



Chris 'Wombat' Crowell is a Game Designer and Creative Director with 20+ years experience creating a wide range of critically acclaimed games. He has worked with globally known brands such as NASCAR, Tiger Woods, Sim City, The Sims, Open Season, Indiana Jones, and Kung Fu Panda. He co-founded the online division at Behavior Interactive, developing the kids MMO Monkey Quest in partnership with Nickelodeon. At Tribal Nova, as Creative Director he helped launch the Wozworld startup, a virtual world for tweens. At Ganz Studios (home of WebKinz), he directed the creation of the Tail Towns MMO and social game for Facebook.

In recent years, Chris has shifted his focus towards working with educators to create engaging and effective **Game Based Learning** and **Gamified Digital Education** experiences. He has worked with leaders in this field such as Glass Labs, Pearson, and TVO to develop cutting edge projects such as Pearson's Insight Learning System and TVO's mPower suite of classroom games. He is currently working at ProdigyGame.com, a massively multiplayer game played by millions of elementary students that mixes gameplay with grade 1-8 math curriculum.

Chris has served on the Board of Directors for the International Game Developers Association, and is a founder of the Positive Impact Games SIG. In 2014, he was honoured to participate in the White House Educational Game Jam.

Why Games can be Effective Pedagogy

Chris Crowell

Physical and digital games are being increasingly used by educators as engaging and effective learning experiences. While many resist this as 'frivolous fun', there are valid reasons why games work as a pedagogical tool.

The Ongoing Evolution of Education

Considering the mandate of education is a popular sport, with pundits forwarding diverse views, but most agree on the basics: the role of education is to prepare the student for participation in society by presenting essential information, and guiding expertise in foundational skills.

“The function of education, therefore, is to teach one to think intensively and to think critically.

Dr. Martin Luther King

Kids are Makers and Digital Natives

In addition to the need to develop these modern skillsets, educators are faced with the second generation of students who have grown up with the modalities of the digital era. They are used to being able to drive every choice, communicate instantly, and access any information with the tap of a finger. Modern education needs to meet the expectations of these students in order to engage and challenge their curiosity and intellects.

Games are Tools for 21st Century Competencies

Games, Gamification of Learning, and Game Based Learning are not intended as replacements to any current effective pedagogy. Rather, these approaches can be valuable additions to the teaching toolbox that educators can leverage to engage the modern learner. The 3rd principle of Adler's 'Paideia Proposal' is 'The primary cause of learning is the activity of the child's mind, which is not created by, but only assisted by the teacher'. Game Based Learning puts the student in the driver's seat, with the teacher's role shifting from 'sage on the stage to guide on the side'. What follows is a review of a number of core properties of games and Game Based Learning that support this premise, and that also contribute to the development of 21st Century Competencies.

Agency and Responsibility

The player controlled interactivity of games is a key differentiator from other forms of media, and especially different

The thing is, society is constantly evolving. Looking through the lens of technological progress, we've witnessed some massive changes from the norms of the last century. In a few decades, we've gone from assembly line factory jobs and vacuum tube powered, room-sized computers, to the lightning fast interactivity of the digital world that is transforming every sector, including schools. Dealing with the differences created by the march of progress is nothing new. 3000 years ago, Heraclitus quipped that 'The only thing that is constant is change', which serves to illustrate the timeless nature of societal evolution, and the need to constantly re-evaluate and update the engines of society, including education.

In response to this changing world, pedagogy as a whole is undergoing a fundamental evolution. While basic comprehension and skills in language literacy, mathematics, science, and art are still essential; the current digital era demands a new set of transferable skills to meet the needs of a rapidly changing world. Globally, many educators are developing new standards under the umbrella title of 21st Century Competencies. Core to these competencies are the mental habits of logic, tenacity, and creativity honed by challenging gameplay. The opening statement of 21st Century Competencies: *Foundation Document for Discussion* reads in part "Researchers acknowledge that the need to engage in problem solving and critical and creative thinking has 'always been at the core of learning and innovation'. What's new in the 21st century is the call for education systems to emphasise and develop these competencies in explicit and intentional ways through deliberate changes in curriculum design and pedagogical practice. The goal of these changes is to prepare students to solve messy, complex problems – including problems we don't yet know about – associated with living in a competitive, globally connected, and technologically intensive world."



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from the didactic paradigm of classroom lecture focused on rote memorisation and repetition. A core element of any game experience is agency. Agency is the ability to take meaningful action, which conveys an associated responsibility for the results of those actions. As Spider-Man likes to say, “With great power comes great responsibility”, which is not only valuable advice, but good reminder that social lessons can be packaged in an entertainment envelope. The relevant point is that ANY power should have an associated responsibility. In a game, the player must observe the game state and create a mental model that makes sense of the game elements, the player’s own goals, available actions, and potential success at each of those actions...and what is likely to happen as a result of those actions. Every action (including taking no action) will have an impact on the state of the game. The student is not only able to make his/her own choices on an action by action basis but is responsible for the analysis and strategy that eventually results in success or failure at achieving his/her goals. One great power of games in the classroom is that students experience cause and effect firsthand, and realise that actions have repercussions.

