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## OP-ED

### Serious play

SUZANNE DE CASTELL and JENNIFER JENSON

Learning is at its best when it is deadly serious and very playful at the same time.

Sara Lawrence Lightfoot (quoted in Kafai 1995: 314)

As commercial gaming continues to thrive, there has been a recent renewal of interest in harnessing players' enthusiasm to educational purposes. But too often the result of those efforts has been what critics have labelled 'edutainment', a commercial hybrid product that is neither entertaining nor educative. And the non-commercial development of 'educational games' has been primarily in the hands of enthusiastic academics from many disciplines who frequently lack funding, skills, or access to cutting-edge technological resources. Given the constraints of attempting to design educational games for a 'consumer market' already familiar with game-playing in 3-D environments developed by well-resourced teams of programmers, designers, sound experts, and so on (expertise and resources that academics are hard-pressed to find), what neither researchers nor educational game-

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developers have so far been able to do is to create an 'educational game' that offers its players the kind of engaging, immersive play-space in which users want to stay, explore, and learn, as they do consistently in commercial games.

In the work we outline here, we first characterize educational research on gaming and game design as myopically focused on gaming out of context. We then identify what might be learned from commercial gaming, examining the ways in which education has been more and less successful at taking seriously gaming's technological possibilities for learning. Finally, we illustrate a work in progress that seeks to refuse the play/education divide in order to explore ways in which play and education can and do intersect.

### **Educational research on gaming**

Anyone seeking to understand what gaming environments have to contribute to digitally mediated educational activity will encounter a broad and diverse set of literatures, many of which can be organized into the following themes:

- *play and pleasure*, most typically taking the form of theoretical accounts of what 'play' means, its structures, functions, and outcomes, considerations of the elements of pleasure, entertainment, and enjoyment in play and games. Such work is often psychoanalytical in orientation, and is typically restricted in scope to elementary and, mostly, early childhood education (Axeline 1947, Winnicott 1971, Brougère 1999, Corbeil 1999);
- *studies of gaming genres*, which focus on making distinctions between games and subtypes of games, including articulating the commonalities and distinctions between simulations and games (Keys and Wolfe 1990, Friedman 1995, Kirriemuir 2002);
- *game-development, systems, and content points of view*, focusing on graphics, artificial intelligence, game-paths, rule-systems, and game playability (Malone 1981, Malone and Lepper 1987, Laurel 1990, Saltzman 1999, Brozik and Zapalska 2000, Klabbers 2000);
- *narrative and gaming*—often based in literary theory, this literature is concerned with analyzing narrative elements, including gaming plot-structures, characterization, setting, dialogue, and so on (Buse 1996, Sherman 1997, Frasca 1998, 1999, Rockwell 1999, Mallon and Webb 2000);
- *psychological, behavioural, and cognitive effects of gaming, especially violence*—this literature typically includes diagnostic analyses of plots, characters, gaming elements, and representations of violence for a 'violence quotient', and then attempts to build causal connections between game-play and violent behaviour in children (Greenfield 1984, 1994, Silvern and Williamson 1987, Schutte *et al.* 1988, Kinder 1991, Shapiro and McDonald 1992, Calvert and Tan 1994, Greenfield *et al.* 1994, Funk and Buchman 1996, Pillay *et al.* 1999, Van Horn 1999, Anderson and Dill 2000, Blumberg 2000);

- *gaming and gender*—analysis includes the attribution of gendered play styles and game preferences (Kaplan and Kaplan 1983, Inkpen *et al.* 1995, Kafai 1996, Brunner *et al.* 1998, de Castell and Bryson 1998, De Jean *et al.* 1999, Funk *et al.* 1999, Thomas and Walkerdine 2000, Walkerdine *et al.* 2000); and
- *constructionist theory and research*, more often a study of children as game-designers than of game-design, considers intersections between design and learning as school-aged children create their own games (Kafai 1995, Kafai *et al.* 1998, Rieber *et al.* 1998, Blanton *et al.* 1999).

This list is not, of course, exhaustive, but it serves here to organize the theoretical standpoints from which the academic community has written about both commercial and educational gaming. Of significance, we contend, is how often the ‘subject’ of this research (the game or the players themselves) is researched and written about with little, if any, consideration of context and culture; this omission has had considerable implications for how the academic community has researched and written about computer gaming.

