



Citations: Some Research Quotations That Informs Our Practice

“If you judge a fish by its ability to climb a tree, it will live its whole life believing that it is stupid” -Einstein

“Tell me and I forget, teach me and I may remember, involve me and I learn.” —Benjamin Franklin

“I am always ready to learn although I do not always like being taught” ~ Winston Churchill

“One of the most difficult tasks men can perform, however much others may despise it, is the invention of good games.” - Carl Jung

“Play is the highest form of research.” - Albert Einstein

“Games and traditional assessments share underlying characteristics that provide a means for quantifying knowledge and abilities. The two environments use complementary technologies that can combine to create more accurate models of student knowledge, skills, and behaviors...Assessment occurs naturally in a game” (McClarty, Orr, Frey, Dolan, Vassileva, & McVay, 2012, p. 18).

“Core leadership principles have remained largely the same since the dawn of time. The trick is learning how to integrate those time-tested principles with evolving leadership practices engineered for twenty-first century success” (Myatt, 2014).

“Perhaps what is most unique about digital games—as opposed to any other learning innovation—is the combination of motivation, engagement, adaptivity, simulation, collaboration, and data collection that can’t be achieved at scale any other way” (McClarty, Orr, Frey, Dolan, Vassileva, & McVay, 2012, p. 23).

-Effective Sims can reduce training costs (Santana as stated by Government Business Council, 2015).

“Educators and developers must work together to produce immersive video game contexts that provide affordances that maximize learning and fun” (Schrader, Lawless, & Deniz, 2010, p. 309)

“Good educational games will consider both the learning goals/content and the game play at the same time, with enough flexibility to iterate between the two to change one or both simultaneously” (Klopfer, Osterweil, Salen, Haas, & Roy, 2009, p. 34).

-Multi-generational workforces differ in their learning preferences, but there is a “sweet spot” where Baby boomers, Gen Xers, and Millennials overlap when it comes to blended learning and active/experiential/discovery learning. Multigenerational workforces like learning that includes interactivity and games (Paradigm Learning, Inc., 2014).

“Serious games can develop soft skills like emotional intelligence, communication, management, critical problem solving and collaboration skills” (Marinho, 2012).

“Gaming/simulation is experiential; it is learning in practice...Games can be modeled in such a way that they invite collective efforts of interdisciplinary communication, functional negotiation, team effort, and shared learning” (Nygaard, 2012, p. xvii).

-Deloitte (2015) conducted a study that collected the responses from over 7,800 millennials from 29 countries. “When Millennials were asked to rate the skills and attributes on which businesses place the most value (and for which businesses are currently prepared to pay the highest salaries),

they pointed to the qualities that were relatively under-developed at graduation. Leadership was considered most valuable (mentioned by 39 percent), but only 24 percent thought this was a strong personal trait on graduation (a gap of 15 points). (Deloitte, 2015, p. 22).

“In a survey of IBM’s own internal gaming community, which includes more than 200 gamers, nearly half believe that game playing is improving their “real world” leadership capabilities; and four out of 10 say they have already applied MMORPG leadership techniques and approaches to improve their leadership effectiveness at work” (IBM GIO 2.0 Report, 2007, p. 6).

“Games lubricate the body and mind...We do not stop playing because we grow old, we grow old because we stop playing!” - Benjamin Franklin

“Finding the balance between game design and pedagogic models has remained the greatest challenge in terms of SG design, echoing the requirement to find a balance between engagement and fun and learning and instructional efficacy” (de Freitas and Routledge, 2013, p. 957-958).

“After people play these Sim games, it tends to change their perception of the world around them, so they see their city, house or family in a slightly different way after playing...Games should engage us in the world rather than distract us from it” (Will Wright).

“[Jesse] Schell uses Self Determination Theory, which states that people are motivated by three distinct psychological needs: the need for competence, the need for autonomy, and the need for relatedness.” (Lefebvre, 2011).

“Our approach to making games is to find the fun first and then use the technology to enhance the fun...The Sid Meier’s branding has always had a sense of easy to learn and hard to master (complexity out of simplicity) that gained a wider fan base for his games...Games are a series of interesting decisions”-Sid Meier.

“Simulation elements enable discovery, experimentation, role modeling, practice, and active construction of systems, cyclical, and linear content. Which means they enable a transferability to the real world.” (Aldrich, 2005, p. 7).

-Don [Kirkpatrick] stated: “Trainers must begin with desired results and then determine what behavior is needed to accomplish them. Then trainers must determine the attitudes , knowledge , and skills that are necessary to bring about the desired behavior(s) . The final challenge is to present the training program in a way that enables the participants not only to learn what they need to know but also to react favorably to the program.” (Kirkpatrick and Kirkpatrick, 2009, p. 3).