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Critical Thinking and Problem Solving

An engaging game experience entails overcoming a series of challenges in pursuit of a goal. The player is presented with some kind of obstacle, and must use his/her available game actions to create a solution that gets the player past the obstacle and further toward his/ her goal. Whether the game is as simple as *Tic Tac Toe* or as complex as *World of Warcraft*, the act of playing a game is a constantly repeating loop of observation, analysis, planning, execution, and feedback. While this analysis process is implicit in all game loops, some games, such as *Body Battle*, offer a familiar explicit problem solving paradigm in the form of ‘detective’ style gameplay where clues are given. The player must explore and analyse the clues to find the solution. No matter whether explicit or subtly implicit, engagement in a digital game experience comes from the challenge of correctly using critical thinking skills in each of those loop phases to solve the problem and create a positive outcome.

Mastery and Resilience

Games are elastic interactive spaces where curriculum concepts can be encountered in familiar scenarios. In an explicit example of curriculum concepts used in a Game Based Learning framework, one game from mPower has students use math concepts such as protractors and geometric angles to navigate a small boat on a river as part of a trash collection job. Using the concepts over and over gives meaning to the concepts, and creates a mental pattern library for use in the real world.

As a virtual reality, games offer a safe space to experiment with the curriculum concepts, with the freedom to learn from failure, applying that new knowledge towards eventual success. The teacher can

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Examples of Games Based Learning



Educators use the incredibly popular game of exploration and creativity **Minecraft EDU** to teach everything from mathematics (implicit in everything from quantities in recipes to time planning) to Spanish language. Games such as **Prodigy** are using gamification techniques to engage millions of students in a wizard filled game world that has answering math questions as method for casting magic spells. **Classcraft** has been used to gamify the regular classroom work with in school rewards and collaboration. Portals such as Edutopia and Edtech can be gateways to many more games, and the communities of educators who use them.

constrain the play in terms of the game and setting of goals, and the student is free to use the tools available in that space to test the boundaries of the concepts, and assess the efficacy of multiple solutions.

Assessment and Differentiation

A digital game can be designed to constantly and invisibly capture granular play metrics for each student. The play metrics can be translated to reports on a teacher dashboard to allow differentiated instruction and assessment that is tailored to the individual student, such as when a student is having problems with particular concepts.

In real time, a digital game can also adjust the gameplay in response to the metrics to serve up the next set of problems at just the right level of challenge for each student. These metrics can inform the scaffolding provided by game help systems, to provide instant assistance aimed at the specific difficulties the student is experiencing at precisely the moment of maximum relevance.

But what about the Violence?

No conversation about the effects of video games can ignore the constant question of whether exposure to violent games increases violence in real life. While this question is provocative, the assumption of a big problem is unsubstantiated.

Like film and television, not all games are ‘violent’. There are untold numbers of games of all sorts, and the discussion should be centered on the particulars of each game. A quick check on the best-selling games of all time shows only two ‘violent’ games, with the puzzle game Tetris taking the top spot.

In reality, violent crime is in decline in the USA. The FBI reports that violent crime per 100,000 in 1997 was 611. In 2016 the rate was 386. This massive drop is over the same period where video game playing has

¹Trilling & Fadel, 2009, p. 50

boomed, to the current ‘sixty-five percent of American households are home to someone who plays video games regularly’. If there WAS a correlation, then we would surely be swimming in mass murderers who were infected by their game experiences. Per the numbers, ‘Violence In Games Does Not Cause Real-Life Violence’ seems to be the rational, if rather boring, conclusion. If anything, there is a case to be argued that the emotional outlets and psychological role-play experimentation offered by videogame experiences have had a deflating effect on violence.

There is even an argument to be made for considering violent games as classroom content. Consider that all media has a range of content that includes violent content. Consider the violent themes in classic classroom literature such as *The Diary of Anne Frank* or *The Iliad*. *Raging Bull* is presented in film studies as a cinematic masterpiece, but it is also an unflinchingly violent movie. *Grand Theft Auto* is a massively popular game series with an anti-social dystopian worldview where violence is a key mechanic. Yet, Toronto teacher Paul Darvasi was able to use this game experience, shared by the majority of his students, to lead a discussion about social privilege in the real world. Treating games as a valid medium allows teachers to reach students in a familiar format, bringing forth discussions about their games in addition to the movies and novels they also consume.

In regard to games in the classroom, one must note that like any other teaching tool, the inclusion of a game in the curriculum is entirely under the teacher’s control.

Summary

Of course, there is no such thing as a silver bullet that solves all problems, and games as part of learning is just another tool for educators to use. But it is a VERY strong tool, and should be understood and used properly. The growing legion of progressive educators prove that games ARE effective pedagogy, and we can expect them to be a standard tool in the 21st Century classroom.