The first thing to note about the literature briefly described here is that it is not necessary to play games in order to research and write about them; in fact, most people who do research and write about games do not play them.

The second thing to note, and this is connected to the first, is that this body of work largely overlooks cultural context. These approaches to analysis share in common a failure to situate games and game-playing within a lived culture of gaming. In gaming culture, games are not just played, they are talked about, read about, ‘cheated’, fantasized about, altered, and become models for everyday life and for the formation of subjectivity and intersubjectivity. There is a politics, an economy, a history, social structure and function, and an everyday, lived experience of a game.<sup>1</sup> It is ironic that even as researchers speak and write about games as immersive, they manage to overlook how the larger context of gaming culture is itself immersive: it enfolds and colours all of these variously researched elements. By way of illustration, we examine three dominant strands of research on gaming in education (violence, gender, and game design) to demonstrate how each systematically underplays the cultural context of gaming, and in so doing overlooks what may be both gaming’s greatest appeal for players, and with that, its most valuable lessons not only for educational game design but for education more generally.

## **Educational gaming: recalling culture**

### *Gaming and violence*

The immersive content of games and their corresponding and supporting cultures is typically ignored by studies of violence that interrogate violent game narratives or blood-and-gore content as a means to explain antisocial behaviours among youth. Focusing on game narrative or content as a means to explain the Columbine massacre or similar events forgets (as Jenkins

[1999] points out) the cultural context of aggressively policed heteronormativity with its school-sanctioned bullying and rejection and all the other ways that game scripts intersect with school rules, the insistent plot structures of everyday life in blonde, Christian middle-USA, roles of hierarchy, dominance, and subordination, the quiet acquiescence to hyper-real inequalities of family circumstance, support, care, and protection, and the unspoken world of 'good ole boys' in which the gun is as foundational a cornerstone of US values as the Bible.

Only research that looks at the *intersection* and *interpenetration* of violent video games with culturally sanctioned forms of school and societal violence can make evident how such game narratives and narratively driven practices of personal and social identification and action are deployed in their lived reality by gamers. Then researchers can begin to understand how it is that games on their own do not produce violence in gamers as an inevitable outcome, but must be grasped in their productive role as new cultural tools, forms of mediation that can activate (or suppress) potentialities already present within players' personal and social environments. One implication of this neglect of cultural context in analysing game violence is that forbidding or restricting access to violent games is no solution to youth violence. Another is that by wrongly targeting games as causally implicated in youth violence, researchers continue to disregard, and therefore to sanction, the forms of school and societal violence without which violent game narratives could not gain their foothold on lived actuality.

Too often, then, understandings of youth and violence are cast in diametrically opposed terms, with blame placed firmly either on the shoulders of the individual or on 'society' at large—and this can encompass the school, parents, teachers, video games, music, TV, movies, and more. In a paper entitled 'The Columbine tragedy: a sociological perspective', Tappan and Kita (1999) argue for an explicitly sociocultural analysis capable of elucidating relationships between human actors and actions, and the cultural, institutional, and historical context in which they are situated. Following Wertsch (1998: 17), Tappan and Kita (1999) propose that researchers must be careful not to limit their focus to individual mental or psychological functions, on the one hand, or to the social setting on the other, seeking, instead, a way to 'live in the middle' and thus avoid antinomies between individual and society and the perils of both methodological individualism and sociological reductionism.

Using a sociocultural lens to study computer-gaming culture means shifting the focus away from its current demonization and paying particular attention instead to the cultural tools it enables and involves. Without such a lens, the ways in which tools are shaped and organized are often decontextualized, either hidden by or abstracted from their particular sociocultural location.

