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Games in Learning, Design, and Motivation
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Games in education have been studied for the last 40 years (Abt, 1970; Egenfeldt-Nielson, 2007; Loftus & Loftus, 1983). These works and others discussed in this paper espouse the potential for game-based education to support students' learning content as well as leadership and collaboration skills through imaginative, intriguing, and challenging play. Egenfeldt-Nielson (2011) noted that, while these claims are consistent over time, game-based learning has yet to be integrated into formal education. The research on games and education is vast but not conclusive, even though a number of journals and conferences are dedicated to the subject. In this research, games are termed serious games (Abt, 1970), video games (Gee, 2003), computer or digital games (Huang, 2012), and simulations (Bredemeier & Greenblat, 1981). One problem with games over the decades is the disconnect between game design and curricular goals. Likewise, the term "games" is all-encompassing and relates to situations in which an individual can play alone or with others, on a field (e.g., soccer or baseball), with a game board (e.g., *Monopoly* by Magie & Darrow in 1936), on a computer or not (e.g., *Dungeons & Dragons* by Gygax & Arneson in 1974, or *Vampire, the Masquerade* by Rein-Hagen in 1991), or with a game console (e.g., Wii, Xbox 360).

The Pew Internet & American Life Project (2008) is a report summarizing how popular video games are in the lives of young people. The authors state, "Video gaming is so widespread among American teenagers that to paint a portrait of a typical teen gamer is to hold a mirror to the population of teens as a whole. Nearly every teen plays games in some way, regardless of gender, age, or socioeconomic status" (Lenhart et al., 2008, p. 7). The Pew study surveyed approximately 1,100 participants, of which one third (31%) reported playing

a game every day; of those daily gamers, 50% reported playing in "clans" or "guilds" (p. 10), which means they play with others online, sometimes in massively multiplayer online role-playing games. Additionally, the Entertainment Software Association (2011) reported that 72% of American households play computer or video games, with the average age of a player being 37 years. Thus, electronic games and gameplay are reported to be ubiquitous in the United States.

Games in the 21st century may be dependent on computers or not. For instance, *Minecraft* (Persson & Bergensten, 2009) and *SimCity* (Wright, 1989) are computer-based, sand-box type games, comparable to *Legos* (the building-block game) in that they present no prescribed story line or narrative progression but rather allow the player to imaginatively create a story. In these games, players roam a virtual world and change it at will. The point of the classic version of *Minecraft* is to explore the world presented in the game (which is random; each time a new world is created), mine building materials (e.g., wood or bricks to build, coal and a stick for a torch), and, if play is conducted in "survivor mode," to build a secure shelter against the "evil spiders" and "creepy-crawlers" that come out at night. The game can be played by a single individual on a desktop computer, laptop, or tablet, or by multiple players on a dedicated, secure server requiring permission to access.

Although *Minecraft* is a product of technology, its virtual activities may be made corporeal. A group of boys on a playground were asked what they were doing. They replied, "Playing *Minecraft* without the computer." They were pretending to mine supplies to build a structure to keep them safe from the creepy-crawlers. They were still playing the game *Minecraft*; it did not matter to the boys that there was no computer involved. They were "playing" a game that they knew how to play with or without technology to facilitate the play. They were taking what they learned by playing *Minecraft* on a computer and adapting that play to a different location, that is, transferring knowledge from one situation to another. This is one example of how children can take skills they learn in playing a game and apply those skills to another setting or problem (Shaffer, 2007), which is one of the skills set forth by the Partnership for 21st Century Skills (2011).

For schools and teachers to determine whether games of any form meet their curricular goals, they must first know what they mean by a "game." As noted above, research on games of all kinds has been published for over 40 years with mixed results for impact on education. For games to meet the goals of the Partnership for 21st Century Skills, a clear understanding of the broad scope of games in education is important. This chapter will first explore definitions and classifications of games or playing a game, looking at digital and nondigital games, and will then explore how games have been used in education to date. The chapter also includes proposed principles for how games can be used by

state education agencies (SEAs), local education agencies (LEAs), and schools to address student learning and motivation to learn.

What Makes a Game?

