From Simulation to Imitation: New Controllers, New Forms of Play

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ABSTRACT

In this paper, we briefly outline some of the early research in the field of digital games and education that attempted to answer the question of what and how people learn from playing games. We then turn to the recent revolution in gameplay controllers (from the classic controller to the touch screen, Wii wand, plastic guitars, microphones, mini-tennis racquets and plastic drums) to argue that gameplay has only just undergone a significant epistemological shift, one that no longer sees gameplay as the simulation of actions on a screen, but instead enables imitation as the central element of gameplay, perhaps effectively for the first time giving players access to a form of play-based learning relegated to the very young. This radical modification of the way games are played, from simulation to imitation, has already attracted new audiences: in Japan, female players exceed male players on the handheld Nintendo DS, in the U.S. and in Canada and elsewhere seniors' homes are purchasing the Nintendo Wii (with its suite of sports and fitness games) to encourage residents to exercise, and since December 2007, when Rock Band deftly beat out Guitar Hero as everyone's favourite game in which players form a band and play using a "guitar", drums and a microphone as controllers. It has never been so obvious that playing games is not a "solo" act: the player is both acting and acted upon by the technology, and his/her play is very much situated within a broader network of actions, actors and activities which are community-based and supported. The question of what and how players are learning in games has been at the forefront of research on education and gameplay in the last several years when we began to ask what and how people learned from playing commercial entertainment-oriented digital games. Long viewed as artifacts of an "unpopular culture," particularly by educators and educational theorists, commercial videogames are now recognized as highly effective learning environments where player (as learner) agency is paramount, and where the acquisition of knowledge and competency is infused in engaging and pleasurable play, not a prescribed task (de Castell and Jenson, 2003, 2005; Gee 2003, 2005; Prensky, 2006; Squire, 2002).

As such, the primary argument for the paper will be to examine new controllers not as simulative experiences, but as technologies of imitation that support players' embodied competence, rather than players' ability to simulate such competence. This hitherto neglected distinction appears to lie at the heart of ubiquitous claims for the power of learning through game-based simulations, and propose that framing inquiry in the terms of what are distinctively meant and offered by simulation and imitation to be a critical conceptual tool for developing theories and practices of digital game-based learning. Whose conflation is at the heart of ubiquitous claims for the power of learning through game-based simulations.

Author Keywords
Play, digital games, hardware, learning environments, education

INTRODUCTION

One of the central questions for education in the 21st century is how best to prepare young people to act and live in a complex world that is constantly remediated and remediating through the use of technologies, in other words, how best to act within a network where there are not only other actors, but where technologies (artifacts) and environments are also significantly present, and are both acted upon and in action. Working in the field of science and technology studies in the 1980s, Michel Callon and Bruno Latour developed a theory that insists on the agency of humans and nonhumans working together both materially and semiotically. Actor-network theory (ANT) attempts to elucidate the relationship between actors and things, illuminating their inter-dependencies, their inter-actions, and the encompassing "support networks" for too long overlooked in androcentric theories of human action (Latour, 2005). Given that technologies have taken on a greater and more inter-dependent role in the lives of young children as well as adults, ANT offers one way of untangling and understanding their threats to and promises for teaching and learning.

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In this paper, we tentatively explore relationships between and among game players and games, using ANT as a means of elucidating some of their complex articulations. We hope to tease out a distinction between simulation and imitation, and indicate how this distinction illuminates an understudied transformation in digital game-based learning, a transformation brought powerfully into play with the emergence of a burgeoning variety of new game controllers, which has particular value and importance for educational applications of digital game-based learning. This second line of inquiry, accordingly, draws on educational theory as well as foundational work on simulation games and gameplay.

JUST PLAYING?