### *Stereotyping play*

A second dominant strand of educationally focused research on computer gaming has concentrated on its gendered dimensions, questioning why so

many more boys than girls buy and play computer games. Early work on this subject focused on articulating differences in 'play styles' between boys and girls, describing these differences along stereotyped masculine and feminine binaries: boys tended to like more aggressive, violent games whereas girls preferred games in which collaboration and role-playing were emphasized. Very little has changed in gendered-based computer-gaming research since this early work—play styles are still categorized along stereotyped gender binaries. However, some of the questions researchers are asking have changed. For example, a preliminary report on children and computer game-playing (Walkerdine *et al.* 2000: n.p.) begins by asserting that there is 'relatively little research which actually focuses on game-playing by young children in a way that allows an understanding of how children are actively produced as subjects within the practices and discourses of game-playing themselves'. This is an important and interesting question, one that suggests a very different kind of analytical work than has been done previously. Significantly, however, this early question is forgotten as Walkerdine *et al.* (2000) present their research on 'play differences' between boys and girls playing computer games. They state, for example, that the girls in their study 'simply did not have the games or equipment at home to play, even though they liked the games'(n.p.), but later, when describing how boys and girls play these games, 'forget' how this fact could profoundly impact both how and what the girls 'chose' to play.

Here Walkerdine *et al.* (2000) in some sense forget (or do not take into account) that the boys they studied already played and used games, whereas the girls in their study were restricted by their parents (in ways in which the boys were not) to playing 'educational' games and programs on a parent-controlled computers, a difference that could significantly impact what they liked to play and how they played. It is as if in their documentation of game-play researchers become seduced by the already familiar analytical categories (what boys and girls 'like') and thereby bypass what is spectatorially present both in their research and in their explanation/s of that research: an already well-established game-playing culture for boys. One part of what is overlooked, then, is an articulation and acknowledgement of how cultural stereotypes and practices position boys with knowledge and access to a certain kind of 'play', a position that girls cannot readily take up or occupy.

### *Learning by design*

Educational research into game design patterns and preferences, like findings of gendered game preferences and play styles, and like studies of violence in games, has equally tended to under-interrogate cultural context. For example, the finding that boys tend to create violent action games which strongly resemble commercial games, whereas girls more often create games which involve educational activities (Kafai 1995) underplays the importance of boys' far greater familiarity with commercial games and girls' restricted access to all but educational games and activities. Similarly, the finding that student game designers tended not to integrate educational content into the

game narrative or activities, but instead required and extrinsically rewarded correct answers to simple factual questions, reflecting a concern primarily with learning outcomes and not necessarily with building knowledge, overlooks the probability that this might be precisely what the students see their teachers doing, and what 'education' has come to mean to them. Interestingly, this is also very much the pattern followed by *professional* educational game designers, suggesting that this approach has more to do with the dominant cultural (op)positioning of play and education than with any features of children's constructivist learning through design activities. Investigating the culture of gaming as against the culture of schooling permits researchers to see how students' game design activities are embedded in background knowledge about the everyday work of the classroom, and may remove a great deal of the mystery about the appearance of extrinsic rewards structures for simplistic and superficial computation and reductively factual responses to direct questions in student-designed games.

So why is attention to the cultural context of gaming left out of accounts on educational research on games? The reality is that gaming is—for all but gamers themselves—not a popular, but in fact an *unpopular* culture. For those who do not actually play games (significantly, that means most who research and write about them in academic contexts), games represent at best a childish pleasure long since left behind, and at worst a threat to every position on the home front: children obsessed and bewitched, partners distracted and preoccupied, money spent and time wasted. Dominant here, then, is an approach to a study of culture that begins from the premise of its negation, and this is why current educational research on games and gaming may not actually tell researchers all they need to know, and why so much of what it does purport to tell them may be mistaken and misleading.

Seen from this wider cultural context, it is no surprise that teachers are often vocally opposed to computer-based gaming. For teachers, these games represent not only something they do not know, but also something potentially subversive and antithetical to education's purported goals—play is something regulated and relegated to spaces outside the classroom where 'real' serious learning is meant to occur.

### **Learning from commercial games**

What if education were to take seriously the immersive possibilities of games for learning? How is immersion antithetical to schooling but not to learning? What if we were to shift the focus from the issues that have preoccupied educational researchers' studies of gaming (i.e. violence, gender differences, and constructivist learning) to ask instead how we might take seriously the importance of play for education? What might it mean to allow gaming to drive an *educational* agenda, asking how we might better harness its possibilities for educative ends?