Most of us know a game when we see one. But trying to define a game is not straightforward, because there are classifications that have to do with (a) the number of players, such as solo-played games (e.g., solitaire, in all its variations), paired games (e.g., chess or handball), and team-based games (e.g., football or doubles tennis); and (b) type of activity, such as role-playing games (e.g., *Vampire, the Masquerade* not on a computer [Rein-Hagen, 1991] or *World of Warcraft* on a computer [Pardo, Kaplan, & Chilton, 2004]). A number of authors have attempted to provide guidelines for defining games (Avedon & Sutton-Smith, 1971; Caillois, 1961; Costikyan, 2005; Crawford, 1984; Huizinga, 2000; Parlett, 1999; Salen & Zimmerman, 2004; and Suits, 1978). This chapter focuses on Huizinga's seminal work and how a few others have modified it.

Huizinga, a Dutch cultural historian, wrote *Homo Ludens* ("Man the Player") in 1938.[1] He noted differences between the "game" as it is defined or described and "playing" the game, or the act of playing the game. Clearly, one is static and the other dynamic. Huizinga studied the act of playing games as elements of culture and suggested that to understand games or gaming one must understand how to play the game. Constance Steinkuehler (2005) also emphasized that one must play a game in order to understand the game and gameplay (e.g., mechanics), much as Huizinga proposed. According to Huizinga (2000, pp. 9–13), the central elements of playing a game include:

a. **Freedom**: Play is not work and is done during leisure time.
b. **Distinction**: Play is not what we do every day and, thus, is not ordinary. To play, we leave everyday life behind; play is totally separate from everyday life, in another location—real or imaginary.
c. **Order**: Play is orderly compared with everyday life.
d. **Beauty**: Play can be beautiful by enchanting and captivating our attention.
e. **Tension**: Play can be tense with competition and goals.
f. **Rules**: All play has rules that are binding and provide no doubt about the boundaries of play.
g. **Community**: Play creates community or a feeling of bonds between participants, clubs, teams, and so on.
h. **Secrecy**: Play includes pretense and disguise, masks, and fantasy—thus, secrecy (i.e., *Vampire, the Masquerade* [Rein-Hagen, 1991]).

Huizinga (2000) states his theory this way:

Summing up the formal characteristics of play we might call it a free activity standing quite consciously outside "ordinary" life as being "not serious," but at the same time absorbing the player intensely and utterly. It is an activity

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[1] The work was first translated into English in 1949, with several reprints, including in 2000.

connected with no material interest, and no profit can be gained by it. It proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner. It promotes the formation of social groupings which tend to surround themselves with secrecy and to stress their difference from the common world by disguise or other means. (p. 13)

In terms similar to Huizinga's, Bernard Suits, a philosopher, described "play as active, voluntary, goal oriented, bound by rules, inefficient, and based on the acceptance of the limitations of rules set for the game" (Suits, 1978, as quoted in Mortensen, 2009, p. 12). Roger Caillois (1961), a sociologist, added two additional features: "uncertainty" and the "absence of productivity." The outcomes are uncertain from the beginning; thus, each time play is enacted, the outcome or the circumstances of the outcome is different. For instance, you may play chess with the same opponent several times and win the game each time; however, the play of the pieces and how you won the game may be different each time, producing uncertainty. Lastly, other than professional players who play for money, lack of productivity relates to a lack of financial income as a result of play. The point of playing *World of Warcraft* (Pardo, Kaplan, & Chilton, 2004) is not to gain financial income, but to build a community or a "guild" made up of multiple players from around the world who work together to achieve a task or a

> **The point of playing World of Warcraft (Pardo, Kaplan, & Chilton, 2004) is not to gain financial income, but to build a community or a "guild" made up of multiple players from around the world who work together to achieve a task or a challenge offered through the game.**

challenge offered through the game. Trying to combine the 20th century gameplay definitions by Huizinga, Suits, and Caillois, Mortensen (2009) proffered these elements for "what makes playing a game different from regular, mundane activities: voluntary, bounded by rules, outside of the everyday, limited in time and space, tense, risky, inefficient, and unproductive" (p. 15). Most recently, Huang suggested that playing a game is associated with "goal-driven behaviors, complex tasks, active problem-solving, teamwork/autonomy, motivation to initiate and sustain behaviors, engagement to sustain behaviors, and enriched interactions between players and other players and the gaming system" (2012, slide 13). These traits or characteristics of game play are consistent with the skills set forth by the Partnership for 21st Century Skills (2011).

