reach conclusions that recommend overcoming the constraining contextual influences (which, he states, are often conceptualized simply in terms of "barriers") so that the effect of technology, or cyberspace culture more broadly, may be more fully felt. In the literature on games and learning, such barriers are conceived either in terms of a dangerously distracting interface or an authoritarian drill-and-practice regime. In both cases, it is the distinction between form and substance, or form and content/meaning, that sustains the technologically determinist claim that games (help to) cause specific ways of learning.

Other models for theorizing technology exist. One approach that was put forward in the 1980s and 1990s within the social studies of technology literature involves treating technology as a literary artifact, whose properties emerge within the interpretative work and social strategies that people engage in to establish what technology is (Selwyn 2008). The work of theorists such as Latour, Woolgar, and Law, as well as others whose work has been associated with the label "actor-network theory" (ANT), is particularly relevant, focusing as it does on the semiotic work that

technologies achieve in domains of activity (see, for example, Latour 2007). McLean and Quattrone (2008, pp. 10–11) summarize one ANT-based study on the significance of a new technological artifact (a water pump) as follows:

> Through their [Law & Singleton] analysis of a water pump in Zimbabwe, they argue that a complex object such as a pump is made by different performances, enactments (i.e., practices and realities that co-exist in the present). In other words, there is no singular object or reality "out-there" as objects maintain a fluid existence with the capacity to exist in many different forms—more than one but less than many.… Multiple objects are therefore seen to exist through the networks of relations. For as the networks of relations change, so do the objects under scrutiny.… There is a shift therefore from representation where objects are the focus of varied perspectives, to objects as enacted in a variety of practices.

This approach seeks to avoid treating technological objects as either a reified reality—since technology is a set of multiple possibilities rather than a singular causal determinant—or as simply a social construction—for the culturally shaped materiality of technology constrains the multiplicity of possibilities. Technological objects are treated as "enacted" in practices, rather than "embedded" (a term which treats objects as entities that precede their realization in practices). In other words, technological objects are understood to have neither inherent forms nor inherent meanings, but rather to emerge as meaningful, material entities in practices.[1] This type of approach suggests a way of examining a technological object such as a game in terms of how it is enacted or signified in practices, starting from a consideration of what is said to count as a game and by what means, rather than assuming that the object can be defined in its attributes and meaning prior to its investigation. This involves taking a step back from presuming the constituent character of the object of analysis—game—in order to look at the practices according to which such an object is created, ordered, and classified; how it is characterized and specified; and within what hierarchy of objects it is situated. In this way, one can examine how a game comes into being as a result of the actions of individuals, institutions, or systems, how it becomes

an object of meaning. Such an analytical strategy focuses on the way in which the practice constructs subject and object (for instance, the player, as well as the game). Consequently, one can examine how objects emerge as meaningful, and how subjects emerge as meaning-makers.

Having mentioned ANT primarily because of its attention to the question of technology, it is important to note that this approach, as I have outlined it here, also characterizes discourse analysis (Andersen 2003). Discourse analysis focuses on how objects appear as meaningful entities within statements. ANT and discourse analysis construct accounts of practice on the basis of different kinds of evidence, and draw on different theoretical antecedents, but both are interested in the conditions of emergence of material entities.

Studying gaming by focusing on how games are enacted as objects of meaning could avoid some of the problems of the form/content dichotomy discussed above. This type of approach would also have implications for theorizing the relationship between games and learning. If we accept that learning is a process by which meaning is made, as Gee and others have argued, the relationship between learning and games can be understood in terms of the way games are enacted as meaningful objects in practices. Games can then be understood to consist of ways of construing ideas, beliefs, and experiences, emerging from particular social relations. It is the involvement of games in such meaning-making that can then be understood to relate them to learning. The relationship between games and learning therefore need not be understood in terms of the meaning of the form, but rather the signification of "game" in practices.

In a study called "Making Games" carried out over a three-year period and within a framework of media education, researchers examined the signification of material, semiotic assemblages as games in a number of research sites, including classrooms, after-school clubs and young people's homes. What counted as a game evolved across space and time; in other words, the parameters for what counted as a game in the classroom were different from what counted as a game in the after-school club or the home. In the rest of this article, I will examine the signification of "game" in one classroom over a five-week period. I will then return to the significance of the analytic approach for conceptualizing the relationship between games and learning.

The "Making Games" Study: Game-Making in the Classroom

The "Making Games" study was a collaboration between researchers in the Centre for the Study of Children, Youth and Media, University of London, and a software development company called Immersive Education.[2] The purpose of this collaboration was to create a production tool for 11–14-year-olds to make their own computer games as well as to develop teaching strategies for use in English and media education classrooms. The premise of the project was that since games are a significant genre in contemporary culture, being "media literate" involves not only being able to analyze games as texts but also produce games.