The commercially, financially, and certainly (for boys and men) culturally successful world of electronic gaming, both console-based (i.e. 'Nintendo', 'Sony PlayStation', and 'Xbox') and computer-based, can offer

important strategies for education. When we compare, for instance, how games ‘teach’ their tools and techniques to players with the ways classroom-based instruction teaches subject-matter knowledge and skills to students, we see several differences. Gaming deploys interactivity rather than display and exposition; its focus is on negotiating an immersive environment rather than on stand-alone task completion. Games use a narrative rather than a propositional organization, and in game-play activity structures replace epistemic/disciplinary structures. Subject positioning and character formation in game contexts are accomplished through role enactment rather than self-representation, and gaming provides for its players a very different politics of engagement that shifts the experience of locus of control from teacher or educational program (‘feedback’) to the player (‘consequences’). Finally, games afford players a greatly enhanced quality and kind of freedom: the gaming culture encourages and enables solidarity beyond/outside the game (chat rooms, bulletin boards, etc.) *with the player, not the teacher or program, having autonomy over the interaction (the degree, kind, with whom, etc.).*

The sum of all these elements is a form of playful immersion within an environment that places the player in control of his or her character and its activities, although much must be learned within and about that environment in order for players to succeed in the game. Gamers navigate through a complex environment in which learning is incidental to and a by-product of their action and interaction *both within the game environment and beyond it*, as they participate in chat and help-seeking, both on and off-line, to compete, collaborate, discuss, and fantasize about the game and their roles in the worlds it makes real, tangible, and even tactile. This phenomenon is sometimes described as ‘stealth learning’ whereby players learn subliminally or incidentally through rule structures, tasks, and activities within the game (Prensky 2001: 24).

In the next section, we examine how education has taken up these potentialities, focusing on the ways in which the importation of traditional classroom rules, roles, and relations ends up subverting and undermining the cultural and imaginative possibilities of gaming for education.

### Teaching educational games

Since the early 1980s when it began to be clear that computer games might gain increasing cultural significance in the North American market with games like *Space Invaders* and *Pac-Man*, education began to take notice (e.g. Bowman 1982). Since that time, there has been a struggle for an educational game that can capture, in the ways in which commercial gaming has been so successful, the forms of engagement with and imagination of its players. Over the last 25 years, no educational game has achieved singular commercial success, although a few games that claim to be educational can also boast some commercial success, e.g. *Where in the World is Carmen San Diego?* or even school-based success, e.g. *The Oregon Trail*.<sup>2</sup>

That is not to say that commercial success is the marker of a ‘good game’, but what it does indicate is the extent to which a game has



successfully captured a popular cultural imagination. Taking serious note of both commercial and educational games, we investigate what is happening operationally that is similar between, as well as what is necessarily different, across these two approaches to play.

Maria Klawe, senior developer of Electronic Games for Education in Mathematics and Science games at the University of British Columbia in Vancouver, Canada (EGEMS 2003a), stated in a public lecture that the 'most common problem with educational software is that students don't pay attention to or learn the way that designers intended' (Klawe 2000). This viewpoint is of interest because commercial developers look at software uses from the standpoint of game design. Their concern is with what the design enables or prevents, not what the user does 'wrong'. In educational game design, by contrast, it is the students who are implicated, not the developer's own designs. The status differential between 'student' and 'purchaser' allows and encourages a very different analysis on the part of commercial and educational developers and, therefore, quite different approaches to troubleshooting game design—with negative results for the playability of educational games.

In educational games, accordingly, design features imported into computer-gaming environments from traditional classroom curriculum design-and-delivery contexts function handily as justifications for diminished attention to playability—and as disincentives to *educational* engagement (Rieber and Matzko 2001). Central among such disincentives are an insistence on developmental assessment whereby players cannot 'move on' in the game until they complete, in linear and lock-step fashion, particular tasks and/or skills; no potential within a game for chance/luck and no room for intuitive leaps or 'twitch-speed' perception and skill; few opportunities for learning through imitation or collaboration, where players can work together through a differential distribution of competence based on players' interests, prior abilities, and particular talents; no game-based reason to dwell in and develop familiarity with the game environment; and few opportunities for instant feedback/pleasure/gratification. Finally, educational games are primarily non-consensual—students 'play' them because they are told to, the rule system is not one that they have agreed to, and so the constraints of the game do not become something to play within, but something to kick against.

