

**A BEGINNING TEACHER'S GUIDE TO LEARNING WITH AND
FROM GAMES**

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CERTIFICATION OF PROJECT WORK


We, the undersigned, certify that the project entitled *A Beginning Teacher's Guide to Learning with and from Games* by *Matthew Baetzhald*, Candidate for the Degree of Master of Science in Education, Curriculum and Instruction in Inclusive Education, is acceptable in form and content and demonstrates satisfactory knowledge of the field covered by this project.



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Abstract

This guide serves as an introduction to the use of games in education. This paper describes and synthesizes valuable learning and motivation concepts and discusses their educational relevance. A case is made that many parallels exist between game design and effective instructional practice. This guide highlights many of the important facets of game design and discusses how such concepts might be applied to educational settings. The guide also provides a few case studies that describe how games have been used in school settings to create positive learning environments that allow students to explore content at much greater depth. Implications for future uses of games in research and practice are outlined.

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Introduction

Creativity is difficult to define yet I place high value on its form and substance. I value creativity in my everyday life, in my approach to education and in what I would like to see in classrooms. I wanted to explore creativity and from that onset I began my research and reading to discover several staggering challenges. First, creativity itself is a large and complex topic. Many have worked to define and understand creativity and its use in education (e.g., Cropley, 2006; Duckworth, 2006; Gardner, 1993; Hong, Hartzell & Greene, 2009) and it remains a controversial topic to this day. Aside from the complexity of defining creativity the matter of evaluating creativity proves to be equally or more challenging. As I delved further into creativity and examined varied educational models they brought me to a startling epiphany. That is, topics surrounding creativity parallel similar issues in game design. I have always had a kinship with games so as I began to uncover research specifically on game designs in education I was further struck by parallel ideas that I had taken for granted in my thinking about education.

Before we continue, however, some clarification is needed. Throughout this guide any reference to games, game design, gamification, and/or gaming encompasses a broad definition of a game. Typically the word “game” is associated with habits and pastimes like baseball, football, or basketball or competitive board games like Monopoly and Jeopardy. The military even engages in war games. References to games here will refer to a variety of games, although an emphasis was placed on educationally related games. But what exactly is a game? McGonigal (2010) defined a game as a community activity with four defining traits: (1) A *goal* or specific outcome in which the participants work to achieve, (2) *rules* which place limitations on how participants can achieve the goal, (3) *feedback* which tells participants how close they are to achieving the goal, and (4) *voluntary* where each participant engages and knowingly and

willingly accepts the goal, rules, and feedback. These general traits are the assumed mode of “game” in this guide. As such, the intent was to keep game definition and use as open as possible.

So how did creativity lead me to games? As I sought to incorporate creativity in my classroom instruction I consistently came across the same problems; how to assess student learning in given time periods. In other words, I could never settle on an effective feedback system mostly because I was trained to grade tests and worksheets. So I made a mental note that a key trait of games was that their feedback systems were embedded within the games themselves. The feedback mechanism was understood by game participants and literate observers (or fans) as well. It was this connection which led me to uncover the gamification movement, a practice of applying game design principles to improve systems of interpersonal interaction. Many gaming principles can also be applied to our understanding of teaching and learning (Gee, 2007). The purpose of this guide, therefore, was two-fold. First, it served as a conceptual overview of how to incorporate game design principles into daily teaching methods. Second, it provides in depth descriptions of popular education-related games.

Incorporating Principles of Game Design into Teaching Methods

This first section examines what games *do* to educate participants and then describes how that might look embedded in one’s instructional methods. Gaming principles discussed include (a) structure, (b) learner-centered, (c) achievement levels, (d) skill practice, and (e) achievement levels.

Structure

Games have many systems from which participants learn to play the game. Generally games which are more social in nature (i.e., games that require more than one person to play) (e.g. team sports, chess, and most card games) do not operate with self-contained explicit

instructions. Rather, they tend to rely on participants who already engage in the particular game to teach rules and requisite skills. Individual games (e.g. many video games, puzzles), in contrast, either incorporate self-contained tutorials or are simple enough that little instruction is needed. Within both game categories (social and individual), however, beginning game levels are generally skill-focused and exploratory in nature. Gee (2007) identified 36 specific learning principles that were used operationally in video games; some of them are highlighted here.