Research activities involved facilitating game-making in a variety of schools over a three-year period. The game-making software was developed iteratively, and a succession of prototypes was taken into schools.[3] All the prototypes consisted of a number of ready-made entities, including three-dimensional locations (rooms and corridors) and props (chairs, tables, health kits, machines, etc.), media (sound and still images), and triggers (which determine the conditions under which an event takes place, i.e., which "trigger" an event). Making a game involved selecting entities and then defining the relations between them. This required writing rules: For example, "If the player clicks on the cockroach, the player gets 50 points." Designing a game with this software meant organizing relations between entities rather than creating entities from scratch; in other words, the emphasis was on designing a game with a set of ready-made items rather than on programming the raw materials of visual or aural representation.

In analyzing the emergence of "game" as an object, I shall draw on data from the second year of the project, as this is when researchers engaged most extensively in observational field work. That year, researchers collaborated with the English and media teacher at a school in Cambridge, United Kingdom, to devise a course focused on game production for a class of 12–13-year-olds. The teacher had been teaching computer games as a topic in media studies for a number of years; our aim was to integrate production work into this existing course. This was organized around a number of concepts, namely computer game audiences (fan communities, constructions of audience pleasures), institutions (companies, regulatory bodies), and texts (particularly those based on stories with

a cross-media market such as *Harry Potter*). To inform production work, we decided to focus on computer games as forms of texts, and to describe these in terms of narrative, rules, and economies. In this setting, then, game-making was framed as an activity designed to develop conceptual understanding—in contrast to, for instance, how game-making was framed as a practice in the after-school clubs and in students' homes. The purpose of asking students to make games in the classroom setting was to enable them to instantiate general concepts in their own texts, to produce texts in order to develop forms of understanding that had a broader application.

The course consisted of nine 50-minute sessions over five weeks. The class comprised 29 students, of mixed ability and mixed gender. I participated in the sessions, and recorded events through the use of video, microphones, and field notes. At the end of most sessions, I also made copies of students' production work.

The Process of Analysis

The analysis below focuses on how students' production work was signified as "game." This means asking some of the questions formulated above, with a view to describing how games were specified and characterized as objects, and the regularities in the different instances of "game" (Andersen 2003; Howarth 2000). Multimodality theory provides conceptual resources with which to systematically analyze the signification of nonlinguistic objects of research, including visual and interactive texts (Kress and van Leeuwen 1996; Burn and Parker 2003) and nonverbal communication and representation in physical places (Jewitt 2006). This involves treating objects as semiotic signs methodologically—and eradicating the analytic distinction, emphasized within certain anthropological traditions, between physical actions and textual objects. Treating the object of research as sign is not the same as saying everything is a text, but it does mean constructing the object of research as "textual" for the purposes of analysis, as something that is "read."

Reading how "game" was signified in the classroom setting involved, in the first instance, undertaking a semiotic analysis of students' production work, using concepts familiar to multimodal analysis, including vectors (which establish a "playing path"), classificatory processes (the means by which representational entities are assigned possessive attributes,

through, for example, health values or points), spatial composition (what is made salient, how entities are framed, etc.), provenance (where signs come from—such as an image from a *Harry Potter* film or the naming of a teacher in school), guide rhythm (which refers to the way in which a chronology is established and a pace designed), demand and offer structures (the demands made on the player, for example, for a particular kind of action, or the offers made, such as a sound playing when an entity is clicked), and modality (for example, signifiers of genre).[4] This kind of analysis enables a description of how production work is specified and characterized as a game object, the regularities in the different instances of games, as well as the regularities in other objects. It also enables a characterization of the type of interaction that the game object facilitates, for example between designer and player, or between spectators of the design and play process; a reference to the Princess of the Senates in a game identifies the designer as someone who knows about the *Star Wars* narrative, and can be interpreted as an invitation to the player to treat the game object as particular kind of fantasy space.

Other data were analyzed alongside students' production work. In order to identify how students, researchers, and teachers responded to, evaluated, and distinguished between ways of making or playing games in different situations in the site of research, video footage of the whole class, field notes, written homework, and lesson plans were analyzed using the same social semiotic concepts. In the classroom setting, particular attention was paid to the purposes and consequences of teacher-led pedagogic interventions.

In analyzing other data in relation to the students' production work, I can establish the hierarchy of objects of which this work formed a part (for example, how the production work fits into the category of "evidence of conceptual understanding" in the classroom). From this, I can establish the practices by which games are created, ordered, and classified.

This analytic procedure can be carried out to produce a history of game-making/play in the setting. By analyzing successive versions of students' production work, I can identify differences between versions, and therefore the principles according to which a game was made and evolved; by principles, I mean the kinds of decisions that plausibly justify and connect differences between versions. In a classroom setting, this means, for instance, identifying how students made games following the teacher's presentation of particular

concepts such as "narrative" and "playable." Changes in principles of design are treated as indicators of how these concepts were effected situationally. Principles of design can be treated as strategies, in that they instantiate "game" in one way and not another; they are choices, from the many different ways in which game can be signified. Comparing principles of design within one setting highlights the dispersion of differences between what counts as a game; it is then possible to identify which principles are more dominant and/or more widespread than others.