Thus, from 1938 to 2012, how a game or gameplay is defined or identified as such has not changed significantly. What has changed is the media through which games are encountered. In the world known by Caillois and Suits, games were played on a field, game board, or through the imagination. Games since the advent of the microcomputer have added computer-based and video-based gameplay to the mix. However, we argue that any distinction to be made between

games that are computer based and those that are not is irrelevant to the definition of a game; the inclusion of computer-based games within the broad range of games merely adds a medium or location for gameplay to occur. While there are games that were initially designed to be computer-mediated (e.g., *Minecraft*), they can be played without the computer, if imagination allows. This also applies to games initially designed to be played without a computer (e.g., *Solitaire*); however, playing on a computer obviates opportunities for cheating.

Games in Education

While games of various types have been used in education since schooling began—including individual and team sports, board games (e.g., chess), and games created by children—educational games used in the 21st century arose in the 1950s through 1980s as alternatives to drill and practice, for enrichment activities, or as computer-assisted/programmed instruction systems (such as the PLATO system from the University of Illinois). The PLATO system consisted of a central computer connected to terminals by telephone lines or satellite. It was used for individual or small-group instruction and began being used in 1958 (Office of Technology Assessment, 1981). The first wave of educational software to emerge included *Number Munchers* and *Oregon Trail* developed by the Minnesota Education Computing Consortium, *Reader Rabbit* developed by The Learning Company, and *Where in the World is Carmen Sandiego* developed by Brøderbund Software, to name a few, when the mini-computer was introduced into classrooms in the 1980s. Where used, these software programs replaced educational playthings, like blocks and puzzles. In a review of educational games versus "edutainment" from the 1970s and 1980s, Mizuko Ito reported that "educational games put gaming at the center of the enterprise" (2008, p. 92). She stressed how what she called "children's software" (p. 92) was attempting to bridge the divide between education and the new concept of edutainment. Ito defined edutainment as an attempt by software developers to blend education and entertainment, thinking that entertainment would catch children's imagination and learning would be better than traditional education methods. She noted further that, as the educational software industry grew, three genres of edutainment developed initially: the academic, which embeds traditional academic content into games and is associated with behaviorist approaches and external rewards; the entertainment genre, which presents family-friendly, prosocial content appropriate for young children (e.g., nonviolent); and the construction genre, which focuses on constructing and authoring activities, not age specific, with Seymour Papert's *LOGO* as the prime example, along with *Kid Pix* (Brøderbund Software, 1991) and HyperStudio (Wagner, 1989). The construction genre software was not obviously educational or entertainment oriented. Ito suggested that as the educational software matured, these three genres devolved into two: software with mostly academic goals and software with mostly

entertainment goals. In her review of educational software (2008), including educational games and edutainment, Ito concluded that many video games created in the 1980s for educational purposes, which she labeled academic, "focused on curricular content, rather than innovative gameplay," emphasized external rewards (i.e., badges or points), and reinforced school-like tasks (2008, pp. 93–94). She further suggested that, in putting educational content into video games with the intent on teaching children through gameplay or fun, developers and educators ran the risk of children recognizing the difference between fun, or entertainment, and school, or education.

> *A major difference between 21st century "serious games" and those from the 1980s is the ability to immerse the player into a virtual world where they perceive themselves as being part of the world rather than merely playing in the world.*

Dennis Charsky (2010), writing on the development of serious games from edutainment and supporting the work of Ito, reported that "edutainment and instructional computer games were once touted as the savior of education because of their ability to simultaneously entertain and educate" (p. 177). However, he goes on to remind us that after many years of implementing these games in schools, they had developed the reputation for being drill and practice masquerading as engaging play. Thus, while the educational software industry was partly established to move away from drill and practice, as illustrated by the PLATO system, teachers saw the products of this new industry as doing exactly what it was trying to replace.

Digital or Serious Games in Education

As educational games have continued to progress since their initial development in the 1980s, they are termed "serious games" in the early 21st century. Serious games combine characteristics of video and computer-based games for immersive learning experiences intended to deliver specific goals, outcomes, and experiences (de Freitas, 2006). A major difference between 21st century "serious games" and those from the 1980s is the ability to immerse the player into a virtual world where they perceive themselves as being *part of* the world rather than merely *playing in* the world. In observing general trends in game research, de Freitas & Oliver (2006) note "an increasing popularity amongst learners for using serious games and simulations to support curricula objectives" (p. 250). Thus, it is not surprising that newer computer games are generating much interest across many educational arenas (e.g., classroom education, government, business, healthcare, hospitality). Garris, Ahlers, and Driskell (2002) posit the rise of serious games in educational settings is due to three factors. First, there is the emergence of a new paradigm in education, moving away from the teacher-centered model toward a more student-centered, experiential mode of teaching

