Reflections on "A Review of Trends in Serious Gaming"
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This article briefly summarizes findings from a review of 95 empirical studies of games used in instruction. The article suggests that such efforts are best assessed as transfer from game play to performance on external tasks that are targeted by the instruction. Review findings suggest that such transfer may be expected only if the cognitive processes engaged by games and external tasks overlap. Integrating games into a course of study is likely to facilitate such transfer. Research on improvement in cognitive processes as a result of playing “first-person shooter” games is briefly overviewed, and suggestions for similar research not using aggressive content are made. Minimal overlap between this and another research review of the effects of games used in instruction is discussed, and the need for generally accepted definitions and a taxonomy of games is noted.

Keywords: computer games and instruction, video games and instruction, games and instruction.

A research review by Young et al. (2012) examined the effects of game playing on classroom learning. That review did not discuss the psychological and cognitive processes that could account for such transfer. Another review of the same literature (Tobias, Fletcher, Dai, & Wind, 2011) found some evidence for near and far transfer (Barnett & Ceci, 2002) from games to external tasks if game and task called for similar cognitive processes, a finding consistent with the transfer literature generally (Mestre, 2005). Results suggested that transfer may not be assumed merely on the basis of superficial similarities between game and task. Instead, cognitive task analyses (Crandall, Klein, & Hoffman, 2006; Schraagen, Chipman, & Shalin, 2000) of both game and task have to be conducted, and research suggested that the amount of transfer depended on the degree of overlap between game and task.

The other review (Tobias et al., 2011) also found, in partial agreement with Young et al. (2012), that transfer from games to tasks was facilitated if the game was integrated into courses of study. It was suggested that game designers
maximize such integration by requiring players to master resources external to the
game (e.g., books, articles, Internet sources, laboratory activities) and making
players’ continuation in games contingent on demonstrating such mastery.

A program of research by Bavelier and her associates (Green & Bavelier, 2003;
for a summary, see A. F. Anderson & Bavelier, 2011) that was not mentioned by
Young et al. (2012) found evidence of transfer from “first-person shooter” games
to cognitive processes such as the ability to flexibly alternate between tasks.
Research suggests that games with a good deal of aggression, similar to those used
in Bavelier’s research, may increase aggressive reactions among players (C. A.
Anderson et al., 2003; C. A. Anderson & Bushman, 2001; Gentile, 2005; Irwin &
Gross, 1995). Ferguson (2007) and his colleagues (Ferguson et al., 2008) disputed
these findings and suggested that if there was an effect it was very small.
Nevertheless, the research review (Tobias et al., 2011) concluded that the weight
of evidence supported an increase in aggression from games and recommended
that developers limit hostility in games. As an alternative, developers might con-
sider developing games with prosocial themes that have been shown (Fontana &
Beckerman, 2004; Greitemeyer & Osswald, 2010) to be effective in increasing
outcomes such as conflict resolution and helping reactions. Whether increases in
prosocial behavior also reduce aggression is an important question requiring inves-
tigation.

Results from Bavelier’s research program (A. F. Anderson & Bavelier, 2011;
Green & Bavelier, 2003) offer the intriguing possibility of studying the use of
games to train cognitive processes in various populations such as older individuals
or individuals with dyslexia and attention deficit disorders (Tobias & Fletcher,
2011b). It was recommended (Tobias, Fletcher, & Wind, in press) that game devel-
opers and researchers consider using nonviolent contexts requiring very high
speed reactions (lasers, tennis serves by professional players, Jai alai contests) to
determine whether the outcomes would be similar to those reported in A. F.
Anderson and Bavelier’s (2011) research program without risking an increase in
player aggressiveness.

In their review, Young et al. (2012) referred to training but did not mention a
number of training studies in the allied health area (see Cannon-Bowers, Bowers,
& Procci, 2011) that have shown interesting effects of games on patients and phy-
sicians. Similarly, Young et al. reviewed findings relating games to achievement
in science but did not review a program of research by Mayer and colleagues (sum-
marized in Mayer, 2011). That research reported data from a number of studies that
found near transfer effects in games dealing with the principles underlying plant
growth or electric circuits. Mayer’s findings and those from the allied health area
are clearly significant for the use of games for learning.

It has been widely noted (Egenfeldt-Nielsen, 2007; Hays, 2005; O’Neil,
Wainess, & Baker, 2005; Randel, Morris, Wetzle, & Whitehead, 1992; Tobias
et al., 2011; Tobias & Fletcher, 2011b; Vogel et al., 2006) that the enthusiasm for
using games for instruction far outstrips the available evidence for transfer from
games to external tasks. It would be useful to divert the energy devoted to rhetoric
about the affordances of games to conducting research demonstrating that those
affordances can be productively used to improve learning from instruction. How
do we produce games that reliably yield prespecified instructional objectives?
Research is needed to produce effective procedures, a technology perhaps, for
achieving these ends. Too often today, games are developed that teach what is intended poorly, or the instructions are integrated into the games ineffectively.

Finally, it is remarkable how little overlap there is in the studies reviewed by Tobias and Fletcher (2011a) and by Young et al. (2012). This lack of overlap appears despite the 39 (of 363 candidate studies) summarized by Young et al. and the 95 studies summarized in the Tobias and Fletcher volume. This lack of overlap speaks to the “explosion of publications and research studies dealing with the value and effects of games” (Tobias & Fletcher, 2011c, p. 4). The high volume of research being conducted makes it difficult to review available evidence since it is continually enlarging.

The lack of overlap in studies cited by the two reviews also speaks to the need for a common, agreed-upon definition of what we classify as games and thereby what to include in studies of this sort. Young et al. (2012) specifically excluded simulations from their review. On the other hand, Tobias et al. (2011) suggested that games are a subset of simulations, allowing some portion of the research on simulation-based instruction to inform the design and development of games. Moreover, there is little agreement even in the way games for instruction are identified; thus, they are referred to as computer games, video games, serious games, and educational games, with other labels probably waiting in the wings. Tobias et al. emphasized the urgent need for an agreed-upon taxonomy of games to use in sorting out the effects of different types of games on different outcomes and students. It is hoped that the community of researchers in this area will mobilize, organize, and rise to the occasion.

References


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