Signifying "Game" across Time

In the analysis below, I focus on the principles of design in students' work, and treat these as strategies for instantiating the sign "game." These principles evolved over time, as the course developed. They can be grouped under three main headings: game as an entity that is played with; game as the exemplification of a course key concept; and game as the opposite of schoolwork. These instantiations of what a game is succeeded each other in time. Tracing them is not intended to map out a pedagogy for teaching game-making; the analysis is intended to be descriptive, not prescriptive. In fact, when researchers and the teacher ran the course the fol-

lowing year, its organization was significantly altered. In analyzing the signification of "game" in an educational setting, I am therefore not saying what a game in this kind of setting ought to be, but tracing the construction of "game" across time.

Game as an Entity That Is Played With

In the first session of the course, students were asked to define games and identify some characteristic components—rules, aims, challenges, and so on—with special focus given to the function of rules, and the way in which they enable and constrain play. Following this initial introduction to key concepts, the second session was dedicated to introducing the software, with students asked to make maze-like environments. The intention (from the teacher's and researchers' perspectives) was that these could serve as backdrops to the subsequent development of rules and narrative. Students made large environments, consisting of numerous locations (figure 1).

A third session was intended to highlight differences in the narrative structure of games, films, and novels: The representation of the same event from the *Harry Potter* franchise was examined in the book, the film, and the game. In the fourth session,
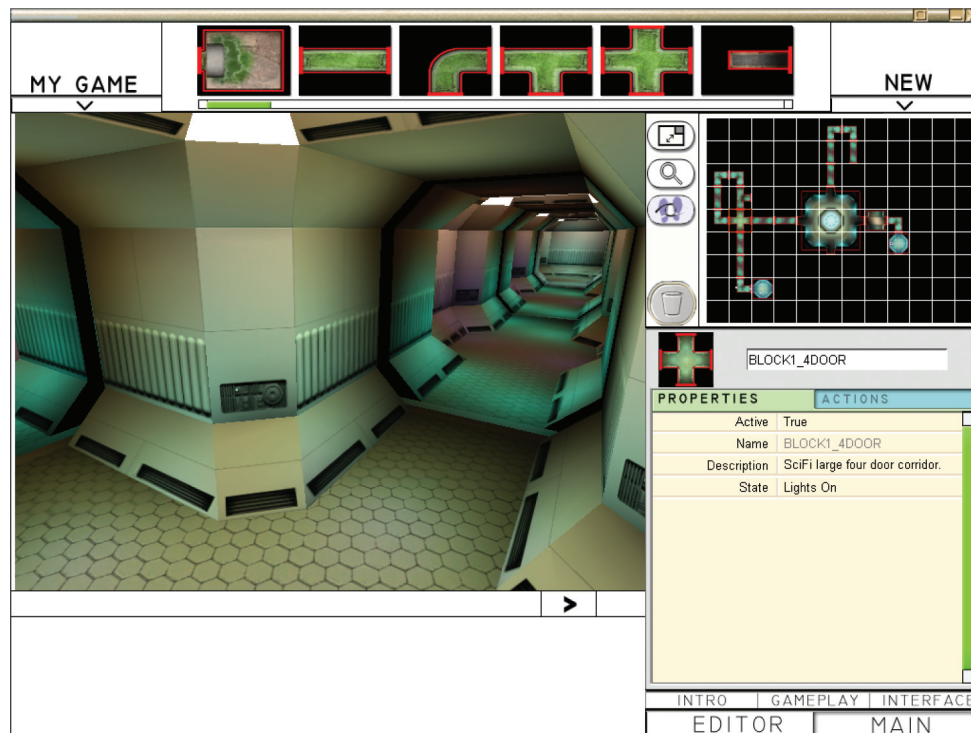

Figure 1 Lucy and Jo's game in session 2. The "map" view is in the right hand corner. This indicates the size of the game. (See supplements.)

students were asked to make a game based on a *Dr. Who* scenario,[5] in which Dr. Who arrives on a spaceship and is assigned a mission; students were then asked to develop this story line, but to include at least two rules.

Many of the games created in session 4 consist of large environments, numerous props, and few rules (e.g., figure 2). I noted in this session that this spatial composition meant that students were prone to getting lost in the environments they had created. By using locations with several exits, the same locations multiple times, and repeat or symmetrical patterns in the arrangement of locations, a loss of direction was produced; the same prop is often used multiple times (figure 3).

