

Running head: DIGITAL GAME-BASED LEARNING AND FINANCIAL LITERACY

The Role of Digital Game-Based Learning
in Teaching Financial Literacy to Young Adults

Julie A. Finlay

University of Texas at San Antonio

The Role of Digital Game-Based Learning in Teaching Financial Literacy to Young Adults

To survive in today's capitalist-driven society, an individual must develop financial literacy — the ability to understand, analyze, and make smart choices about money management. Financial literacy encompasses short- and long-term stability, requiring basic math skills needed to pay bills and balance a checkbook on a day-to-day basis, but also the critical-thinking ability necessary to manage debt and execute personal investment decisions for the future.

These basic skills have become as vital to survival as reading and writing, but our capitalist society has done little to promote them. Just seven states require personal finance curriculum in high schools, and only nine states require any graduation-dependent testing or assessment of student knowledge about personal finance (National Council on Economic Education, 2007). To become financially literate today, an individual must depend on personal experiences, motivation, and use of available information and instruction. But expecting people to absorb unstructured instruction on a complex topic like financial literacy may be asking too much in our information-overloaded world (Gee, 2007). A 2007 national study revealed that while 80 percent of U.S. adults think financial literacy is important, and many want to enhance their own personal financial knowledge, roughly 65 percent have *not* pursued any money management instruction in the last 12 months (Networks Financial Institute, 2007).

Without basic financial life skills, individuals in our capitalist society face a bleak future, as illustrated in current statistics and recent anecdotes. From August 2007 to October 2008, more than 850,000 U.S. homes were repossessed due to mortgage default (Clifford, 2008). The Consolidated Credit Counseling Service (2008) recently reported a 30 percent rise in personal bankruptcies from 2007 to 2008. And news reports have documented countless stories of

consumers directly affected by the financial crisis. For example, a November 2008 Google search of the terms "foreclosure" and "didn't understand" yields more than 150,000 results, including hundreds of news stories from media outlets across the country. Story after story features consumers who willingly admit they entered into risky financial agreements without the ability to analyze the associated risks or understand the lending terms. As such, they were incapable of making informed decisions about their money management. In short, they lacked financial literacy. And individuals without financial literacy risk negative effects on their financial stability because they are more apt to file for personal bankruptcy (Jump\$tart, 1998). At the root of many of those bankruptcy filings is excessive spending (Zhu, 2008), likely due to an inability to make smart money management choices.

Overview: Applying Social Cognitive Learning Theory to

Financial Literacy Education of Young Adults

The current financial crisis has helped increase the urgency for promoting financial literacy. Proof of this is the introduction of President Bush's Council on Financial Literacy (The White House, 2008) and the fact that the economy was a key issue in the 2008 U.S. Presidential election. Whether taught inside or outside the classroom, the basic requirements to achieve financial literacy remain constant. To become financially literate today, an individual must understand more than how to use cash and count coins. He or she must have practical, focused experience with and instruction about the current tools used in the financial management environment: credit cards, debit cards, basic loan and credit options, investment products, identity theft and fraud protection tools, and virtual banking and online investing. Rather than being theoretical, the instruction must relate to the social context of real-life financial management, maintenance of which is increasingly migrating to the online world.

An overriding challenge is that to become financially literate, an individual must be motivated. Until the current financial crisis, many consumers were not motivated to learn money management. They trusted that the market would not falter; they trusted unscrupulous lenders; they trusted that they'd be rescued if necessary (Zhu, 2008). The financial crisis changed the landscape because it motivated many consumers to take responsibility for their own knowledge to realize financial stability. To sustain that motivation and truly change behavior, our society must develop well-crafted financial literacy instruction that incorporates feedback and encourages attainable goals.

One key target audience for financial literacy education is college students, prime candidates for money management instruction since they are just starting to flex their financial muscles with first uses of checking accounts and credit cards. The training for these future leaders can not come soon enough because according to the U.S. Public Interest Research Groups (2008), 66 percent of college students have at least one credit card, and just half of those pay their balances in full each month. The average student will graduate with \$2,623 in credit card debt. Lack of financial knowledge and experience surely plays into this statistic, considering that, according to the survey, nearly one quarter opted to use the convenience of high-interest credit cards to pay for staggeringly high tuition costs instead of using conventional college loans, which typically feature low-interest rates.

Keeping in mind the goals of social context and motivation, the most appropriate strategy for financial literacy instruction of young adults should incorporate social cognitive learning theory, which depends on learning through the environment and focuses on motivation through setting goals and expectations (Schunk, 2008). With increasing attention on financial literacy,

chances are instructional designers will soon be tasked to build programs to meet those learning needs. Digital game-based learning (DGBL) may have a role.