and learning and applied learning versus remembering information. Second, new interactive technologies have been developed over the last two decades allowing for computers to support interactivity between individuals who are separated spatially, even if only in the next classroom, along with tools that will record these activities into a database for analysis purposes. Third, serious games have the capacity, if designed appropriately, to capture students' attention and hold it through various activities. Mayo (2007) suggests the advantages to using serious games in education include, but are not limited to, experiential learning, inquiry-based learning, goal setting, cooperation or competition, continuous feedback, and time on task. Expanding on the work of Garris et al. (2002) and Mayo (2007), Wrzesien and Alcañiz Raya (2010) advocate for the use of serious games in education for three main reasons which take into account the skills proposed in the Framework for 21st Century Learning first published in 2002 (Partnership for 21st Century Skills, 2011): (a) They use actions rather than explanations and create personal motivation and satisfaction; (b) they accommodate multiple learning styles and abilities; and (c) they foster decision making and problem solving in virtual settings, thus allowing students to affect the virtual world and see potential impacts of decisions, or return and try another solution for comparison.

James Gee (2004), a linguist by training, notes that as games have become more complex (i.e., serious games), they have incorporated scaffolding, intelligent tutors, and affinity groups for learning. He further suggests serious games represent experiential learning spaces where learners encounter rich, collaborative, and cooperative activities and interactions. In these spaces, they offer learners complex tools and resources for complex problem solving (Gee, 2003). Using personal experiences with *World of Warcraft* (Pardo et al., 2004) and observational data of children engaged with gaming environments, Gee argues that children learn more and better through these environments, if the games are designed appropriately to stimulate higher-order thinking and collaborative activities. Thus, his argument agrees with that of Garris et al. (2002), as noted above, that serious games may be more likely to address 21st-century skill development through scaffolding of learning, active rather than passive interactions, support of multiple learning styles by using intelligent tutors and affinity group support, cooperative and collaborative experiences/activities/interactions, and complex problem solving.

Paradigm of Game-Based Learning

Shaffer (2007) noted that researchers have shown that well-designed computer/video games can teach players innovative and creative ways of thinking, deep understanding of complex academic content, and valuable forms of real-world skills, given their ability to provide rich, complex, and compelling virtual worlds (see Adams, 1998; Barab, Hay, Barnett, & Squire, 2001; Gee, 2003; Shaffer,

2005, 2007; Starr, 1994). A new paradigm of game-based learning has emerged, one centered on theories of situated cognition, arguing that people learn best when engaged in activities that are goal-directed so they are meaningfully engaged and invited to be "experts" in some area of the game (Gee, 2003; Shaffer, 2007; Shaffer, Squire, Halverson, & Gee, 2005). According to Squire (2007), "These games give us access to the ways of thinking (including knowledge, skills, values, and dispositions) of experts, and invite us to experience the world in new ways" (p. 53).

Integration of games into teaching and learning activities has been a challenge from the beginning for many reasons. As noted, game development has not been in sync with curriculum needs. Although the digital or immersive delivery format in modern games is new, the experience for many teachers in schools using these games is strangely similar to what happened with bringing electronic technology (e.g., films, video, television) into schools over approximately 75 years: There was a disjunction between the new technology and what needed to be taught (the curriculum). While games may provide interesting formats and add motivation to various activities, a missing critical piece is helping teachers learn how to think about games within teaching content. Regardless of delivery, as educators we must remember that content is what is important. If content (and outcomes) are separate from the activity, teachers tend to think of games as trivial, unimportant, or time fillers. For a truly beneficial integration of games into education, the issues around what teachers are asked to teach (e.g., the curriculum) and the tools provided must be connected.

In her review of educational games cited above, Ito (2008) stated that original educational software intended for use on mini-computers was not designed with curricula in mind, nor vice versa. This is also true with the new, serious games; thus, if a teacher finds a serious game that his or her students find engaging and motivating, that same game may or may not coincide with the goals of the curriculum in use. Barriers to game use in schools include a lack of access to equipment, especially up-to-date equipment (e.g., graphics/video cards), preventing the use of newer, sophisticated game programs in classrooms (de Freitas, 2006). Multiplayer, serious game platforms popular with teens and adults and rich in imagery provide opportunities to "visit" the U.S. Capitol Building without needing to travel to Washington, DC or go through the security barriers. These platforms are powerful for introducing historical events or conditions, but they can be unmanageable for teachers uncomfortable with the game genre. Also, some instructional technology policies prevent accessing Internet sites identified with games, thus blocking access for meaningful interaction between players at a distance. Because these serious game environments are highly immersive and collaborative, teachers' supervision of the classroom and students can be challenging. As stated at the beginning of this chapter, key findings from the literature suggest that—in spite of a preponderance of articles, journals, and

conference papers devoted to how games, in their various forms, can support teaching and learning—the empirical evidence is inconclusive to support claims that games in any format transform teaching and learning for all.