Importing such values, assumptions, and strategies from education into gaming cultures has meant that educational software and, more recently, educational game design, has *not* been hugely successful at taking up and exploiting the resources digital technologies make available for learning. Although drill and practice-oriented feedback systems are increasingly being replaced with integrated 'learning environments', education has not been able to realize the immersive possibilities of new digital resources, which, as Murray (1998) has pointed out, constitute the defining experience of digitally-effected virtuality. Entering an immersive environment means being willingly engulfed, enfolded, contained, and yet at the same time free of familiar worldly, ideological, and even bodily constraints. On entering a virtual place in a virtual body, what becomes important is motion through time and space, rich perceptual possibilities, both auditory and visual,

illumination that renders some areas more and less visible, the patterning of zones within the environment, the ways both objects and activities define the organization of that environment, and the fact that all of these are navigable, so that player agency is paramount. Immersion, although it requires a form of submission to rules, involves a *willing* suspension of disbelief and a conscious and voluntary acceptance of the particular conditions of the virtual environment which, paradoxically, gives its players in return unrestricted access to possibilities for full participation. Educational games are not like this, and for at least two reasons.

First, whereas commercial gaming is extremely successful at building in problem-solving kinds of tasks and puzzles that are relatively seamlessly integrated, more dependent on, and more informed by the 'back drop' of the game (so that they are better supported both by the narrative structures, by characters, and by the rules that govern game play), educational games consist in a structured series of puzzles or tasks embedded in a narrative structure with which they have, typically, only the slenderest of connection. In the EGEMS (2003b) game *Avalanche*,<sup>3</sup> for instance, a player climbs a mountain of mathematics puzzles to get some data; climbing the mountain is not itself the process by means of which a player acquires the data because there is no relation between climbing, the mathematics puzzles, and the data, apart from a purely extrinsic one. In this respect, *Avalanche* typifies education's uses of gaming: the forms of rationality and conceptions of value are primarily instrumental rather than intrinsic. Just as 'interactivity' was deployed in earlier computer-based educational program development, nowadays gaming and play function in educational software design as extrinsic, decorative, and primarily motivational elements. Play is an enticement; it induces reluctant participants to perform learning tasks that are structurally posited in the game itself as unpleasant.

A second reason for education's failure to exploit commercial gaming resources is its inability to permit or support freedom of movement in space, whether actual or virtual. Immersion, paradigmatically an experience of fluidity, of limitless navigability and full participation, is antithetical to the kinds of rigid structures, boundaries, and 'no-go zones' that define access to and engagement with schools and schooled knowledge. Adopting socio-cultural theory as a frame for understanding immersive environments as space makes visible the ways in which such environments *must* fail in their educational goals, and the ways in which commercial game environments retain their capacity to make 'stealth education' a reality. In commercially successful games, players are rendered into visible game characters and provided bodies, vantage points, positions, and movements in and through locations that give them greater access to the resources of the virtual world. They increase and expand their competence within that world, mastering its demands, learning skills of navigation and operation, increasing their familiarity with the environment, building up structures of expectation, and mastering tools and resources to realize goals they themselves desire. These affordances increase the likelihood of users becoming what Lave and Wenger (1991: 29) call 'full participant[s]', that is, competent members within the game environment seen as, again in their terms, a 'community of practice'.

As users are *denied* access to tools, overlooked, restricted, or otherwise rendered invisible in all but a narrow band within the programmed environment, sequestered away from most of its knowledge resources, and denied access to unauthorized participant structures with/in the games' activity-structures, their opportunities to gain experience in a full range of roles necessary for full participant status are diminished. In terms of sociocultural educational theory, then, it is easy to see how and why commercial games' *unrestricted* access to identities, positions, tools, resources, and activities offers players an immersive environment optimally conducive to the development of competence. On the other hand, education's restrictive lock-step linear developmental progression within a purportedly game-like environment makes immersion impossible. Like school itself, where constant interruptions by teachers, authorized *de jure* to do so under any and every circumstance, make students' immersive engagement in reading, writing, painting, even just thinking, virtually impossible, so the continuous interruptions that define so-called educational play-space make the intensely pleasurable sustaining illusion of immersion impossible, and with this loss the educational benefits of game play are given up as well.