-Experiential learning is generally comprised of five components. According to Svinicki and McKeachie (2011), these components are:

1. The learning incorporates real-world situations, equipment and problems
2. The situations contain some difficult, ill-defined problems.
3. Learners will encounter solving similar problems in the real world
4. The instructor serves as a guide rather than the lead problem solver
5. After learners arrive at a solution, they spend quality time in reflection about how they solved the problem and in reviewing their feedback

“Modern video games immerse minds in virtual worlds in which the players must explore and discover the attributes of complex relationships and develop sophisticated skills and strategies in order to advance within the game. The virtual environments of video games appeal to student’s innate desire to learn and self-educate by sparking their natural curiosity while they are engaged in something they already enjoy. In other words, video games create a unique opportunity for tangential learning. Tangential learning is about being exposed to things within a context in which you’re already engaged” (Niles, 2010). “Educational computer (video) games are considered effective teaching tools because they (1) use action instead of explanation, (2) create personal motivation and satisfaction, (3) accommodate multiple learning styles and skills, (4) reinforce mastery skills and (5) provide interactive and decision-making contexts” (Kebritchi and Hirumi, 2008).

“Learners can take risks in a space where real-world consequences (i.e., grades, risk of looking silly) are lowered” (Gee, p. 11).

“To provide an enjoyable interactive experience for the widest variety and number of users, game’s, and more generally any end-user technology’s, design should follow a four-step methodology:

- Mix and match the components of Flow.
- Keep the user’s experience within the user’s Flow Zone
- Offer adaptive choices, allowing different users to enjoy the Flow in their own way; and
- Embed choices inside the core activities to ensure the Flow is never interrupted” (Chen 2007).

“Even though we had rejected the first-person shooter approach, the first-person perspective still seemed emotionally critical to simulating and learning leadership practices” (Aldrich, 2004, p. 64).

“As with everything, this ending content would be instructive as it reinforced what to look for in one’s real life that signified leadership success or failure” (Aldrich, 2004, p. 68).

“Although leadership potential in a given situation can be measured by effective use of power, tension, and ideas, for it to grow in the long term, business results have to follow” (Aldrich, 2004, p. 194).

“The development and adoption of simulations will change the nature of work, change the skill sets of our culture, and create an international industry that will eventually account for billions in revenue” (Aldrich, 2004, p. 229).

“Anyone looking at simulations is used to looking at all three types: cyclical, linear, and systems” (Aldrich, 2004, p. 231).

“Open-ended environments are very good for developing strategies, building up environments, and taking ownership. Skills learned this way are the most easily transferable from situation to situation” (Aldrich, 2004, p. 28).

“With such computer-controlled mannequins in a full-scale operating room or other medical settings, physicians, nurses, and other healthcare providers can learn both technical and behavioral (such as, leadership, teamwork, communications, and resource management) skills” (Bergeron, 2006, p. 52).

“Cadets also use America’s Army to learn the basics of land navigation, force protection, procedural first aid and survival, critical thinking and leadership, and maintenance and intelligence skills” (Bergeron, 2006, p. 59).

“Few serious educators would claim that games are the most efficient way to learn facts, especially when pressed for time. However, serious games may be the effective means of safely learning skills and attitudes—processes that are difficult to acquire through rote memorization” (Bergeron, 2006, p. 68).

“Proponents of simulated patient cases or games report that the superiority of the case-based approach to medical training also applies to the use of interactive virtual patients in medical training” (Bergeron, 2006, p. 69).

“There is evidence that serious games may be the most effective means of learning skills and attitudes and that serious gameplay may support longer-lasting learning than traditional methods” (Bergeron, 2006, p. 74).

“Serious games add the constraints of security and privacy, because performance during gameplay may be used to assess the player’s knowledge, skills, and attitudes” (Bergeron, 2006, p. 159).

“Many massively multiplayer games and limited multiplayer online games are capable of emotionally intelligent dialogue. A standalone game in which a mentor avatar guides the learner through challenges can also support an emotionally intelligent dialogue” (Bergeron, 2006, p. 185).

“Following the lead of networked, multiplayer entertainment games and high-end military combat trainers, serious games are evolving into team-based learning experiences that emphasize leadership skills, real-time problem solving, and cooperative gameplay” (Bergeron, 2006, p. 369).

“Play is voluntary, intrinsically motivating, and involves active cognitive and/or physical engagement that allows for the freedom to fail, to experiment, to fashion identities, and freedom of effort and interpretation” (Ifenthaler, Eseryel, & Ge, 2012, p. 44).

“Good games can act as transformative digital learning tools to support deep and meaningful learning” (Ifenthaler, Eseryel, & Ge, 2012, p. 47).

“With simulated visualization and authentic problem solving with instant feedback, computer games can afford a realistic framework for experimentation and situated understanding, hence can act as rich primers for active learning” (Ifenthaler, Eseryel, & Ge, 2012, p. 47).

“Games can involve players in forming, experimenting with, interpreting, and adapting playing strategy in order to solve problems, thus enabling players to practice persistent problem solving” (Ifenthaler, Eseryel, & Ge, 2012, p. 48).

“Well-designed games and productive learning processes employ ongoing feedback as major mechanism of play/learning support” (Ifenthaler, Eseryel, & Ge, 2012, p. 48).

“We also believe that well-designed games can serve as one excellent type of learning environment because games are intrinsically motivating and can facilitate learning of academic content and twenty-first century competencies within complex and meaningful environments” (Ifenthaler, Eseryel, & Ge, 2012, p. 55).

“In digital games, people learn in action. That is, learning involves continuous interactions between the learner and the game, so learning is inherently products of learning cannot be isolated from the context, and neither should assessment” (Ifenthaler, Eseryel, & Ge, 2012, p. 52).