Emphasis is placed on visual richness, color, quantity, repetition, and the bewilderment of perceptions. These can be interpreted as modality markers that establish a sensory coding orientation, "used in contexts in which the pleasure principle is allowed to be the dominant: certain kinds of art, advertising, fashion, cooking, interior decoration, and so on" (Kress and van Leeuwen 1996, p. 170). This principle of design suggests that "game" is signified here in terms of visual, visceral excess, a signifier that could be said to stand in opposition to more distant, abstract, or academic forms of engagement (Kress and van Leeuwen 1996, p. 170). A comparison can also be made with Caillois's (1967, p. 47) game classification system, in which games classified as "ilinx" are those intended to bring about "physical confusion and helplessness."[6] Games in this category are contrasted with games of competition, chance, and mimicry, and are characterized by sensory voluptuousness rather than rules; in the wake of this categorization, one can suggest that students' productions are textual equivalents of swings and playground roundabouts. At this stage in the course, a game is something that students play with, rather than an assemblage they put together for others to play.

Game as the Exemplification of a Course Key Concept

By session 4, the teacher and researchers agreed that the approach students were taking to game design was somewhat of a distraction from the key concepts that the course was intended to cover: rule (students rarely made these), narrative, and economy (as some kind of cohesive framework that was not just logical, but textual). Consequently, in session 5, the teacher showed on the whiteboard a story he had written featuring Dr. Who—the character from the eponymous TV series—and a game that illustrated the story. The

Figure 2 Mick, Alf, and David's game in session 4, in map view. (See supplements.)
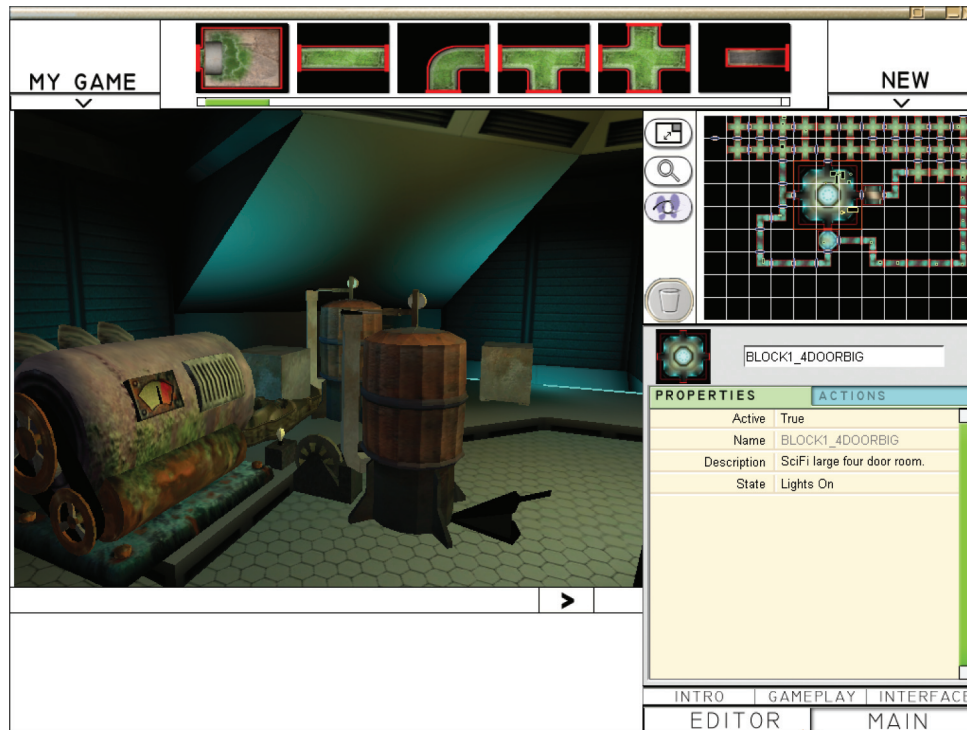
Figure 3 Game saved as "Klapominlklwsza" in the fourth session, with the map view in the right hand corner. One location contained the following props: two safes, two pumping machines, one generator, one sarcophagus, one turntable. Across the game, there were also 12 elevators. (See supplements.)

story involved finding the right key (among several identical keys) to open a pirate chest that contained a CD disk on which codes were inscribed; these codes were necessary for a further sequence of actions. Narrative was realized, then, in the teacher's game, as a linear sequence of events. Students were then asked to make a game, using two locations only, to tell a story based on *Dr. Who*. In session 7, the teacher showed his game again, and reiterated that students should make games with two locations only and minimal props.

Games made by students in the fifth and subsequent sessions demonstrate some of the principles the teacher had shown and discussed. For homework in session 6, students were asked to write the story that their game was designed to tell.

Over the next few sessions, a great variety of games were made. There are patterns, however, in their principles of design. No single game is representative, but I will focus on a game made by a student named Tom, in part because he also submitted the homework assignment for session 6, which provides insight into the approach he took to designing his game.