As professors working in faculties of education for the past ten years researching digital gameplay as well as the design and development of games for education, we have often been asked about their educational worth in terms of the question: "Are digital games good or bad for children?" Much like other similar questions that have been asked for decades: "What is literacy?" or "How is reading best taught?" or "What makes a good teacher?" the answer is a resounding "It depends". The most useful questions are not so much whether or not digital games are good or bad for children, but how we are understanding and constructing both educational values, and what we mean by 'game'. Less ambitious but more productive questions could be something along the lines of: "What is so compelling about this medium that even young children are willing to devote hours and hours to complex, demanding and challenging forms of computer-supported play?" and "While playing, and in order to play, what might players be learning and how are they learning it?" The discourse of good/bad is always a slippery one and no one seriously wants to argue that eight year-olds should be playing games that are targeted and rated for adults, nor that they somehow are intrinsically "good" or "bad". Digital games, as with television, film and books in the past, merit study, and indeed rightly deserve much of the attention devoted to them lately. This is not to deny that access to and actual use of digital games is far from ubiquitous: girls and women, for example, continue to be under-represented as players and are woefully few in the industry (latest figures from the International Game Developers Association (IGDA) put the number of women working in the commercial games industry at 11.5% - http://www.igda.org/diversity/report.php).

The difference new controllers make to who plays, what players can learn from games and how, is particularly interesting in relation to the demographics of access and use. This recent revolution in gameplay controllers (from the classic controller to the Wii wand, plastic guitars, microphones, sports equipment, plastic drums, and beyond) represents a significant epistemological shift, one that no longer sees gameplay as the simulation of actions on a screen, but instead invites and enables imitation, a form of learning often relegated to the very young, as the central element of gameplay. This radical modification of the way games are played is productively seen, we propose, as a 'paradigm shift' from simulation to imitation, one that has already attracted new audiences to digital game play: in Japan, female players exceed male players on the handheld Nintendo DS, in the U.S. and in Canada and elsewhere seniors' homes are purchasing the Nintendo Wii (with its suite of sports and fitness games) to encourage residents to exercise, and since December 2007, when Rock Band deftly beat out Guitar Hero as everyone's favourite game in which players form a band and play using a "guitar", drums and a microphone as controllers. It has never been so obvious that playing games is not a "solo" act: the player is both acting and acted upon by the technology, and his/her play is very much situated within a broader network of actions, actors and activities which are community-based and supported.

EDUCATION AND GAMEPLAY

In his early work on how players learn from videogames, James Paul Gee went so far as to specify a series of "learning principles" that commercial videogames enact. Learning in videogames, as Gee and others argued, is not accomplished through the delivery of content, understood as abstracted "facts;" rather meaning and significance arise through the player's activation and negotiation of images, objects, events, and so on, in specific situations of challenge. Gee challenges classrooms to imagine similar kinds of "teaching". Alongside their ability to contextualize and embody meaning through player agency and exploration, videogames also provide good models for understanding the educational problem of "transfer," where solutions to an earlier problem require modification in the face of a new challenge. Transfer, Gee explains, requires that learners identify the similarities and differences between two sets of circumstances; while schools often deliberately structure such situations, he notes that "direct" transfer rarely happens in "real life". Videogames, however, excel at offering a range of circumstances that call for the continual updating of previously learnt strategies (either from the same game or, as importantly, from other games) in order to move on in the game. That these challenges are often framed as urgent "life-or-death" situations, and that the consequences of a poorly modified strategy are often immediate, means that players must reflect on and innovate previous solutions "on the spot" (Gee 2003, p.127).

More recent work has focused on *what* players are learning through playing Massively Multiplayer Online Games (MMO's), outlining the "traditional" literacy demands (reading, writing, posting comments) of playing, and some of the "higher order" reasoning skills that are publicly displayed by extremely experienced players (Steinkuhler, 2006). Gee, writing about "good" commercial games, further argues that what is so compelling about them is that they can indoctrinate players into specialized, higher order discourses, something that continues to be the most difficult challenge of traditional literacy schooling. For example, I