“Games add a layer of engagement. By providing goals and challenges, managed to keep players just at the edge of their capabilities, computer games capitalize on deep principles of learning” (Ifenthaler, Eseryel, & Ge, 2012, p. 62).

“Studies also show that games can support: (1) students’ epistemological understanding of nature and the development of science knowledge, and (2) students’ attitude, identity, and habits of mind in terms of their willingness to engage and participate productively in scientific practices and discourse” (Ifenthaler, Eseryel, & Ge, 2012, p. 174).

“There is mounting evidence of the success of game-based learning for providing learning experiences which enable students to develop and demonstrate the achievement of learning outcomes from lower order foundational knowledge and skills through to complex concepts and higher order metacognitive and creative skills” (Ifenthaler, Eseryel, & Ge, 2012, p. 217).

“Playing games can support valuable skill development, such as strategic thinking, planning, communication, application of numbers, negotiating skills, group decision-making, and data handling” (Ifenthaler, Eseryel, & Ge, 2012, p. 217).

“Simulations, often associated with higher order learning, can also in certain cases, be used for teaching facts and knowledge. Their characteristic simplification of real-world systems can help students solve problems, learn procedures, understand phenomena, and practice skills safely and efficiently” (Ifenthaler, Eseryel, & Ge, 2012, p. 224).

“Instructional games are known for their ability to motivate and engage students in learning process. Harnessing games ability to assess student’s motivation in every phase of the learning process and respond in appropriate manner to maintain the optimal engagement and motivation levels will boost learning” (Ifenthaler, Eseryel, & Ge, 2012, p. 395).

“We believe that video games offer tremendous untapped potential for improving formal school and helping youth learn academic knowledge outside of schools” (Ifenthaler, Eseryel, & Ge, 2012, p. 427).

“Educational games proved to be effective learning tools, presenting a number of benefits such as:

Improve student’s knowledge

Support learner to acquire new skills

Increase learner’s motivation

Increase learner’s satisfaction” (Ifenthaler, Eseryel, & Ge, 2012, p. 356).

-We tend to think of soft skills as this unfortunate area of development because it's not as concrete as code or Photoshop. In reality, there's a list of characteristics that show up in quality leaders, we can learn how to seek them out, and we can learn how to encourage their growth. (IGDA Production SIG & Fuller, 2013)

-Making a game isn’t just about writing code, creating images or building game levels. Making a game requires collaboration and interdisciplinary communication at the highest level – and that requires leadership, at all levels within an organization, regardless of team size or project scope. (Spector & Denius-Sams Gaming Academy, 2014, para 1).

“Possible educational impact is not limited to knowledge acquisition or skill practice; it also include exploration, problem solving, or incidental learning” (Ritterfeld, Cody, & Vorderer, 2009, p. 5).

“We identified four primary learning principles through which serious games attempt to impart skills, knowledge, or ideas to the players: practicing skills, knowledge gain through exploration, cognitive problem solving, or social problem solving” (Ritterfeld, Cody, & Vorderer, 2009, p. 16).

“Through this entertainment education blend, the advantage of fun game play calls attention to some important social and educational issues, spurring deeper thinking, discussion, and learning, as well as creating opportunities for vicarious experiences that would be otherwise impossible” (Ritterfeld, Cody, & Vorderer, 2009, p. 48).

“Games can be used for different types of learning” (Ritterfeld, Cody, & Vorderer, 2009, p. 67).

“These relations between emotions and complex learning are of course quite relevant to the design of serious games that promote deep learning” (Ritterfeld, Cody, & Vorderer, 2009, p. 91).

“The games are deep in the sense that the content and skills tap deep reasoning, critical thinking, complex systems, causal chains and networks, and other difficult material that is part of science, technology, engineering, and mathematics (STEM)” (Ritterfeld, Cody, & Vorderer, 2009, p. 93.)

“During leisure time, digital interactive games can deliver constructivist learning opportunities that people will eagerly play for the fun of it” (Ritterfeld, Cody, & Vorderer, 2009, p. 120).

“Games involve challenge to reach a goal, and serious games can pose compelling and motivating challenges during leisure time that require the player to learn new content, engage in higher-order thinking and problem solving, make decisions, interact with others collaboratively and in leadership roles, and try out new experiences that would be difficult or impossible in the physical world” (Ritterfeld, Cody, & Vorderer, 2009, p. 120).

“Within a well-designed game, learners have a safe and private environment in which they can try out and rehearse new skills, receive helpful feedback, progress at their own pace, and learn how and why things work beyond simply memorizing a series of facts” (Ritterfeld, Cody, & Vorderer, 2009, p. 120).

“Learning is more likely to be experienced as fun when there is a good reason to learn, the material is tailored to the individual learner’s abilities, the system provides helpful feedback and support, and the learner has some personal control over the process” (Ritterfeld, Cody, & Vorderer, 2009, p. 121).

“Game players are directly engaged in the world of the game and receive feedback for their own actions. They gain first-hand experience of mastering problems in the virtual world of a game, and this experience of mastery and seeing it lead to effective decisions can be a powerful way to learn, compared to carrying out problem-solving exercises on paper and receiving external acknowledgment in the form of a grade” (Ritterfeld, Cody, & Vorderer, 2009, p. 122).