Over sessions 6 and 7, Tom arranged two locations separated by a locked door. In one of these locations, a robot is situated in front of the door, and between five identical levers on either side (figure 4). Rules determine that clicking on specific switches opens the door and causes the robot to move forward into the second location.

For homework after session 6, Tom wrote the following assignment (figure 5):

Tom's game involves the kind of visual repetition that also characterizes the games in the first four sessions of the course; the same lever is used ten times in one location. However, this principle of design is no longer justified primarily in terms of excess and physical dizziness. Rules are written for two of the levers: one to open the door and the other to move the robot. This configuration of elements sets up a problem to be solved, and establishes an order by which the space may be explored.

In the game, spatial organization means that the switches can be clicked in any order. The proximity of the door to the levers, and the absence of any other entity, are strong indicators that the levers are keys of some sort. Although visual repetition of the same
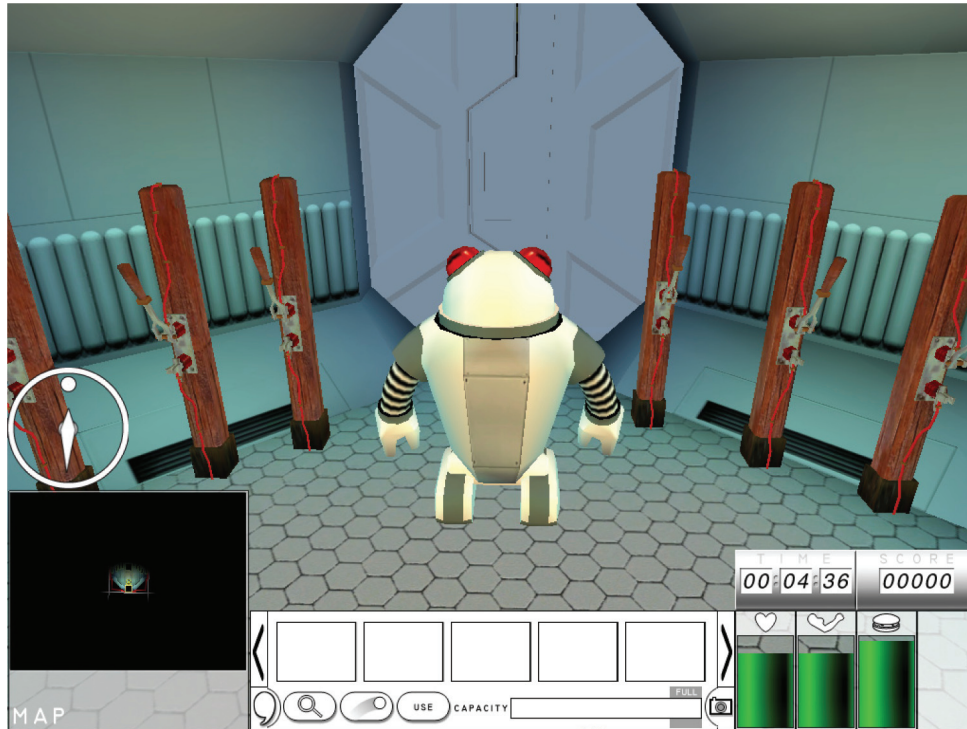
Figure 4 First location in Tom's game, with electric switches on the left and the right and the robot in front of the door. (See supplements.)

entity makes the space between the levers temporally significant, spatial contiguity means that it is possible to click on all the switches in quick succession and assume that one or two of them will open the door. What is it then that makes a sequence of levers and a locked door into a puzzle, or under what condition are these levers, and the rules with which they are associated, signifiers of "game"?

In the written narrative, the multiple switches create suspense. The three dots preceding the word "nothing" indicate a temporal pause between a cause and its hoped-for effect. The door opens after two attempts are described individually and three more attempts grouped into one sentence; this creates tension and avoids repetitive, bathetic phrasing. The same three-step sequence is reiterated to move the robot, ordering the attempts into two halves of one process, linked by the conjunction "and" in the first paragraph. The written narrative is an account of a problem being solved. It seems plausible to argue that the game is an illustration of this account. What signifies the set of levers and the locked door as a puzzle to be solved and a story to be told is the written homework assignment, rather than the arrangement of the game per se, in which the lack of temporal restriction and spatial con-

tiguity undermine the "problem" of finding the right lever. The creation of an ordered sequence of identical levers can therefore be interpreted in terms of realizing principles of written narrative in game form.

To use Barthes's (1977) term, one could argue that the written narrative provides anchorage for the game—it makes the meaning of the spatial and visual composition more specific. Anchorage implies the co-presence of the item that supplies the "anchor" and the anchored item. The two items are co-present only from a certain perspective, as items submitted to the teacher (students did not show each other their stories in class—nor did they, at this stage, play each other's games). Tom's game can therefore be treated as an illustration of the themes and structures of his written narrative, organized for the teacher as audience/viewer within this setting.