might never actually skateboard, but if I play a game like "Tony Hawk" long enough and gain enough skill in it, I will become familiar with all the specialized moves, all the specialized language that constitutes skateboarding, having never played. In other words, I have moved, through simulation of a skilled practice, from tacitly knowing that skateboarding involves a skater and a board, to mastery of a "semiotic domain" in which I am able to discuss, think and learn about, and generally share a culture of skateboarding even with those who are professionally trained, all by playing a video game. It has been argued, with considerable money, both public and private, invested in that argument, that physical skills can be acquired through simulated play in a range of videogame-based sports environments. Then there's the controversial argument that first person shooter games both can and do support the development of highly accurate weapons skills (Grossman, 2000). This has challenged many of us to attempt to see if we can build compelling *educational* games that might move someone from novice to expert status, not in the worlds of skateboarding or warfare, but perhaps in history, mathematics or science. So, there are those who veer away from commercial games, and are attempting to construct games that are both fun to play and educational (Ciavarro, Dobson & Goodman, 2007; de Castell & Jenson, 2007; DiPaola & Akai, 2007; Droumeva & Wakkary, 2007; Levy & O'Brien, 2007; Watters, 2005). What is significant here from an educational standpoint is that digital games are understood as far more than just entertainment: they are studied as artificially intelligent spaces where people collaborate, problem solve, read, strategize, communicate, participate, and act together both inside and outside a game and its rule structures and are doing so in increasingly greater numbers.

WHAT PLAY HAS MEANT: FROM SIMULATION TO IMITATION

As we know, digital games have customarily been played one of two ways: a single player sitting at desk in front of a computer screen using the keyboard/mouse/"joystick" as input devices, or by sitting around a screen (usually television) and using a gamepad/controller to interact with the game and through the game, with other players. In both cases, the player's actions were to press keys, mouse and/or buttons and that action was "translated" into an on screen simulation of action by the player's character/avatar. For example, in order to make Mario jump over the cartoon-like mushrooms (Goombas) in *Super Mario Bros.*, a player would click the correct button (either on a keyboard or on a controller) and Mario's simultaneous corresponding action would be to jump. In this way, the action of jump (or walk or run or shoot) is a *simulated act* that is synchronized with the correct input cues from the player. There is of course an entirely arbitrary relation between the player's actions ("press A", for example, and Mario's jumping.) A button press is the technologically mediated means to the avatar's jumping, but it is of course, nothing like the jumping. A button press bears no resemblance to a jumping event. Button pressing is the action whereby jumping is simulated, and by simulated jumping we mean, with respect to the player's action, a kind of 'as if' jumping. The player presses a button, and it is 'as if' the player made that character jump. Not insignificantly, in the past few years, input devices have radically changed, and this has resulted in a very different form of gameplay with a very different relation of player action and game event, one that, seen from the standpoint of actor network theory, may greatly alter how we understand and use digital games for education.

Simulation games such as flight simulators and racing games and/or "simulative" exercises like *Sim City* are widely acclaimed as effective training environments: race car drivers practice "real" race courses in video games (Doerr, 2008), pilots train to fly (Lee, 2005) and for centuries war games were simulated to train for battle. Simulation games have most typically had two intersecting goals: a simulative experience that is as ("as if") real as possible, and a goal-based "play" experience. Meyers (2003, p. 7) suggests that in this tension between "real" and "play" or simulation, "the real" in digital games often gives way to entertainment. In other words, as Apperly (2006) further develops: "Within this [discussion on simulation games] is often the assumption—or the promise—that the game is "authentic" to the "real" activity, that the game will be a relatively accurate simulation, which does not subsume the authenticity of the simulation entirely within the demands of entertainment" (p. 12). What is key here is the promise of a simulated "real world" experience, one that engages the user through play. Yimalz, et al. are even more direct, stating:

> Simulation has two meanings:(a) imitation and (b) goal-directed experimentations with dynamic models (Ören, 2005). Simulation games are used for entertainment and for training purposes. The role of simulation in entertainment games is to provide real-ism. In this case, simulation denotes imitation of the intended world, real or imaginary. (p. 340)

On this view of things---a characterization whose important flaw we will later contest--simulation games have, through 'imitation of the real traditionally attempted to simulate behaviours and attitudes in the "real world" (Williams, 1980).