Richard Van Eck notes that young children today, those part of the net generation, "require multiple streams of information, prefer inductive reasoning, want frequent and quick interactions with content, and have exceptional visual literacy skills" (2006, p. 16). Understanding these children and their approaches to learning is a challenge to teachers schooled during the era of text-based teaching and teacher-centered instruction. Thus, if these 21st-century games are to be included by teachers to support their teaching and students' learning through differentiated instruction, connections between the games and instructional strategies must be explicit. Using the new types of serious games or even new versions of well-traveled games (e.g., *Where in the World is Carmen Sandiego* [Brøderbund Software, 1985]) without considering the new types of students and how they learn may miss the mark.

Proposed Principles for SEAs, LEAs, and Schools on Games in Education

As discussed above, the possible combinations of game features—such as number of players, venue, nature of rewards—is large. The biggest challenge for any game is to fit into a curriculum or, at minimum, fit a particular teacher's instructional style. A new report from the Joan Gantz Cooney Center at Sesame Workshop puts it this way:

> Making games work in the classroom requires an understanding not only of issues specific to learning games, but also of the systematic barriers to entry and constraints of the K–12 environment for any supplemental product in the K–12 space. The dominance of a few entrenched players, the long buying cycle, the multi-layered decision making process, the fragmented marketplace, the demand for curriculum alignment, the requirement of a research base, and the need for professional development all will [have an] impact. (Richards, Stebbins, & Moellering, 2013, p. 53)

Larry Cuban (1985) documented how each new technology invented to make education easier for teaching and learning—moving from still images to film to "talkies" to television to computers—has not delivered on its promise. In fact, he noted that problems with technology (e.g., filmstrips breaking, projector bulbs burning out, and more) made it more likely that teachers used technology merely as a supplement, as opposed to infusing it into the teaching and learning process. Even in the more recent era of digital technologies, the case continues to be made that without the integration of educational programs, technology, and theory, significant progress in learning and instruction will not occur (Spector, 2001).

Given Cuban's and others' rather bleak picture of technology's limited ability to support teaching and learning over time, how are SEA, LEA, and school administrators to move forward with current educational software, and games

in particular? The first principle is to connect the curriculum and the games to be used, or identify what goals/objectives/competencies are addressed through the educational software or game that cannot be achieved through other means. As noted by Charsky (2010), there are different types of games, but educational games tend to be seen by students as representing old ways of teaching (e.g., drill and practice) rather than engaging and motivating to learn. So here the point is not to make a list of games that may be relevant but to work with game developers and game researchers to identify games that specifically meet the goals of education at different levels (e.g., pre-K, elementary and middle grades, and high school). Ito suggests the construction genre of games has the best chance for transforming the conditions of childhood learning since they are participatory and may include opportunities for self-authoring, digital authoring, online journaling, and social networking—all aspects of 21st-century skills (Partnership for 21st Century Skills, 2011). Supporting local educational administrators and teachers by helping them work through how educational games can be harnessed for learning is essential.

The difficulties are the same for SEAs, LEAs, and even individual teachers: How can connections between computer software and games and curricula be made? How do we sift through the myriad of offerings to find quality instruction? One source of guidance is a paper by Klopfer, Osterweil, and Salen (2009) entitled *Moving Games Forward: Obstacles, Opportunities, and Openness*. The authors stress that the first goal is to identify the obstacles to incorporating games, serious or otherwise, into the learning process. Recent work by product developers toward aligning computer software (including games) to the Common Core may also be of assistance, as noted in the recent article, *Games and the Common Core: Two Movements That Need Each Other* (Chen, 2013).