Tom's written narrative was also shaped by the process of game-making. The doctor arrives looking for "a mystic item of great power," but leaves with "the four crystals he was searching for." This substitution in the written text is explained by the demands of the visual mode to be more precise about what is to be represented (Kress and van Leeuwen 1996). However, the relation between game and written narrative is

My Game

When the doctor is on a search for a mystic item of great power when he gets mysteriously teleported into a room, the doctor is facing a control panel he presses a button on it and a message beams up in front of him, he reads it "Press the 2 electric switches and try and take the robot with you through the doors, then talk to the other control panel."

He looks around the room and sees 2 sections with 5 electric switches in each, he tries the far left one on the left side first... nothing, and next he tries the one on the right of that... still nothing. He tries all the ones on that side until he gets to the last one he pulls it and the doors open up.

He then remembers he needs to take the robot through so he pulls the electric switch closest to the door on the right side... nothing, and then he tries the next one... still nothing, and then he pulls the next and the robot walks really fast through the door and when he gets through the door he stops and starts to jump.

He walks over to the other console and another message pops up "fix the generator, and there should be a message inside." He walks up to the generator and eventually fixes it, a message falls out of the machine, he reads it "Get the three keys out of the three chests and then and only then you may enter the secret chamber. He walks around the room and finds the three chests, he opens them and then he walked into the secret chamber, he then finds the four crystals he was searching for, he picks them up and gets transported back to his ship.

Excellent — the story and game work very well together, and you explain them effectively, adding some nice touches.

Figure 5   Tom's homework after session 6.

one of exemplification (van Leeuwen 2005): The game exemplifies a concept (narrative) developed in the writing. This approach seems to explain the particular characteristics of games made in the middle section of the course (sessions 5–7), which are often organized to sustain a linear sequence of actions, the justification for which is elaborated in written homework.

One can understand this in terms of the aesthetic valuation of the written form in this setting. The introduction of a new practice (game-making) and material resource (the software) destabilized principles of recognition according to which assemblages could be legitimized as signifiers of "narrative." In the first few sessions of the course, students and the teacher/ researchers worked with different conceptions of what counted as a game and game narrative. The homework assignment, and demonstration of the *Dr. Who* game and story on the whiteboard, established norms

in respect to this: They indicated what would count as narrative in a text produced with the game-authoring software in this classroom. From this perspective, Tom's arrangement in the software environment can be understood as an endeavour to position its author as a good student, with valid knowledge (because it is) in a legitimized form in the setting. It should be emphasized that this is no criticism of the teaching approach adopted; rather, it suggests that a new textual practice in the classroom generated a level of uncertainty about what could count as the enactment of a familiar concept within the English and media studies curriculum—namely, narrative. Consequently, students, teachers, and researchers worked according to textual norms more familiar within this setting (those associated with writing), in order to have some kind of index of what could be recognized as learning in this setting.

Game as the Opposite of Schoolwork

In the penultimate week of the course, students were asked by the teacher to finish off their production work in order to be able to dedicate the last lesson to playing each other's games. The teacher also demonstrated how to use the audio facility of the software, which enabled audio files to be incorporated into games. In this session, many students began their production work anew, and stopped developing the work they had achieved up to this point.

Principles of design vary in the last two sessions of the course; however, a number of games demonstrate a similar approach to audio design. This consists of deploying sound to create a counterpoint structure; in other words, sound is organized to contrast strongly with visual arrangements.

Dave and Helen's game illustrates this. Over several sessions, these two students had developed a game together. It consists of a sci-fi environment containing a number of levers; clicking on the levers causes a robot to move forward (many games have this same "mechanic" of play, which characterized the teacher's own game shown on the whiteboard). In the penultimate session, rules are added so that clicking on the levers also causes sounds to play. These sounds include the mooing of a cow, the crowing of a cockerel, and the bell chimes of a church. The aural and visual landscapes contrast with each other, the one associated with futuristic time travel, the other with pastoral existence. This makes the

sounds into aural jokes—they are humorous because they undermine the expectations set by the visual arrangement. Van Leeuwen (2005, p. 277) describes this type of linking as an "adversative extension," in that information is added in counterpoint to other items of information.

I observed in class that the teacher rarely put on headphones when examining students' games. This was because of the need to remain aware of the activities of the class as a whole while working with individual students. Similarly, the researchers' attention was given to rule-writing on screen, which meant that they did not wear headphones either. Only students wore headphones, when they re-designed and played each other's games. In class, then, headphones created a dimension of the visual space that remained out of the teacher's/researcher's view, but which became "visible" in play with peers.

In the penultimate session, Dave and Helen re-wrote the introductory message for the opening screen of their game. The one they had produced in the previous weeks is shown as figure 6.