### **Can 'play' and 'education' intersect? The 'Ludus Vitae' project**

The *Ludus Vitae* project (its name, in Latin, means *both* 'school' and 'game of life') seeks to bring play and education together in an ecology-focused, character-driven, online gaming environment.<sup>4</sup> It is briefly described here in order to illustrate a response to fundamental challenges of designing for 'serious play'. Questioning what educational purposes are served by driving a wedge between work and play, learning and pleasure, discipline and passionate intensity, the premise of the *Ludus Vitae* project is that a reclamation of the classical connection between 'learning' and 'playing' is long overdue. Our central purpose as curriculum designers, accordingly, is to understand what gaming environments have to contribute to digitally mediated educational activity, and to harness those capacities and reorient them to educative ends. But this is unlikely to be realized by tacking on traditional school-defined learning outcomes to unrelated computer-based stories and puzzles.

In what follows, we detail the particular challenges the *Ludus Vitae* environment is engaging with in its ongoing development. These are:

- redesign from the prototype's 2-D to the 3-D graphical environment which players of commercial games have come to expect;
- creation of a set of rich, fully navigable immersive environments;
- game play from a first-person perspective, with player agency paramount, and players given full control over character choice (with characters able to be modified by players), setting, tools, challenges, and goals for character development;

- maximum freedom of movement with no lock-step linear barriers, no add-on learning tasks, no puzzles or quizzes, and no evaluation;
- equal rewards for skill development (e.g. speed) as for content mastery;
- all learning narratively embedded, with use of interactivity, not exposition, as the basis for learning; encouraging player solidarity, collaboration, and communication beyond game play itself by providing both a bulletin board (for posting questions, tips, and ‘cheats’), and a chat function in the larger gaming environment; and
- attention to maximum inclusiveness in all stages and aspects of design, not only gender inclusiveness, but also non-stereotypical inclusion of culturally diverse characters, including opportunities to design and role-play ‘flawed’ characters as well as ‘virtuous’ ones.

Where this project’s approach to educational game design differs from others discussed here is in its refusal of instrumentalist means-to-ends deployments of gaming resources for learning. Instead, we see play and learning as mutually constitutive, and their conjunction, therefore, as transformative of both. Game play, at its best and most powerful, is engaged seriously, with effort, commitment, and determination; and this, like any serious engagement in learning, affords pleasure, excitement, immersion, and playfulness. Our working assumption is that students/young people can find intense pleasure in the pursuit of ‘real’ knowledge for ‘real’ purposes, but that existing ‘educational games’ trivialize students’ goals, abilities and forms of engagement, and leave little room for their participation in authentic knowledge-generation.

We therefore seek to create an environment that is immersive and affords multiple locations and paths freely navigable by players, to create characters who (though not always likeable) are powerful, changeable, and never stereotypical, and to devise content that is bounded and defined, not by school subject divisions or academic disciplines, but by activity structures intrinsic to the game narrative, its themes, and its purposes.

In designing characters we are attempting to build, intertextually, upon the well-established archetypes and scripts that gaming culture has established, and in our plot structures we exploit contemporary cultural knowledge, skills, and critical questions and problems that affect students’ lives within and beyond school. To recognize in our design the critical role of lived cultural practices in sustaining engagement in a digitally effected ‘virtual’ world of the game, we have created a macro-structure within which the game is embedded and which supports supplementary game-related forms of cultural activity, using chat and information functions as well as web-based communications with both peers and resource persons from a range of specialized fields, knowledge of which is a requirement for various aspects of game play.

Supporting participatory design, the game offers a program ‘shell’ in which the centrally developed formal game structure can be appropriated,

adapted, and built upon by local user-groups (e.g. teachers and students) to develop their own custom-built curricular units, which can then become a formal part of the central game. This structure is a vehicle to invite and enable users to become partners in the design and development of their own educational resources, as well as to contribute to the larger 'community' of the game.