Principles for schools in implementing or infusing games into lessons are more specific. Alexander, Eaton, and Egan (2010) proposed three main approaches for teachers, principles, parents, and others who oversee public education to understanding the connection between games and education: (a) seeing games as teaching desirable learning skills through play; (b) focusing on integration of curriculum content into games (but cf. Ito's perspective, above); and (c) extracting learning principles embedded in e-games and applying those to the educational context. Here, the foremost point is that teachers and school administrators must see that desirable learning skills can be attained through playing games. If this proposition is not accepted, then games will never be included at any level. Making the connection between curriculum and game content helps teachers, principals, and other administrators to make connections for students. However, Ito's warning—that students will perceive the scam of games masquerading as education—underscores the need to think through how the games really support the curriculum. Here, school administrators might consider the construction genre of games in which mathematics, social studies, and

writing could be incorporated. However, this approach requires knowledge of the games and the curriculum to help teachers and parents see the connections.

Another approach to understanding the connection between computer software and games to 21st-century classrooms, teaching, and learning is to consider the skills and abilities to be acquired through the games—analysis, deduction, discrimination, and rule following, among other skills. In this approach, learning is active because players must interact with the game in order to learn the skills. This approach resonates with the work of Gee (2003), Ko (2002), and Moreno and Mayer (2007), who all suggest that in order for children to glean the most from educational games, they must be actively engaged.

One more approach to understanding the connection between computer software and games to 21st-century classrooms, teaching, and learning is to consider how serious games can be used to teach content. For this application, games are used as an

> *One more approach to understanding the connection between computer software and games to 21st-century classrooms, teaching, and learning is to consider how serious games can be used to teach content.*

external motivator, whether for drill and practice or for other types of learning. As noted by Lenhart et al. (2008) in a report for the Pew Research Center, most American teenagers are playing games, so this transfer could be important. Games can be used to practice information (e.g., the use of *Jeopardy* [Griffin, 1964] in any subject). Although these games may not have been designed for educational purposes, adapting them can support learning by reinforcing students' knowledge. The problem is that they are perhaps not as interactive as e-games, as supported by Gee (2003). As more games are being designed specifically with the classroom in mind, such as *Quest Atlantis* (Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005), it is essential to ensure that the learning outcomes match the educational aims of using the games. As noted by Alexander, Eaton, and Egan (2010), "It is not at all clear that game requirements do not inadvertently compete with and displace intended curricular objectives" (p. 1838).

The last approach to improving the effective use of games in the classroom entails teachers analyzing what is engaging about an online game, and then applying it to curriculum. The aspects of online games that players enjoy include the narrative structure (beginnings, middles, and ends), "heroic" human qualities ("secrecy" from Huizinga), vivid images and emotional engagement ("beautiful" from Huizinga), distant locations or events ("extraordinary" from Huizinga), and role playing, which invokes rules. Capitalizing on how these aspects can be used in any area of teaching and learning will be essential.

For administrators of SEAs, LEAs, and schools, the key to getting teachers to infuse games into teaching and learning will be helping them see the relationship between the content within the game and curricular goals/competencies to be

attained. Most teachers are not going to establish effective gaming classrooms by themselves, and they are not going to learn how to establish them in a teacher education program or an afternoon or summer professional development program. An ongoing support network for teachers interested in infusing game features into their practice needs to be created, a network comprised of the principal and colleagues equally engaged in the effort, and further supported with time for the teachers to see how gaming works for others and in their own classrooms (Schifter, 2008). Without a model to support teachers' exploration of games in their practice, teachers will resort to those teaching methods they understand best. Games, like educational software, have been shown in studies to have positive impacts on learning in laboratory settings (Barab et al., 2001; Shaffer, 2007), but when implemented in classrooms, they have been less than stellar (Ito, 2008; Charsky, 2010). The problem is not necessarily with the games themselves as with the lack of support and understanding of how change in teaching cultures happens over time.

Action Principles

a. Align games with curriculum content objectives, including the Common Core Standards.
b. Decide what learning skills need improvement or development and choose games which address those skills, rather than the other way around.
c. Provide opportunities for teachers to be part of manufacturers' demonstrations to ensure a thorough understanding of how the game is intended to work and how to maximize student outcomes.
d. Encourage partnerships between educators and game manufacturers, particularly in a game's development stage.
e. Contact manufacturers and volunteer to be part of teacher focus groups as games are developed.
f. Choose games that consider engagement factors, such as action, imagery, role playing, and so forth.
g. Be knowledgeable about hardware–software compatibility, upgrades, licensing fees, shelf-life, and so on when choosing games. Keep in mind the total cost of purchases.

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