A Brief Summary of DGBL

DGBL is more than just edutainment, or lessons embedded in entertainment. Rather DGBL's goal is to blend serious learning and interactive environments. Due to its origin in corporate training, some of DGBL's biggest proponents are corporate decision-makers like Marc Prensky (2007), author of *Digital Game-Based Learning*. Interest in DGBL has spread into academia, prompting research that strives to link DGBL, learning theory, and pedagogy.

Some contend that marrying DGBL and basic skills instruction is a “moral imperative” (Squire, 2002) for today's young adults — the first generation of digital natives who have grown up with game systems. Prensky (2006) writes, “The true secret of why kids spend so much time on their games is that they're learning things they need for their twenty-first century lives” (p. 5). A new ethnographic study of digital youth released by the MacArthur Foundation (2008) echoes that position, revealing that online experience allows young people to develop the skills they need to be fully active citizens in contemporary society. But critics like author Mark Bauerlein (2008) disagree, arguing that while young adults have certainly embraced the digital age's tools, there's no evidence that the influence has made them more “learned, knowledgeable, fluent, up-to-date, or inquisitive” (p. 8-9).

Teachers, too, are divided on DGBL. In an unscientific online poll at the Edutopia Web site, 78 percent of 510 users voted that computers and video games are effective teaching tools (Bernard, n.d.). Those who disagreed posted comments asserting that DGBL examples to date are only loosely based on pedagogy and haven't represented sound instructional strategy. They claim that real learning requires more work than playing a game.

This paper explores both sides of the DGBL debate as it might be applied to teaching financial literacy to young adults inside or outside the classroom.

Digital Game-Based Learning Should be Used in Financial Literacy Instruction

DGBL is Innately Motivating to Young Adult Learners

One of the biggest hurdles in learning is motivation, “the process whereby goal-directed activities are instigated and sustained” (Schunk, 2008, p. 393). If learners are unmotivated or disengaged, they likely will not put forth the effort to learn. So educators have asked the question, “What *does* motivate today’s young adults to learn?” The answer seems to be digital games. *Got Game* authors Beck and Wade (2004) describe games as “a central, defining part of growing up for many millions of people” (p. 6). Recent survey results from the Pew Internet & American Life Project (2008) revealed that 97 percent of American teens play digital games, and at least half play daily.

Researcher Tom Malone (1981) tied the allure of digital games to a user’s feeling of mastery or intrinsic motivation, which is the goal of authentic learning. Successful digital games sustain that motivation by challenging users without pushing them being beyond their capacity. In educational theory, this could be compared to Vygotsky’s Zone of Proximal Development, the difference between actual and potential learning capacity (Schunk, 2008). Prensky (2007) argues that if young adults are as innately engaged in digital games as usage trends suggest, why not embrace DGBL and apply what designers of successful games have discovered?

DGBL in the Form of Simulations Promotes Enactive Learning and Self-efficacy

Learning by doing, or enactive learning, allows an individual the opportunity to learn from his or her own actions and mistakes (Schunk, 2008). Games researcher James Gee (2007)

claims that games in general fall squarely into this kind of learning. In fact, it's been argued that games are a "vital educational function for any creature capable of learning" (Crawford, 1982) because they offer the opportunity for modeling and play as instructional strategies (Van Eck, 2006). If that is true, games in digital form should provide the same educational value, especially when they offer specific opportunities for simulation (Kirriemuir & McFarlane, 2004; Rieber, 1996; Gee, 2007), lessons about real life (Prensky, 2006), and computer-related self-efficacy (Eastin & LaRose, 2000).

Digital games that feature real-life simulations and role-playing allow a user the advantage of making mistakes and learning from those mistakes without being hindered by the serious consequences of reality. (Shaffer, 2006). Gee (2007) describes this as learning with a low cost of failure, and compares it to Erik Erickson's theory about psychosocial moratorium, a period of development when young adults experiment freely with roles (Erikson, 1968).

An example helps paint the picture: Losing your fortune in real life can be insurmountable, but losing a fortune in a well-designed online banking digital simulation game can be a near-real learning experience with no negative financial consequences beyond the computer screen. A user who wants to win the game but is unfamiliar with an online checking account and bill paying service will be motivated to learn how to use real financial management tools to win the game, but greater learning is also happening. In this example, the user is provided with "a model of doing in order to learn, rather than learning in order to do" (Kirriemuir & McFarlane, 2004), and can practice "performance before competence" (Gee, 2007, p. 218), before carrying that learning from the virtual world to the real world. Also, well-crafted simulation games are immersive experiences that can put users in a state of engagement

or “flow” (Csikszentmihaly, 1991), where they perform at optimal levels. In turn, that immersion promotes reflection (Oblinger, 2006), which leads to authentic learning.