In education, imitation has always had a central role: young children imitate adult behaviour, and students imitate the knowledge and attitudes of their teachers (within limits). The same is true of religious education, paradigmatically e.g. for christian schooling, it is exhorting the "imitation of Christ" and asking children to pose the guiding question "what would Jesus do?" It is in part through the imitation of attitudes, dispositions and behaviours that people are understood to be socialized, and it is through the process of

imitation that we so often recognize people as having "learned" something.

Imitation has a long history of theorization, stretching back to early Greek culture where "mimesis" (imitation) was viewed as a form of representation. While for Plato, mimesis was a deterrent in the search for authenticity, or the "real" (Sullivan, 1989), for Aristotle, mimesis is: "inherent in man from his earliest days; he differs from other animals in that he is the most imitative of all creatures, and he learns his earliest lessons by imitation. Also inborn in all of us is the instinct to enjoy works of imitation" (Poetics, 1898/1998). For Aristotle, mimesis was central to our understanding of the world, as Puetz (2002) explains:

> Mimesis not only functions to re-create existing objects or elements of nature, but also beautifies, improves upon, and universalizes them. Mimesis creates a fictional world of representation in which there is no capacity for a non-mediated relationship to reality. Aristotle views mimesis as something that nature and humans have in common - that is not only embedded in the creative process, but also in the constitution of the human species. (n.p.)

While it is not within the scope of this paper to provide an extensive overview of theories and conceptions of mimesis, subsequent work on mimesis by theorists such as Walter Benjamin and Theodore Adorno underscores the importance of understanding representational forms (poetry, art, language) as fundamentally inseparable from "the real". Whereas simulation is "as if" real, however, imitation is "just like" it, which is to say that simulation depends, conceptually, upon the absence of the real, while imitation depends upon its presence, as a model upon which one seeks to be or to make something 'just like' it. In this sense of intrinsically requiring presence, Adorno observes that "mimetic behavior does not [just] imitate something but assimilates itself to that something" (1984, p. 163).

What we think is significant here is that while theories of simulation and gameplay include—and we would argue, mistakenly include--- imitation as a kind of "outcome" or "practice" that defines a simulation game, it is not therefore the case that such imitation *simulates* reality, rather that imitation is *modeled upon* it. To put it another way, imitation (mimesis) can be viewed as a set of relational practices that might "refer to the activity of a subject which models itself according to a given prototype (Adorno, 1984). So it might be in the doing of something, that is, intrinsically, in the very act of imitation that a particular behaviour is accomplished. This critical distinction between imitation and simulation is one which has been entirely ignored in the groundbreaking early work on simulation and gaming which, as illustrated above, simply conflated the two as aspects of the same thing, and which continues to be ignored today by everyone we have found writing about the educational value of simulation-based digital gameplay. We, however, see this as a very important and useful distinction, and in what follows, we will endeavour to make this claim more concrete by arguing that, and showing how, new controllers make behavioral imitation much more "real" than the classic controllers did.

NEW FORMS OF IMITATION?

As stated previously, the last two years have marked a turning point for commercial games in terms of the kinds of controllers used to interact with games. The first of these new controllers of which we can expect to see now a rapid proliferation of types (so this is just an initial taxonomy), are most easily divided into three categories: the "Wii wand" and its various subsequent accoutrements from plastic sports equipment to balance boards, music related devices (dance pads, microphones, plastic guitars and drums) and the Nintendo DS (touch screen, voice recognition, and the latest – built-in camera). The remote-control shaped "Wii wand" is wireless, using infrared technology to detect player movement that is synchronized with an avatar displayed (usually) on a TV screen. What is so very different about the Wii devices is that they encourage embodied, active play that corresponds to, indeed imitates (instead of is simulated by) on-screen action. For example, "Wii Sports", which came free with purchase of the Nintendo Wii system, allows players to construct an avatar, a "Mii", and use it to play an array of sports games through that avatar – tennis, golf, boxing, bowling and baseball (and other mini-games). In order to play, the player must imitate a golf swing, or a tennis swing, a baseball swing or even rolling a bowling ball with the controller. In effect, the player imitates "real world" action that is correlated with action within the game. While it is possible to "cheat" the action, and not fully swing a golf club, for instance, for the most part, the action of the player does imitate, say, throwing a punch in boxing. Indeed, the Wii marketing campaign has been "Get up and play" – an inverse of the ethos that playing games is a sedentary activity.