The introductory message written in session 9 is different in tone, somewhat more redolent of a line from a *film noir* (figure 7). The dramatic tension of the original story line (the spaceship set to explode imminently) is undermined by turning it into a common situation ("it's times like these") associated with illicit behavior rather than heroic values.

The pastoral audioscape and the new opening message were designed in the session when students were told they would play each other's games. These counterpoint elements seem to have been intended for a different audience than that targeted previously: other students, as opposed to the teacher. When Dave and Helen submitted a "final" version of their game at the end of the course, they removed all sounds and the additional introductory message; the humorous, satirical elements were stripped out and the game they had designed two sessions earlier was handed in.

This layering effect is found in some computer games, which enable players to "unlock" new (sometimes illicit or humorous) resources upon completion of certain tasks. A number of games, notably the highly popular franchise *Grand Theft Auto*, have received press coverage for "hiding" material to avoid "Adult" ratings, material which is then made viewable by downloading modifying software programs.[7] Dave and Helen seem to re-fashion this convention on the basis of conventionalized classroom relations,

Figure 6   Introductory message in Dave and Helen's game in session 7. (See supplements.)

Figure 7   Introductory message in Dave and Helen's game in session 9. Carlsberg is a popular beer brand. (See supplements.)

Figure 8 Frank and John's game, session 9. (See supplements.)

and by exploiting the facilities offered by equipment necessary to manage the class (headphones). The effect of having "unsuitable" or rarefied content is achieved by satirizing and undermining the seriousness of earlier work, and work that is visible on screen—and "hiding" this illicit content from the teacher/researchers. The counterpoint structures can be understood as modality markers, which position earlier versions of the game as "work," in contrast to "play." Sutton-Smith (1997) argues that institutional settings characterized by a strong work ethic have tended to define play as "not-work"; play is established as a point of contrast rather than a specific activity.[8] Drawing on this, one can argue that earlier versions of Dave and Helen's game, those made prior to the penultimate session, are *retrospectively* constructed as "work," thereby signifying a new intended audience: other students. This audience is signified in differentiated relation to the teacher (i.e., the audience is *not the teacher*; the audience is the opposite of the teacher). In other words, the game addresses an audience that exists as a consequence of the social organization of the classroom.

Another game produced in the penultimate session is made according to similar principles of design, but enacts very different relations with the teacher,

as well as other students. Frank and John's game consists of a medley of entities, selected on the basis of incongruity: A couple of fez hats are placed on top of a robot, a match is placed on the floor on a different scale to all the other items, mines and bombs are stacked up alongside skulls and rats—the sheer number of items obscures the playing path, or what it is that the player is meant to do to stop the spaceship from blowing up (figure 8).

By linking sounds to a select number of items, Frank and John map a way through the visual medley. In the scene shown in figure 8, the only item to make a sound when clicked is the key beside the robot—this also opens the safe that enables Dr. Who to escape from the ship. The spectacle and humor of the visual arrangement is undercut by a highly restricted aural network that connects the various items to be interacted with to progress through the game. Whereas Dave and Helen use sound as a satirical counterpoint to the visuals, Frank and John present a highly heterogeneous visual (and public) environment that can nevertheless be navigated in an ordered sequence by (other students) wearing headphones. The two games enact different relations between the authors, the teacher/researchers, and the other students in the class.

Learning and Games

The analysis suggests that principles of design emerged from the historical and conventionalized relations in this setting. What was signified as a game was a function of those relations. At the start of the course, when asked to make a game, students created something that they themselves could play with (such was then the meaning of "game"). Following the teacher's and the researchers' intervention to focus production activities on the learning outcomes for the course, "game" was that which realized the teacher's instructions and imitated the demonstrated principles of design for "doing narrative." When production work was refocused to target other students, principles of design changed again to address the new audience, signified in opposition to the previous target audience (the teacher/researchers).

Significations of "game" are strategic: they realize a social purpose. The ways in which students signified their production work as "game" positioned them differently in the classroom. This was particularly noticeable when students realized a convention of commercial games—their use of "hidden" content—but "hid" different things: in one case, the illicit, subversive humor of games, in another, the tightly organized network of clues that enabled progress toward an end point. What was hidden and what was made visible positioned students differently, with one pair hiding the playfulness of games, and another which makes them playable. The two strategies evoke different meanings of game play: silliness hidden by seriousness, or vice versa. The choice of strategy had implications for students' social identity in the classroom, with respect to the teacher as well as their peers.