Content is built into the game primarily through occupationally-based activity structures and character options which are both dynamic and pre-scripted: they are under the player's control, but have a delimited<sup>5</sup> repertoire of dispositions and abilities as a function of users' initial (and ongoing) vocational, occupational, and disciplinary choices. Characters can alter as well as develop as a result of players' tactical gaming decisions through their engagement—and this is the critical educational dimension—in a variety of research and 'knowledge-building' activities. These activities (simulated expeditions, experiments, conferences, practical dilemmas, and technical challenges) exploit digital tools and call upon *both* traditional text-based and web-based networks and resources, and encourage curricular integration of new educational technologies without the disintegration of traditional ones. The game itself poses challenges and dilemmas<sup>6</sup>—not quizzes or 'puzzles'—within linked 'activity settings', representing levels and kinds of engagements (confrontations/challenges) with critical ecological problems and themes.

Our central purpose is to engage learners as agents and architects of their own education through their pursuit of forms of knowledge and skill seen as 'really useful' to them, but whose pursuit is as pleasurable, rewarding, and engrossing as it is practical. The goal of the *Ludus Vitae* project, accordingly, is to design tools as toys that train players in skilled ways to bring local educational needs, resources, and practices into play. Teaching with technology does not mean either the abandonment of well-proven educational tools and pedagogies, nor the abandonment of the local, face-to-face, embodied practices of teaching and learning that can make education a pre-eminent means of social solidarity in a time of pervasive, and often technologically accomplished, fragmentation and alienation. Rather, we are working to create a resource in which centralized and dispersed design and development, face-to-face and computer-mediated interaction are interwoven in lived cultural practices—a resource that creates new digital networks, not a 'cyber-mall' of commerce and consumption, but what Illich (1973) called a 'tool for conviviality', a place to meet and work and imagine and create.

What stands in the way of this project's success, and the success of similar educationally focused projects, has little to do with any failure to meet what are admittedly difficult challenges; it has to do, instead, with what it neither promises nor even attempts. What a game like this does *not* try to do is to track users in ways that generate accountability systems and structures pre-scripted by school-based learning practices, outcomes, and goals. The fervour with which testing and tracking systems are insisted upon by educational authorities bent on the pursuit of outcome measures whose value and significance are presumed as an unquestioned good is the greatest impediment to creating the kinds of educational games we have tried to indicate are possible and desirable. This demand for measures and

'indicators' of national educational 'excellence' for economic 'competitiveness' forgets that there is absolutely no educational value, and much that is lost to educational engagement, by their deployment as essential goals of educational technology. There needs to be far more consideration given to what precisely it is that such testing and tracking of school-defined learning tasks is purported to accomplish, educationally, for learners working in a convergent digital medium, a medium that operates transformatively upon contemporary knowledge, skills, and representational apparatus, such that both these traditional tasks, and indeed their physical location within schools and classrooms, are being superseded by interdisciplinarity, multimodal literacies and computer-based learning tools and resources. Only when educational authorities relinquish outmoded conceptions and practices of tracking explicit, readily measurable, and documentable 'learning outcomes' as the primary, if sub-textual, goal for computer-based educational gaming (rendering the concern of educational computer-games learning in its basest of forms), and attempt instead to make use of the nuanced and obvious affordances of new digital tools to create immersive environments that prioritize the functions, capacities, and the skills and learning opportunities of play, will there be real hope for, and real prospects for educational game design to learn from the path-breaking innovations of its market-based counterparts.

While we acknowledge that the fiscal, imaginative, and skill-based resources available to designers of commercial games far outweigh what is typically available to and possible in education, what we are precisely *not* arguing is that this should be thought to be an inescapable impediment to development. In fact the best games, from the simplistic and still-played early versions of *Pong* and *Space Invaders* to the recent best-selling 'PlayStation II' game, *Grand Theft Auto: Vice City*, are immersive, not necessarily because of their stunning graphics or sounds (which *Pong* and *Space Invaders* certainly do not have), but because they engage players in ways which are pleasurable, stimulating, and challenging, and which reward, more or less immediately, players' knowledge acquisition and skill development.

We have tried to argue here that educational game development has forgotten what commercial gaming exploits, fosters, and well understands—that games are fun and engaging because players are not continuously 'held back' but are instead encouraged to develop skills quickly (that is, learn within the environment of the game) and are rewarded within the rule and game structures; and that gaming is not a discrete activity or set of activities, but a culture and for many people a whole way of life, in just the same way that education (although probably not schooling) can be.