“Interactive media, including digital interactive games, can provide dynamic assessment in which the game or the teacher measures the learner’s performance, helps the learner reflect on her or his performance and strategies, provides help and suggestions for improvement, allows opportunities to practice, and then assesses again” (Ritterfeld, Cody, & Vorderer, 2009, p. 123).

“The preliminary evidence suggests that strategic thinking ability and transfer can be enhanced by playing a digital game that requires those skills” (Ritterfeld, Cody, & Vorderer, 2009, p. 161).

“A series of motives for educational use of digital games and simulations that can be of value here. Among their most important motivations are: (1) games stimulate fantasy, challenge, and stir curiosity; (2) games offer safe and cheap environments to experiment with daily-life affairs or one’s dreams; (3) games provide practical and relevant contexts for learning, while creating a good fit between learning and future professions; (4) games activate learning through competition-based education in addition to active knowledge construction; (5) games may adjust to youth culture” (Ritterfeld, Cody, & Vorderer, 2009, p. 181).

“Four underlying mechanisms of the appeal and impact of playing digital games: wishful identification, immersion and presence, mastery of challenges, and perceived realism” (Ritterfeld, Cody, & Vorderer, 2009, p. 194).

“The usage of digital games may serve as a coping strategy or a tool for self-induced therapy. This reasoning is confirmed by the effective usage of virtual environments for therapy in anxiety and posttraumatic stress disorders” (Ritterfeld, Cody, & Vorderer, 2009, p. 211).

“It is proposed that serious games gain capabilities to induce social/behavioral change due to their ability to trigger relevant motivational processes, especially the motivation to select change-related messages, to process their content during exposure, and to elaborate on them beyond the exposure situation” (Ritterfeld, Cody, & Vorderer, 2009, p. 254).

“Entertainment games can include chances for incidental learning of knowledge or skills, which might be transferable to life outside the game world, serious games endorse intentional learning according to predefined learning goals, which can be implicit as well as explicit” (Ritterfeld, Cody, & Vorderer, 2009, p. 324).

“In addition to using constructivism, immersion, and simulations to enhance learning, educational games can be designed with other pedagogical features that have been shown to foster learning, such as role modeling; self-directed learning in environments where the individual learns how to learn; placing learning and problem solving in a familiar context so that learners can more readily draw on their prior experiences in that setting; scaffolding, feedback, and other forms of learner help and support; adaptive instruction that adjusts to the learner’s performance and abilities to keep the material challenging but not too easy or difficult; intelligent tutoring and coaching learner understanding and transfer of skills; the development and rehearsal of planning skills and other basic academic skills; and the use of fantasy and narrative to enhance engagement and to provide a framework for remembering and applying what was learned” (Ritterfeld, Cody, & Vorderer, 2009, p. 123).

“Researcher Kurt Squire tested a simulation/game called Supercharged, developed at MIT by John Belcher and Andrew McKinney, to teach about electromagnetic forces. Using pre- and post- tests with control groups, he found that the participants in the control group receiving interactive lectures improved their understanding by 15 percent over their pre-test scores, while those who played with the game improved their understanding by 28 percent” (Aldrich, 2009, p. 4).

“Combining the context and emotional arguments, many have argued that failure is necessary to learn. Experimenting in environments where failure is acceptable is therefore necessary to learn and ultimately to develop cognitive resiliency” (Aldrich, 2009, p. 6).

“Essentially, games should be used when students need to be more engaged than they are. When students are not expressing interest in the content or demonstrating only rote learning, introducing interactive content can attract and engage them. It can be light and fun, or it can be deep and challenging” (Aldrich, 2009, p. 51).

“Educational simulations should also be used when content is meant to be applied beyond the classroom but currently is not. For example, if an organizational behavior class is striving to drive real changes in the behavior of the students once they leave the classroom but is failing, then simulations might be a good choice” (Aldrich, 2009, p. 53).

“By using design-based research the next generation of games and simulations has the potential to dramatically improve students’ motivation and educational outcomes, as well as generating new insights about the nature of learning” (Gibson, Aldrich, Prensky, 2007, p. vi).

Digital natives who play a lot of games are provided with skills, such as dealing with large amounts of information quickly even at the early ages, using alternative ways to get information, and finding solutions to their own problems through new communication paths” (Gibson, Aldrich, Prensky, 2007, p. 3).

“Critical thinking and problem-solving skills, drawing meaningful conclusions, some inductive discovery skills like observation, trial, and error and hypothesis testing, and several other strategies of exploration were other positive effects of games on learning” (Gibson, Aldrich, Prensky, 2007, p. 5).

“Challenges in a game tend to fight students’ boredom and keep them engaged with the activity by means of adjusted levels of difficulty. Fantasy in a game increases enthusiasm by providing an appealing imaginary context, whereas curiosity offers interesting, surprising, and novel contexts that stimulate students’ needs to explore the unknown. Finally, the control characteristic gives learners the feeling of self-determination” (Gibson, Aldrich, Prensky, 2007, p. 6).

“Gaming activities have the potential to engross the learner into a state of flow and consequently cause better learning through focus and pleasant rewards, while increasing their motivation and attainment” (Gibson, Aldrich, Prensky, 2007, p. 6).