Sutton-Smith's (1984, p. 61) argument about the nature of play is highly pertinent in this respect: "the major meaning of social play that emerges from a review of folkloric material is that play is about power and the struggle for identity within the dominance-subordination domains of one's peers." This concept of play contrasts with more familiar beliefs about the intrinsic "fun" or motivational value of games, often noted in some educational literature. Games, from a more anthropological perspective, however, are a particular genre of social activity, concerned with the constitution of differentiated social bonds. The analysis of production work has explored how principles of design positioned students in relation to each other

and the teacher/researchers, and has drawn attention to the basis by which production work could be recognized or legitimated as a game in this classroom. Game-making in this respect has been conceptualized as a means to enact social bonds, drawing on available cultural and material resources.

Conclusion

This article started with a consideration of the ideological values underpinning theories of play, including game play in education. Choosing to focus on how games are enacted in social practices betrays ideological values too. It privileges what people do with contemporary technological objects, how they use them to realize a purpose; consequently, it does not set out to discover how education can be significantly transformed through the deployment of technology or indeed by any other means. This means that while paying attention to how technological artifacts are enacted, it is not a statement or celebration of human agency. The analysis is suggestive of the way in which familiar patterns of interaction and authority were reinscribed and reiterated in the organization of production work.

I noted in the introduction that games are often heralded as one remedy for the failure of "traditional schooling." One way of interpreting the research data would be to see them in terms of the colonization of a popular media form by the oppressive, authoritarian forces of such "traditional schooling"; students indeed did not make games that could be recognized according to many generic norms of commercial games, and in organizing their production work, realized social identities specific to the classroom. However, this interpretation assigns a particular essence to games that remains foundational across time and space. In effect, it extracts games from their context of emergence, which is precisely what "traditional schooling" is often understood to do to knowledge. If the relationship between games and learning is not to be conceptualized in terms of what games do to learners or the education system more generally, how can it be understood?

One of the limitations of analyzing the signification of games is that it becomes very difficult to make statements about what is being learned that do not reiterate a description of what is being done. This is a limitation from the perspective of those who wish to make generalized and predictive statements about

what learners can do or can understand as a result of making or playing games. It is certainly possible to interpret the data presented in this article in terms of the importance of media education, and media production specifically. Students have engaged with a media genre in productive and participative ways—in ways that would not have been possible without the software and without the opportunity or requirement to do game design. But it would also seem that students have not learned *about* the media, or *about* games, as if games or media culture were some entity "out there." Rather, the process of study and production gave rise to specific forms of games—a genre of game characterized by its history in both popular and classroom domains of interaction. This offers a somewhat different way of understanding the relationship between games and learning. Rather than learning being something that is behind, underneath, or covered by games, it can be understood as a way of describing the process by which games emerge; a way of accounting for how a game comes to be playable (including not playable). In this study, learning names the process by which students positioned themselves as particular kinds of players and designers. In this respect, "game" need not be understood as a specific kind of entity, but a particular way of interacting. The implications for understanding the relationship between games and learning therefore are that games need not be defined as a set of forms, or a type of content, but as entities whose forms and meanings are both situated and strategic.

Notes

1. The concept of enactment in ANT shares some similarities with the concept of performativity in Judith Butler's work (see notably her book on the relationship between materiality and discourse, *Bodies that Matter*, 1993). Both theorists focus on the materialization of bodies/objects in social practices and seek to undermine the dichotomy between the material and the discursive.
2. The "Making Games" project was funded by the Paccit-Link program between 2003 and 2006. The principal investigators were David Buckingham and Andrew Burn.
3. The software is now available through Immersive Education, and is called *MissionMaker*. It is currently used in over 200 schools across the United Kingdom.
4. For further details of these concepts and how they can be used in analysis, see chapters 2 to 6 of *Reading Images*: *The Grammar of Visual Design* (Kress and van Leeuwen 1996). Drawing on a grammar of visual design is not intended to focus on the visual at the expense of other modes such as the aural or the written; however, it does mean that such elements are framed

as components of a visually organized text. The grammar also needs to be modified to account for 3D interactive spaces, rather than 2D still images. This has implications for describing aspects such as spatial composition, since spatial distinctions such as front/back and left/right are to some extent a function of how a space is interacted with. Spatial layout restricts such movement in particular ways, so such distinctions are not redundant, but they are not necessarily fixed once and for all. Further details of how multimodality concepts can be reworked for analyzing 3D interactive spaces can be found in Burn and Parker (2003) and Pelletier (2007).

5. *Dr. Who* is a popular science-fiction TV series.
6. My translation. Ilinx games include funfair rides, turning rapidly round and round on the spot, going on swings, and so on.
7. See for example the BBC news website, "Hidden sex scenes hit GTA rating," July 21, 2005. http://news.bbc.co.uk/1/hi/technology/4702737.stm.
8. This definition of play, in Sutton-Smith, is characteristic of the "rhetoric of frivolity," a rhetoric of play that identifies play as subversion and nonsense, the opposite of seriousness. This definition constructs work as obligatory, sober and not fun, with play its mirror opposite. The duality of work versus play, Sutton-Smith argues, derives from the urban industrial view of work and time.

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