DGBL can teach learners about real-life financial concepts such as cause and effect (e.g., paying a bill creates a debit in the account), long-term versus short-term gains (e.g., the long-term effect of investing \$20 versus spending it), and sequencing (e.g., depositing a paycheck before paying a bill). This experience allows learners to see a relationship between their virtual and real-life identities (Gee, 2007). And just as rules for actions in real-life are often learned trial and error, DGBL’s built-in rules can be learned through trial and error.

On the other end of the learning spectrum, mastery of the game and its tools leads to confidence and self-efficacy, a learner’s belief that he or she can perform in a certain way or reach certain goals (Bandura, 1997). For novice online-banking users, computer self-efficacy may be a key ingredient to overcoming anxiety associated with using the current online tools (Eastin & LaRose, 2000) for money management. Those very real financial management skills and feelings of computer self-efficacy should be transferable to real-life accomplishment of online-based activities (Compeau & Higgins, 1995), like banking and bill paying.

Digital Game-Based Learning Should Not be Used in Financial Literacy Instruction

Media Like DGBL Can Never Influence Learning

Nearly a quarter century ago Richard Clark (1983) asked a question that still surfaces in current educational technology literature reviews: Can media ever influence learning? Clark’s answer is no; learning can only be the result of content combined with instructional strategy, and media is merely a tool for the teacher to deliver that strategy. Clark’s supporters use his argument to question the value of DGBL, and to encourage instructional designers to resist the

lure of this latest “shiny object” in instructional strategy or to label it as the definitive answer to education reform. One of those supporters is Mark Bauerlein, author of *The Dumbest Generation* (2008), who writes: “Techno-cheerleaders view the digital learning experience through their own motivated eyes, and they picture something that doesn’t yet exist” (p. 125). He and other Clark supporters argue that tools have not, can not, and will not supersede instructional strategy.

DGBL Promotes Unconscious Learning

The edutainment digital games that exploded onto the education scene in the 1980s and 1990s had a distinctly behaviorist focus, which encouraged play and relied on extrinsic motivation to reward unconscious learning (Kirriemuir & McFarlane, 2004; Nielsen, Smith, & Tosca, 2008) instead of promoting reflective authentic learning. While proponents argue that DGBL has evolved to promote more desirable and long-lasting intrinsic rewards for learning, many of the digital game titles available today still rely on repetitive drill-and-practice and behaviorally focused trial and error, which may help improve hand-eye coordination but don’t necessarily promote transferable skills (Nielson, 2008; Kerr, 2006), long-lasting learning effects, or strong learner engagement (Thornburg, 2006).

Rather, most of today’s DGBL offerings are like vitamins wrapped in chocolate cake — an attempt to trick learners into unconscious ingestion of knowledge instead of instilling in them a desire to learn. Unconscious financial literacy gained through DGBL will not transfer to real life, where its application — or lack of it — can determine financial stability.

DGBL Assessment is Difficult to Measure

Just because a user finishes a digital-learning game doesn’t guarantee that learning happened. Squire (2002) quotes the results of a comprehensive 1973 research study that

concluded there was no significant achievement difference between learners taught with instructional games versus traditional methods.

While some might argue that has changed in the age of digital gaming, which offers infinite user activity log capabilities and built-in scoring systems to use in learning assessment, test scores have not proven consistent positive results. The National Center for Education Evaluation and Regional Assistance (2007) found that among 132 schools using selected math and reading digital learning materials, test scores were not significantly higher. Chen and Michael (2005) also suggest several challenges linked to DGBL learning assessment. For example, in open-ended simulation games, which may be the most appropriate venue for teaching financial literacy, there may be an infinite number of solutions. The user who wins may not know if it was luck or correct decision-making that led to the win. Without explanatory reinforcement, which is not always provided in digital games, the learner could be left guessing.

Another obstacle to assessment is cheating, an acceptable practice in non-academic digital gaming. Hints and cheat codes for most major digital games are just a simple Web search removed from a user who would rather win the game by cheating than through learning. Bauerlein (2008) argues that young adults have become so comfortable using the computer for non-learning pursuits like gathering cheat codes, that those habits will likely leech into the DGBL experience, compromising learning, and nullifying the possibility of positive results.