Games provide a great deal of highly interactive feedback, which is crucial to learning. Practice and feedback, learning by doing, learning from mistakes, goal oriented learning, discovery learning, task-based learning, question-based learning, situated learning, role playing, coaching, constructivist learning, multi-sensory learning are applicable interactive learning techniques, when learning through games” (Gibson, Aldrich, Prensky, 2007, p. 6).

“The “Games-to-Teach” project carried by Massachusetts Institute of Technology proposes design principles for successful game design. These are designing educational action games by turning simulations into simulation games; moving from parameters to “power-ups [adjustments made on some traits of the character in the games, such as shifts in player speed, height, and so forth to enhance their attributes]” (Gibson, Aldrich, Prensky, 2007, p. 15).

“The learning process that gamers use sounds strikingly similar to three of Bloom’s higher levels of learning:

Application: Uses a concept in a new situation;

Analysis: Separates material or concepts into component parts so that its organizational structure may be understood;

Synthesis: Builds a structure or pattern from diverse elements” (Gibson, Aldrich, Prensky, 2007, p. 70).

The development of “soft” skills such as collaborations, cognitive, and social intelligence are not the desired end, but are a form of collateral learning, the means that allow players to be successful in these environments” (Gibson, Aldrich, Prensky, 2007, p. 73).

“Players develop competency in the three areas that Dede outlined as critical to long-term success in modern work environment:

Collaborate with Diverse Teams of People

Create, Share, and Master Knowledge

Thrive on Chaos” (Gibson, Aldrich, Prensky, 2007, pp. 76-78).

“Necessary skills in the 21st century revolve around forging connections, handling information and thriving in chaotic environment. Learning is about achieving those competencies, not memorizing and repeating facts out of context” (Gibson, Aldrich, Prensky, 2007, p. 82).

“Games can provide motivation, enhance problem-solving skills, communication skills, and develop creativity through activities such as role-playing” (Gibson, Aldrich, Prensky, 2007, p. 153).

“The use of business simulations as a form of experiential learning and disruptive innovation has evolved significantly over the last six decades” (Earl, 2012, p. 24).

“It is estimated that 95% of AACSB schools (The Association to Advance College Schools of Business) and 86% of all business schools in the United States were using business simulation games” (Earl, 2012, p. 30).

“Three specific advantages to using computer-based simulations in corporate training which will allow it to grow exponentially in the future. These three advantages are; (a) specific knowledge, (b) learning on demand and (c) lower costs” (Earl, 2012, p. 34).

“Disruptions in technology are providing more opportunities to improve the simulation gaming learning experience and a number of pedagogical innovations are beginning to emerge which will drive the way which business simulations are used in the future” (Earl, 2012, p. 55).

Online business simulations provide a technologically powerful and appealing alternative to current corporate training. The low cost nature of simulations offer a value proposition that is persistent and one that grows larger as companies look for ways to cut back on corporate training” (Earl, 2012, p. 58).

“Research has shown that participants perceive online business simulations as an effective training tool” (Earl, 2012, p. 70).

“Adults working in a corporate environment prefer engagement and the opportunity to experience concrete action as the basis for learning, rather than being lectured in a classroom” (Earl, 2012, p. 79).

“The simulation compresses time, allowing participants to quickly see the results of their actions and better understand how management decisions impact the company on an operational, market, and financial basis” (Earl, 2012, p. 82).

Research results strongly suggest that the adoption of online business simulation in corporate training environments can (1) increase business knowledge of employees and managers at all levels within a company and (2) provide a rate of increase in business knowledge and acumen which is well beyond that obtained by traditional practice” (Earl, 2012, p. 137).

“The self-paced and interactive nature of such simulations will allow participants to teach one another and reflect on what they have learned through “learning by doing” rather than “learning by knowing” (Earl, 2012, p. 138).

“Utilizing a simulation or business game/serious game of any kind is an exceptionally effective learning tool. With the exception of either teaching the subject matter yourself or learning through real-life trial and error, simulations and games are one of the most effective ways to learn new subject matter” (Hall, 2014, p. 16).

“Practice by doing alone has a 75 percent retention rate. Business simulation and games give learners the ability to immediately use your leadership development training content” (Hall, 2014, p. 17).

“A recent study determined that management training programs utilizing a simulation provided significantly improved leadership development in results versus control groups that didn’t utilize a simulation” (Hall, 2014, p. 20).

“Research showed that simulation-based learning has a significantly higher level of likelihood of achievement orientation, directedness, influence, and team leadership” (Hall, 2014, p. 21).

“Adults learn better by doing. As adults, we learn by trying, learning, and applying what we have learned to real-life situations” (Hall, 2014, p. 22)

“Strategic simulations are incredibly effective when trying to align strategy, reduce silos, increase business acumen, deliver leadership development, or teach people about the overall strategy of your business” (Hall, 2014, p. 42).

“Custom business simulations quite possibly score the highest in area of engagement. This is because the participants know the solution is about their business, jobs, and roles” (Hall, 2014, p.54).

Within large companies, training, and development groups spend significant time building leadership curriculum around competency models, management growth plans, emotional intelligence requirements, management skills, assessment skills, business acumen, and a lot more” (Hall, 2014, p.71)

“Business simulations and serious games are a phenomenal answer to the problem of how to engage leaders around stimulating programs that can apply advanced curriculum to corporate strategy and uniqueness” (Hall, 2014, p.71).