Educational game design will be better able to learn from commercial games and gaming how to use these rich resources for educational purposes only when it relinquishes its grip on users, abandons its insistence on testing and tracking and record-keeping, opens up its game paths and activity structures, and learns to build in challenges and activities more seamlessly integrated, more dependent on, and more informed by the 'backdrop' of the game—that is, actively supported by the game's narrative structures, by its characters, and by the rules that govern its play both in virtual spaces and in the lived cultural environment of its players.

The cultural environment of schools today is, in many ways, antithetical to the immersiveness of play—it insists on timed activities (no room for ‘losing track’ of time by being absorbed in reading a book or solving a mathematics problem); curriculum is designed mostly to ‘survey’ a subject area, with little opportunity to study one or two subjects in depth; and goals and immediate feedback (both punishment and rewards) are often held back from students in institutionally sanctioned power struggles between students and teachers. In commenting on the design of an educational computer game, Rieber and Matzko (2001: 16) define ‘serious play’ as ‘purposeful, or goal oriented, with the person able to modify goals as desired or needed. Most important, the individual views the experience of serious play as satisfying and rewarding in and of itself and considers the play experience as important as any outcomes produced as a result of it’. Serious play, then, is a process of immersion: the players’ attention, fully engrossed and absorbed in the activity results in significant learning. As such, serious play and schooling are frequently at odds.

What might it mean to create and sustain an *educational* gaming culture drawing upon the powerful tools of the current culture of commercial gaming, both online and off-line? What if we began a game design project by asking not how we can include extrinsic educational components which we then force players to complete in order to advance in the game but by asking how we can devise educative components that immerse students in the least pedantic, the most demanding, and the most engaging forms of intelligent participation in fields and forms of human endeavour? We might then be better positioned to understand just how educational serious play can be. In pursuing learning activities whose value resides in the engagement itself and not in the profits it accrues for—and from—the learner, we might begin to reclaim from a pervasively commercialized institution of formal schooling the education it appears increasingly to have abandoned in favour of the development and credentialing of job skills. Ironical and fitting, indeed, that it should be through play that educational goals might now be recovered and reclaimed.

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### Notes

1. In the 1980s, computer and video-gaming culture was frequently written and theorized about in the context of the arcade—a public space where researchers observed young men (primarily) playing arcade and video games (Haddon 1988). This work argued that arcades developed and sustained a separate ‘youth culture’, and a number of studies framed game-playing as ‘delinquent’. In the early 1990s with the reintroduction of game consoles (‘Nintendo’, ‘Sega’, and later ‘PlayStation’), video game-playing moved back

- into the home, and with it, we want to suggest here, went the 'easy access' of researchers to observation and documentation of video game culture.
2. The commercial computer games referred to in the text are: *Grand Theft Auto 3* (2002) (New York: Rockstar Games); *Pac-Man* (1980) (San Jose, CA: Namco); *Pong* (1999 [1966]) (Beverly, MA: Hasbro Interactive); *Space Invaders* (1999 [1978]) (Santa Monica, CA: Activision); *The Oregon Trail* (2001) 5th edn (Novato, CA: Broderbund); *Where in the World is Carmen San Diego?* (2003 [1985]) (Novato, CA: The Learning Company/Broderbund).
  3. This is just one of many such examples and is not meant in any way to single out this game or its designers.
  4. See, for example, de Castell *et al.* (2001). This project was initially conceived and prototyped in August 2001, and is currently undergoing redevelopment.
  5. Broadly speaking, character specifications have an 'epistemic basis' in core disciplinary frameworks that make up the public school curriculum, further enriched by the inclusion of forms of participation, activity structures, and users' occupational choices and experiments. Players select (but they can also create, using unscripted elements) diversely different and distinctive game paths as they research, network, and react to game challenges and constraints.
  6. Prototypical examples would be ecological 'crises' like the phenomenal rate of destruction of reef environments, and in particular the death of corals in those environments, or the problem of controlling particular insect infestations that threaten agricultural production without destroying desirable species of insect life in that same environment.

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