Video Games: What Are They Good For?

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Like all technologies, video games can be good, bad, or indifferent: It all depends on how they are used (Gee 2007, 2014; Shaffer 2007). While there are many good uses to which we can put video games (e.g., Bavelier & Green 2009), here I will suggest how we ought to use video games for learning, in and out of schools and across the world, in light of our current high-risk global world. Today's world is what some people now abbreviate as "VUCA": volatile, uncertain, complex, and ambiguous (Johansen 2007). In a VUCA world we need learning and problem solving that has a real impact and we need people and societies able to deal with complexity (Gee 2013).

The approach to learning I advocate in a VUCA world I will call "PCCP": Problem Solving, System Thinking, Collective Intelligence, and Participation. Video games, I believe, can do their most important work when they facilitate these four things.

Several principles are important for the creation of PCCP learning. First, don't ask about video games as stand-alone technologies. Rather, ask about how games can be well-integrated with

other tools and technologies, forms of participation and social interaction, and various curricular activities to create PCCP *learning systems*.

Second, focus on learning facts, information, and formulas as tools for solving problems, not in and for themselves. Facts learned just for themselves do not lead to problem-solving abilities. Facts used as tools for problem solving are more deeply understood and facilitate problem-solving skills (Gardner 1991; Gee 2004).

Third, focus on problems that recruit system thinking. System thinking means knowing how the elements in a natural, human, or mixed natural-human system interact to create emergent properties at the level of the system as a whole (Meadows 2013). It means, as well, understanding the nature of detrimental unintended consequences and how to seek to avoid them.

Fourth, when designing a learning system, network tools, people, forms of participation, and activities so that so that the network is smarter than any person or tool in it. This is collective intelligence (Clark 2008; Nielsen 2012; Surowiecki 2004). Such networks store multiple forms of interacting expertise and recruit a wide diversity of sources of information and human experience.

Finally, ensure that learners feel that what they do in the learning system counts and matters. Humans thrive only when they feel that their participation counts. When they do not they tend to withdraw and suffer malaise (Marmot 2004; Pickett & Wilkinson 2011). It is crucial today, as

well, that our learning systems make people feel, in the long run, that what they do matters and counts at the level of society and the world, as well.

We are just at the start of research on how games can best contribute to PCCP leaning systems. But there are number of examples well worth thinking about. The much publicized game *Foldit* allows everyday people to use their pattern recognition skills to fold proteins. *Foldit* is a game within a larger system. The system contains the game's smart mechanics, web sites that organize chemistry learning, and social media and guild structures that organize player collaboration all in the service of collective intelligence. Players have discovered the correct structure for a number of proteins, including one that helps cause AIDS.

In *World of Warcraft*, a much played, well-beloved (and now aging) massive-multiple game, game mechanics, rules of social interaction, guild structures, interest-driven websites, strategy guides, and a great variety of "mods" (software tools that facilitate play, problem solving, and assessment) often made by the players' themselves give rise to highly organized problem solving, system thinking, and collective intelligence and invention. While the content of the game is not academic, its approach to learning, skill building, and collective intelligence is applicable in other domains.

Video games are essentially well-designed goal-based experiences that focus on problem solving. They recruit game mechanics and interfaces that serve as smart tools for problem solving and assessment. This is what they have to contribute to a PCCP learning system.

There are many other ways to build learning systems around games or to use games as parts of learning systems organized around other sorts of platforms. Often games are good for preparation for future learning, motivation, and basic embodied understandings that can then contribute to learning using other tools and activities (Rigby & Ayan 2008). Games can be the "stars" in some learning systems and "supporting actors" in others. But, in either case, they need a whole supporting cast to create PCCP learning for a VUCA world.

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