Analysis and Conclusions

The DGBL debate rages on. While there isn't enough valid research to know whether its use in instructional technology is consistently effective, the popularity and reach of digital technology continues to grow and position itself as a powerful force in all learning settings. The most appropriate digital games for teaching financial literacy to young adults should be based on

social cognitive learning theory, using simulations of real-life money management. But in reality, there is a dearth of games like this that are built specifically to promote authentic learning on this subject. Instead, there is a wealth of edutainment offerings, which may never deliver beyond behaviorally focused unconscious learning with no credible assessment and a short intellectual lifespan. Some educators argue that is not really learning at all.

Mishra and Koehler (2007, April) call the marriage of education and technology a “wicked problem ... that require(s) us to develop new ways of confronting (the) complexity.” One way to come closer to the answer about DGBL’s role in teaching financial literacy or any other subject is to devote more research to psychometrics, or measurement of mental capabilities (Chen & Michael, 2005) that are typically associated with DGBL. Data that proves learning may help win the debate.

Another way to address the issue is to form coalitions of leaders in game design, education, and business to probe the potential of DGBL. The Education Arcade is exactly that — a consortium of educators, educational publishers, media companies, and game developers aiming toward the goal of authentic learning by blending instructional strategies with engaging digital play for all critical subject matters. The results of their collaboration could help DGBL gain credibility with skeptical educators and doubtful parents. But their efforts must also appeal to young adults, who desperately need guidance as they start their financial journey and demand innovation based on their jaded experience as digital natives. For these young adults, successful integration of DGBL and financial literacy is critical, as it could make the difference between this age group’s financial stability and a life-long cycle of poverty, which will be a key to our society’s future.

References

- Bandura, Albert. (1997). *Self-efficacy: The exercise of control*. New York: W.H. Freeman.
- Bauerlein, Mark. (2008). *The dumbest generation: How the digital age stupefies young Americans and jeopardizes our future (or, don't trust anyone under 30)*. Virginia: Jeremy P. Tarcher / Penguin.
- Beck, John C. & Wade, Mitchell. (2004). *Got game: How the gamer generation is reshaping business forever*. Boston: Harvard Business Press.
- Bernard, Sara. (n.d.). The Edutopia poll: Are computer and video games effective teaching tools? Retrieved October 29, 2008, from the Edutopia Web site at <http://www.edutopia.org/node/3499/results>
- Chen, Sande & Michael, David. (2005). Proof of learning: Assessment in serious games. CMP Media LLC. Retrieved October 25, 2008, from http://www.gamasutra.com/features/20051019/chen_01.shtml
- Clark, Richard E. (1994). Media will never influence learning. *Educational Technology Research & Development*, 42(2), 21-29.
- Clifford, Catherine. (2008, October 23). *Foreclosure filings spike 71%*. CNNMoney.com. Retrieved November 08, 2008, from http://money.cnn.com/2008/10/23/real_estate/foreclosures/index.htm?postversion=2008102305
- Compeau, D. & Higgins, C. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, 19(2), 189–211.
- Consolidated Credit Counseling Service. (2008, June 4). *Credit basics: Personal bankruptcies continue to rise — Consumer tips to avoid money problems in an uncertain economy*.

- Retrieved November 08, 2008, from <http://www.consolidatedcredit.org/press/Personal-Bankruptcies-Continue-to-Rise.aspx>
- Crawford, C. (1982). Why do people play games? In *The art of computer game design*. Out of print. Retrieved October 24, 2008, from <http://www.vancouver.wsu.edu/fac/peabody/game-book/Coverpage.html>
- Csikszentmihaly, Mihaly. (1991). *Flow: The psychology of optimal experience*. New York: Harper Perennial.
- Eastin, Matthew S. & LaRose, Robert. (2000). Internet self-efficacy and the psychology of the digital divide. *Journal of Computer-Mediated Communication*, 6(1). Retrieved November 8, 2008, from <http://www3.interscience.wiley.com/cgi-bin/jhome/117979306>
- Erikson, Erik H. (1968). *Identity, youth, and crisis*. New York: W.W. Norton & Company.
- Gee, James P. (2007). *What videogames have to teach us about learning and literacy*. New York: Palgrave Macmillan.
- JumpStart Coalition Press Release. (March 12, 1998). Bankruptcy Rates Linked to Financial Literacy, Says JumpStart. Retrieved November 10, 2008, from the JumpStart Web site, <http://www.jumpstart.org/upload/news.cfm?recordid=40>
- Kerr, Aphra. (2006). *The business and culture of digital games*. London: Sage Publications.
- Kirriemuir, J., & McFarlane, A. (2004). Games and learning. Futurelabs. Retrieved September 24, 2008, from http://www.futurelab.org.uk/resources/publications_reports_articles/literature_reviews/Literature_Review378
- MacArthur Foundaion. (2008). *Living and Learning with New Media: Summary of Findings from the Digital Youth Project*. Retrieved November 24, 2008, from <http://digitalyouth.ischool.berkeley.edu/files/report/digitalyouth-WhitePaper.pdf>