Dance pads have also enticed players into more physically active forms of play engagement and they are just one of many music related controllers that are also reshaping digital gameplay. *Guitar Hero I*, *II* and *III* and their various successors, use plastic guitars as controllers. The player imitates playing a guitar by pressing colored keys in time to a music track. The difficulty is increased by the number of notes/buttons required (3 is the easiest, 5 the hardest), speed of play and number of notes that are played together (to create a chord). Very literally, then, the player's imitative action corresponds, mimetically and physically, to 'playing' the notes displayed on the screen. Similarly, in *Rock Band* players also imitate musical "play" through singing, playing guitar and by using traditional wooden drumsticks on a set of plastic drum-pads that work in similar ways to the guitar, in that a player hits the correct colored drum as directed by

the music. *Rock Band* is meant to be played collaboratively, with up to four band members playing simultaneously (vocal, drums, guitar and bass).

What is yet to be determined in these imitative practice-games is whether and how skills acquired in playing them can be transferred to their "real world" equivalent activities (the classic educational problem Gee identified as "transfer of training"). To begin to look more closely at transference in relation to these imitative game-playing practices, we initiated a pilot study, in the summer of 2007 with four young adults (17-20), two of whom had prior musical training, and two did not. To look at the 'agency' of new controllers, to try to see the impact on learning, competence and transfer of the 'thing' in this network, we looked for relations between prior knowledge, game competence, and subsequent performance. We began with the question: might there be a connection between prior music skills and first time play skills when playing *Guitar Hero II* or *American Idol* (a game in which a player sings into a microphone, and the game judges relative pitch, length held of note, and timing)? Briefly, what we found is that at least for first-time players, some musical training meant that their ability to pick up and play the game far exceeded the ability of those who were not musically trained to play guitar or sing. While the pilot study sample of 4 people cannot admit of generalization, it does suggest some interesting "transference" questions: could it be the case, inversely, that someone highly skilled at a game like *Guitar Hero* or *Rock Band* could actually improve their "music" skills in the real world, and which skills would those be: those related to rhythm and timing, perhaps, or the ability to read a score? Is it possible to use games like *SingStar* or *American Idol* as means of training one's voice? (How) does playing Wii tennis improve someone's tennis game? Studying even just four subjects brought more clearly into view educationally salient differences between simulation based and imitation-driven gameplay.

Simulation has been characterized as an 'analytical science' (Klabbers, 2009), whose challenge is to "bridge the gap between knowledge and action [the 'transfer of training' problem in its classic form'] in simulation games. Good simulations demand fidelity to salient aspects of performance. However the analysis of complex tasks is itself an inordinately complex matter: WHICH aspects have greatest salience? Or, to put the question slightly differently, Of WHAT task features, aspects, elements and components should fidelity be demanded? The bias in simulations is towards *accurate task analysis* and *faithful representation* of salient aspects of the task analyzed; the bias in imitation is towards the *modeling of exemplary performance*, and its end is *experiential verisimilitude*. The locus of the distinctive 'truth claims' of simulation and imitation are polar opposites, with simulation's investment in veridicality being towards knowledge and information, and imitation's orientation to truth inclined, rather, to experience and performativity.