“The role of the simulation is to reinforce, engage, and enable more natural learning of the training content” (Hall, 2014, p.74).

“People learn most effectively by teaching others – and this scenario makes that learning happen. When your participants begin to share their insights, they are actually teaching others” (Hall, 2014, p.80).

“The optimal way to use a business simulations is:

1. Let participants make decisions. They’ll make some mistakes.
2. Let them see and think about the mistakes that they’ve made. Show them the results as a group and encourage discussion. Try to apply the insights back to their business and roles.
3. Give them an opportunity to try again and use what they learned in the previous round in another round” (Hall, 2014, p.82).

“Simulations and games can engage participants in an environment that safely provides a means to practice learning content better than any other tool can. Thus it’s important that you view a business simulation and/or serious game as a means to practice and apply” (Hall, 2014, p.126).

“Play is a profound engine of change. The ability to play is an essential ingredient of craftsmanship. If we succeed in teaching students to play they will have gained a lasting strategic competence” (Nygaard, Courtney, & Leigh, 2012, p.1).

“The use of simulations and games for religious and military purposes is known to have been part of many ancient civilizations. Egyptians, in the time of the Pharaohs, used board games to “play with” notions of the afterlife. The Gupta dynasty in India played Chaturanga – progenitor of modern Chess – a board game that apparently represents two armies and aided teaching about the tactics and strategies of warfare” (Nygaard, Courtney, & Leigh, 2012, p. 2).

“Games and simulations began to appear in even the most staid university faculties, and Management Faculties, in particular, had taken to developing and using “Business Games” of various kinds” (Nygaard, Courtney, & Leigh, 2012, p. 3).

“Simulation is any means of creating replication of any aspect of the real world for the purpose of analysis, skill development, research and learning” (Nygaard, Courtney, & Leigh, 2012, p. 5).

“The first known example of online role play in Australia, and possibly the world, was Middle Eastern Politics Simulation which was started at The University of Melbourne in 1990 by Vincent and Shepherd” (Nygaard, Courtney, & Leigh, 2012, p. 27).

“Games, simulations and role plays have the potential to help students deal with professional decisions in a social context” (Nygaard, Courtney, & Leigh, 2012, p. 42).

“Games, simulations and role plays offer environments where students can safely experience and learn from system failures – both implicitly and explicitly” (Nygaard, Courtney, & Leigh, 2012, p. 43).

“A game is a constructed situation in which players make efforts to win within defined rules. So games can allow discovery learning about rules, where these can be represented in some form as a game, and the player has to discover the underlying rules by trial and error” (Nygaard, Courtney, & Leigh, 2012, p. 49).

“Simulations differ from games in that they aim to model how a complex reality functions and to present participants with a realistic, if simplified, problem to solve. The dynamics of interaction between participants depend mainly on the rules and modeling built into the simulation” (Nygaard, Courtney, & Leigh, 2012, p. 50).

“In a role play, learning takes place through identification with a character in social context. This leaves room for the learners’ own imaginative elaborations and interpretations. The focus is on the interaction between people with different world views and priorities” (Nygaard, Courtney, & Leigh, 2012, p. 50).

“One of the most significant practical implications of systems thinking for the design of learning activities is the need to build the students’ capacity to learn from system failures” (Nygaard, Courtney, & Leigh, 2012, p. 50).

“Simulations have been used in higher education for over fifty years, yet lecturing and teacher-directed activities, remain dominant in higher education” ((Nygaard, Courtney, & Leigh, 2012, p. 86).

“Students who engage deeply (become immersed in context-based strategies) have been found to have higher learning outcomes and take more responsibility for their own learning than students who engage at a surface level (instrumental, reproductive and minimalist behaviors). Incorporating simulations in curricula provide students with risk-managed opportunities to practice context relevant skills” (Nygaard, Courtney, & Leigh, 2012, p. 86).

“A survey of users and non-users of business games identified the top three advantages of using simulation games as (1) providing experiential or active, participative learning; (2) integrating different functional business areas; and (3) allowing direct application of theory” (Nygaard, Courtney, & Leigh, 2012, p. 101).

“Medicina is a game-based learning environment for non-native speaker of English studying nursing at Flinders University in Australia. An important outcome of all nursing school curricula is competent communication and Medicina is a teaching/learning activity designed to help meet that aim in a manner that is not available elsewhere in the curriculum” (Nygaard, Courtney, & Leigh, 2012, p. 123).

“The action of Medicina involves the student watching a digitized simulation of the clinical environment (a hospital), listening to a command to find a particular medication, and using the mouse to select the correct option among images of five bottles with different names written on them” (Nygaard, Courtney, & Leigh, 2012, p. 124).

“Students can learn in a safe, comfortable environment where they can test their listening and reading skills with real, but reduced, consequences” (Nygaard, Courtney, & Leigh, 2012, p. 137).

“Games and simulations made from scratch – employing methodologies of playfulness, experimentation and invention – offer the possibility of learning outcomes that are not over-prepared, guarded or guaranteed” (Nygaard, Courtney, & Leigh, 2012, p. 148).