- Malone, Thomas W. (1981). Toward a theory of intrinsically motivating instruction. *Cognitive Science*, 5(4), 333-369.
- Mishra, Punya & Koehler, Matthew J. (2007, April). Technological Pedagogical Content Knowledge (TPCK): Confronting the wicked problems of teaching with technology. Paper presented at 2007 Society for Information Technology & Teacher Education Conference, San Antonio, TX.
- National Council on Economic Education. (2005). *What American teens & adults know about economics*. (A Harris Interactive Poll prepared for the National Council on Economic Education). Retrieved October 29, 2008, from the NCEE Web site, <http://www.ncee.net/>
- Networks Financial Institute at Indiana State University Press Release (September 4, 2007). National Study Assesses U.S. Adults' Financial Literacy. Retrieved October 29, 2008, from the Networks Financial Institute Web site, <http://www.networksfinancialinstitute.org/News/Pages/PressReleasesArchive.aspx?PressReleaseID=58>
- Nielsen, Simon E., Smith, Jonas H., & Tosca, Susana P. (2008). *Understanding video games: The essential introduction*. New York: Routledge.
- Oblinger, D. (2006, May). Simulations, games, and learning. Retrieved October 3, 2008, from the Educause Web site at <http://net.educause.edu/ir/library/pdf/ELI3004.pdf>
- Pew Internet & American Life Project. (2008). Teens, video games, and civics: Teens' gaming experiences are diverse and include significant social interaction and civic engagement. Retrieved November 24, 2008, from the Pew Internet Web site, http://www.pewinternet.org/PPF/r/263/report_display.asp

- Prensky, Marc. (2006). *Don't bother me, Mom. I'm learning!: How computer and video games are preparing your kids for 21st century success and how you can help!* St. Paul, MN: Paragon House.
- Prensky, Marc. (2007). *Digital game-based learning*. St. Paul, MN: Paragon House.
- Rieber, Lloyd P. (1996). Seriously considering play: Designing interactive learning environments based on the blending of microworlds, simulations, and games. *Educational Technology Research & Development*, 44(2), 43-58.
- Schunk, Dale H. (2008). *Learning theories: An education perspective*. (5th ed.). Upper Saddle River, New Jersey: Pearson Prentice Hall.
- Shaffer, David W. (2006). *How computer games help children learn*. New York: Palgrave Macmillan.
- Squire, Kurt. (2002). Cultural framing of computer / video games. *The International Journal of Computer Game Research*, 2(1). Retrieved October 29, 2008, from <http://www.gamestudies.org/0102/squire>
- The National Center for Education Evaluation and Regional Assistance. (2007). Evaluation report entitled Effectiveness of Reading and Mathematics Software Products: Findings from the First Student Cohort. Retrieved November 13, 2008, from <http://ies.ed.gov/ncee/pdf/20074005.pdf>
- The White House. President's Advisory Council on Financial Literacy Press Release. (January 22, 2008). President Bush Announces President's Advisory Council on Financial Literacy. Retrieved October 29, 2008, from the White House Web site, <http://www.whitehouse.gov/news/releases/2008/01/20080122-7.html>

- Thornburg, David. (2006). Can games be used to teach? *Learning & Leading with Technology*, Retrieved October 29, 2008, from the International Society for Technology in Education Web site at www.iste.org/Content/NavigationMenu/Publications/LL/LLIssues/Volume_33_2006_2005_/april_No_7_/33706p.pdf
- U.S. Public Interest Research Groups. (2008). Results of the Campus Credit Card Trap Survey. Retrieved November 10, 2008, from the Truth About Credit Web site at <http://www.truthaboutcredit.org/campus-credit-card-trap>
- Van Eck, Richard. (2006). Digital game-based learning: It's not just the digital natives who are restless. *Educause Review*, 41(2), 16-30.
- Zhu, Ning. (in press). Household consumption and personal bankruptcy. *Journal of Legal Studies*.