This is because simulations are created to represent what is true about a task, to represent the 'real world' (or that aspect of it) as accurately as possible, whereas imitative practices are enacted to experience and practice how it feels to engage in a given task or activity. The former seeks to use 'knowing that' within a represented reality (Frankin, 2004) as a bridge to 'knowing how' (Klabbers' "gap between knowledge and action"); the latter seeks to build know-how in the 'real' world through imitative practice in a 'virtual' one. If we are able I these ways to more accurately describe that continuum between simulation and imitation, we will recognize that there must be a midpoint, a meeting point, indeed a convergence between these two, and it is illustrated, paradigmatically, by, for instance, a flight or driving simulator (or even better, training simulation embedded within its 'real-world' context--- Salas et al refer, as one example of 'best practice' an embedded training system within military aircraft that supports realistic in-flight training and pre-mission rehearsal while on route to the actual mission. (Salas et al (2009), citing Cooper, Viney and McDermott (2003), Moving in either direction from that point of convergence, however, will mean sacrificing experienctial fidelity for informational accuracy in the case of simulations,and sacrificing informational accuracy for experiential fidelity, in the case of imitation.

Bolstered by what we have suggested is a more powerful theory for studying learning as always "networked," supported by a web of relations both human and non-human, invited us to ask how "transfer" works differently in simulation than in imitation. On one dimension, this may be a simple question of proximity – of "where the action is", so to speak, where and in what aspects of the learning goal are realism and fidelity invested, and where they are deferred.. The re-embodiment of play in imitation-driven digital games gives reason to suppose that both the work and the learning involved in play afford real transfer to the knowledge and skills thereby imitated, because the player uses the real as the model against which to try to be "just like" it.

Researching players using the new controllers earlier described makes it clear that, while the button mashing of simulation-based play may have impacted players thumb and finger muscles, Wii players imitating boxers really do sweat, *Rock Band* drummers develop stronger arm muscles, singers learn to hold a note longer and with sustained pitch, and *Guitar Hero* guitarists read and follow a musical score and learn to make fast and accurate chord changes. What's important here aren't, of course, the specific changes co-constructed by player and game, but the larger possibility that with technologies supporting players' *embodied* competence, rather than players' ability to *simulate* such competence, the way digital games work for education has shifted, as has the problem of transfer of training, from

carefully calculated abstract information embedded in a representation of the real, to embodied imitation of the real.

CONCLUSION

Are digital games good or bad for education? Well, it depends…From the perspective of actor network theory, what matters enormously is the specific system and context of activity, what is required by and afforded to agents through tools and technologies, social involvements, strains and supports---and it depends upon what we are looking for. If we are looking to increase students' abilities to generate correct propositions about states of affairs in relation to which they themselves have neither any agency nor any embodied competence, but which they can read off from a complex digitally effected simulation, then there is much to be 'learned' from simulation-based digital games. It is critical to bear in mind, though, that the gameplay skills that players develop through simulation games are nothing like the skilled events they represent and manipulate. Player actions are arbitrary vis-à-vis the 'real' event, and so they must be. This is a point of conceptual necessity, since simulations necessarily stand in for the real. Imitative play, by significant contrast, engages players directly with the forms and functions of the real, which their efforts seek to increasingly become 'just like". This distinction between 'as if' and 'just like' is, we contend, absolutely central to whether and how a digital game can bridge the 'transfer of training' gap between learning and application. If educational activities are to be transformative for learners, they must instantiate their goals, rather than being a causally effective means to an externally defined end. In educational theory terms, this intrinsic relationship is what defines an *educational* as opposed to a *training* objective, or, to put it a bit differently, in the words of philosopher of education, Richard S. Peters, "If the process is not itself educational, the product cannot be a education". We see enormous promise for the advancement of educational processes and outcomes in the continued development of imitation-driven play, and correspondingly diminished educational promise in forms of digital gameplay based on simulation.

It may well be that so long as we look myopically for a testable, demonstrable increase in students' mastery of traditional school knowledge and skills, and if we restrict our conceptions of video games to violent first-person shooters, we'll find that more is lost than gained from video game play. Identifying and studying the many and varied networks of affordances that digital gameplay offers - particularly in this technologically enabled re-embodiment of play from simulation to imitation - may offer genuinely productive avenues for research and educational practice which takes seriously into account the dramatic and profound transformation of knowledge and of learning in a networked society.

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