“Learning is seen as an emergent process of experimentation, exploration and discovery, initiated by the tutors, but realized and managed by the students, with shared responsibility; a challenge that encompasses surprise, struggle and also possible failure” (Nygaard, Courtney, & Leigh, 2012, p. 148).

“Classroom-based simulations can be more advantageous than case studies because they enable students to consider the consequences of their actions and how they can change their behavior” (Nygaard, Courtney, & Leigh, 2012, p. 212).

“Simulations are key in transferring learning to reality offering self-discovered content as opposed to teacher-directed learning. Participants engage in learning as a result of feedback on their actions and behaviours in the simulation” (Nygaard, Courtney, & Leigh, 2012, p. 212).

“Simulations are, in essence, a form of technology for teaching and learning, and are powerful in ensuring that the classroom becomes a “laboratory” in which life, work and education infuse to produce learning. They make a meaningful contribution to the teaching practice of educators who are tasked with adding knowledge that translates into learning” (Nygaard, Courtney, & Leigh, 2012, p. 212).

“When students are immersed in the simulation world they are provided with an opportunity to experience a theory in practice. This is particularly relevant in management education, where it is uncommon for a laboratory or fieldwork to be used to enable students to experience what has been presented” (Nygaard, Courtney, & Leigh, 2012, p. 213).

“Simulations are particularly valuable as an experiential learning method suited to adult learners” (Nygaard, Courtney, & Leigh, 2012, p. 221).

“Simulations are very effective in facilitating reflection and self-awareness, and developing skills, and are clearly a useful tool for teaching and learning” (Nygaard, Courtney, & Leigh, 2012, p. 221).

“A role play setting supports a fairly free development of activities and also hones students’ intercultural skills by requiring them to adopt a different viewpoint and engage with others from different cultural environments, varying social groupings, and diverse socio-economic backgrounds” (Nygaard, Courtney, & Leigh, 2012, p. 264).

“Four specific rationales for embedding games into curriculum:

1. Sensitising: a game is used at the beginning of the course to sensitise students to the problem situation: for example, managing a large infrastructure project.
2. Exploring: once students know about a problem a game can be used to explore its different dimensions: for example, how the complexity of a large infrastructure project can influence management. Now theory comes first and students will experiment with how it takes place in a simulated real-world case.
3. Practising: often theories or skills need some practice for learning to take place. A game

provides an ideal setting to apply and practice such knowledge or skills safely.

4. Proofing: less common but intriguing is the use of a game to assess students. Performance in the game is an indication of how well a student has acquired relevant knowledge and/or skills” (Nygaard, Courtney, & Leigh, 2012, p. 174).

“We define learning games as games intentionally designed to help the player meet instructional goals while actively interacting with and being engaged and immersed in the experience” (Coleman & Hussain, 2015, p. 1).

“The learning game provides an environment in which the player must demonstrate a level of understanding of a body of knowledge or skills (expressed as learning objectives) to achieve game goals by solving challenges posed in the environment” (Coleman & Hussain, 2015, p. 1).

“Learning games provide the learner an experience within the game context that is tailored to the content and is a critical component to foster learning. Context-specific experiences like this are designed for a learning game to support learning and enable the learner to achieve advanced learning objectives (eg., understanding cause and effect and decision making)” (Coleman & Hussain, 2015, p. 2).

“The field of learning games have grown significantly over the past decade, and the practitioners creating this new, powerful type of product have gradually formed new design and development methods tuned to the particular needs of producing a game that is both entertaining as a game and effective as a learning product” (Coleman & Hussain, 2015, p. 6).

“By placing real-world concepts, such as physics, at the core of gameplay, the game offers more than just a fun experience and can actually teach the player something” (Coleman & Hussain, 2015, p. 56).

“Games can be considered serious games, which are games used specifically to educate, inform, train, advertise or change behavior” (Coleman & Hussain, 2015, p. 56).

“Educational games have been available for years and some have been successful in motivating learners, extending gameplay, and recreating real-world situations” (Coleman & Hussain, 2015, p. 94).

“With the increase in the use of games for education and training, learning game developers seek to create games that not only teach, but engage and motivate learners (Coleman & Hussain, 2015, p. 121).

“Learning games are generally accepted as being as effective as traditional training in some contexts, and it is clear that motivational aspects of gaming are attractive across generations of students” (Coleman & Hussain, 2015, p. 121)

“The U.S. military continues to be an active proponent of games for learning. America’s Army, which was developed by the U.S. Army in 2002 and has been updated numerous times since, is considered the Army’s most successful recruiting tool” (Coleman & Hussain, 2015, p. 282).

“Other games developed by the military include DARWARS Ambush!, designed to teach convoy survival; Tactical Iraqi, a game to teach Arabic to U.S. soldiers before deployment to the Middle East; and VECTOR, an immersive game designed to teach soldiers how to interact with people in foreign cultures without offending them” (Coleman & Hussain, 2015, p. 282).

“Of particular interest are MMOGs, which can be used to teach the leadership, teamwork, and communication skills critical to mission success, particularly in urban warfare situations” (Coleman & Hussain, 2015, p. 282).

“Organizations have effectively used role-playing and simulation-based games to teach soft skills, such as sales, customer service, management strategy, and leadership” (Coleman & Hussain, 2015, p. 282).

“As learners develop, games can provide age-appropriate opportunities for critical thinking and decision making” (Coleman & Hussain, 2015, p. 284).

“Games may be played synchronously, as a whole-class activity in which everyone is playing at the same time, or asynchronously as a reward, enrichment opportunity, or homework” (Coleman & Hussain, 2015, p. 285).

“It has frequently been noted that a considerable amount of incidental learning occurs during gameplay. Players are so engrossed in the game that they do not realize they are learning problem solving, resource management, adaptive behavior, or leadership skills” (Coleman & Hussain, 2015, p. 291).

“When students are immersed in a game, learning is secondary to the activity; however, the goal of learning is achieved” (Coleman & Hussain, 2015, p. 292).

“Massively multiplayer online role-playing games (MMORPGs) mirror this approach in that participants, given an objective, work together to meet challenges by pooling their knowledge and skills with those of other participants” (Coleman & Hussain, 2015, p. 293).

The Tactical Language and Culture Training System (TLCTS), which is used extensively to help service members and business people to develop the language and cultural skills needed to interact with people in other countries and other cultures” (Coleman & Hussain, 2015, p. 293).

The ACEDT Method is based on five phases (Analysis, Core design, Experience design, Development, and Testing) with four different level of iteration within and among those phases” (Coleman & Hussain, 2015, p. 305).

“For many learning games, multiple learning experiences – each focused on particular learning objectives – must be created to cover the range of training required” (Coleman & Hussain, 2015, p. 306).

“The core design phase is a highly creative phase in which many ideas should be exchanged among the whole team and with key stakeholders, and is excellent for team building, learning about the different priorities of team members from different disciplines, and getting all team members to start discussing design elements using common lexicon” (Coleman & Hussain, 2015, p. 306).

“From an educational perspective, there is a great deal of commonality between the characteristics of games and the characteristics of effective learning experiences...good learning activities are intrinsically challenging – but achievable – and stretch and engage the learners through gradually increasing levels of difficulty” (Whitton, 2010, p. 31).

“One of the benefits of digital games...is the ability of a computer to provide the interaction and feedback that is crucial to the experiential learning cycle and to the whole learning process” (Whitton, 2010, p. 48).

“Computer games have the advantage that they can situate experience within a meaningful context” (Whitton, 2010, p. 49).

“The problem-based learning approach to learning and teaching has clear parallels with the activities that take place in certain types of computer games, such as puzzle or adventure games” (Whitton, 2010, 50).

“Researchers have highlighted that computer games have the facility to create real-life problem-solving experiences” (Whitton, 2010, p. 50).

“Even when the context of the game is not directly relevant to the subject area, the transferable skills associated with problem-solving, such as lateral thinking, information gathering and analysis, and developing and testing solutions, can be valuable nonetheless” (Whitton, 2010, p. 51).

“The fact that games can immerse players in virtual worlds and alternate realities and can lead to extremely high levels of engagement means also that they have the power to lead the players’ emotions, which is a powerful factor in learning” (Whitton, 2010, p. 66).

“Students are notoriously assessment-centered and using game play as part of the formative or summative assessment for a course is one way to ensure that students engage with it” (Whitton, 2010, p. 104).

History professor Rob MacDougall integrates Civilization into his class by allowing students to play and modify the game to think of new ways to model science, technology and history (Owens, p. 491).

During a media summer camp, a study was conducted with a group of World History students...By the end of the camp, Tony emerged as a leader in the class, making several key observations about history and geography based on his game play, including observations on the role of luxuries in shaping history and how these luxuries (a product of geography) affected economics and politics. In fact, it was connections among history, geography, and the game that first attracted Tony to Civilization III. (Squire, 2004. p. 346)

"There is a tacit model of learning that is inherent in most studies of instructional games. First, the objective is to design an instructional program that incorporates certain features or characteristics of games. Second, these features trigger a cycle that includes user judgments or reactions such as enjoyment or interest, user behaviors such as greater persistence or time on task, and further system feedback. To the extent that we are successful in pairing instructional content with appropriate game features, this cycle results in recurring and self-motivated game play. Finally, this engagement in game play leads to the achievement of training objectives and specific learning outcomes. This instructional model is illustrated in Figure 1" (Garris, Ahlers and Driskell, 2002, p. 445).

One of the problems with this approach has been validation in different contexts of learning and difficulties of bringing pedagogic models, game development and learning processes with dedicated tools and techniques into one model. Inherently, the problem lies with mixing processes (eg, game design processes) with pedagogic models (eg, activity theory) and the tools and techniques, such as user-centered design and heuristics. In an attempt to overcome this problem, we have integrated flow charts to indicate process flows, and have managed to validate the “four dimensional framework” for evaluating games, game selection, and for game design and assessment. However, finding the balance between game design and pedagogic models has remained the greatest challenge in terms of SG design, echoing the requirement to find a balance between engagement and fun and learning and instructional efficacy" (de Freitas and Routledge, 2013, p. 957-958).

"To attain a balance, the elements of the new model then need[s] to include design, cognition and practice-based implementation elements: serious game design, soft skill and cognitive development, and implementation into the learning environment (de Freitas and Routledge, 2013, Figure 2, p. 958).