The “*Bottom-up Basic Skills Principle*” states that, “Basic skills are not learned in isolation or out of context; rather, what counts as a basic skill is discovered bottom up by engaging in more and more of the game/domain or game/domains like it. Basic skills are elements of a given type of game/domain”. Games inherently use a teaching method referred to as scaffolding, where students are given opportunities to build upon prior knowledge. Gee breaks this into the “*Subset*” and “*Incremental*” principles where learning happens in simplified environments throughout the participation of a game and ordered in the beginning to lead to appropriate conclusions for use in more challenging situations later. Gee also identified the “*Concentrated Sample*,” “*Explicit Information On-Demand and Just-in-Time*,” and “*Discovery*” principles to further describe how games scaffold their participants. With the “*Concentrated Sample Principle*” fundamental skills are constantly revisited in different situations early in a person’s participation to reinforce those skills for use in later and more complex situations. As it sounds the “*Explicit Information On-Demand and Just-in-Time Principle*” identifies how games give explicit instructions just when it would matter most or whenever a participant seeks explicit instruction. Further the “*Discovery Principle*” identifies that games use explicit instruction exclusively as a minimum and allows participants to explore and “make discoveries.”

While these concepts should not be new to most educators, Gee (2012) pointed out that there was disconnect between theory and practice; “We have handed kids all the manuals without the games. And Imagine, now if you did that to gamers, there’d be a revolution”. Most of what I have seen and done in education has focused on explicit instruction, content lectures, and rote learning. So what does this change look like? Before we incorporate these concepts into practice a teacher must rethink and reassert their position in the classroom. Contemporary societies provide almost infinitely information accessible through multiple devices; yet our schools still focus on pupil learning and showing that they have acquired or retained certain content. Rather than planning out elaborate presentations and well-timed questions, teachers must create an environment for content discovery to happen on its own. Gee (2007) talked about how video games, for example consistently taught skills within a context which made the skills relevant and that

...all learning is... learning to play ‘the game.’ For example, literary criticism and field biology are different ‘games’ played by different rules. (They are different sorts of activities requiring different values, tools, and ways of acting and thinking; they are different domains with different goals and different ‘win states.’ (p. 7).

While Gee expanded on the definition of games to include everything that we do, the core idea remains that the focus has been on skills and interactions while the content itself was secondary. So the question remains: what does this change look like? I break down these differences in three separate but inter-related parts: (a) learner-centered, (b) skilled practice, and (c) achievement levels.

Learner Centered. Earlier I mentioned how access to content is no longer restricted to what teachers present to student or that which can be gleaned from textbooks. Certainly content

still exists in this media but our access to it has expanded beyond anything that was imagined when our school systems were developed. Wesch (2010) talked about how teachers and professors act as the gatekeepers of knowledge in typical classroom settings and not surprisingly students are not engaged. He described how his colleagues' and his own students don't read textbooks or assigned readings. Quite often, they complain about the irrelevance of the content to their own studies. Much like Gee discussing our different lives (or careers) as unique games with different rules, Wesch noted that we educators must do the work of making education more relevant to our students' lives. As teachers, we must focus less on what content to cover and more on what skills our students must master (e.g., Darlington, 2010; Gordy & Peary, 2005; Hoffman & Nadelson, 2009; Mohn, 2011).

Games capture this learner-centered atmosphere by challenging participants with levels just above what they believe is possible. In essence, games create virtual carrots that are dangled in front of participants and say, "good job, you've accomplished this, but now try this." Gee (2003) argued that "[g]ood games operate at the outer and growing edge of a player's competence, remaining challenging, but doable, while schools often operate at the lowest common denominator." For teachers the new system creates a daunting challenge especially when transitioning from rote learning, tests, quizzes, and worksheets to more free-form and open-ended paths to success. One good place to start is by embracing the digital worlds for academic purposes. Some schools, for example, have adopted internet tools such as Khanacademy.org which schools have used to "flip" the classroom/homework paradigm by allowing students to engage in content on their own time via youtube video's and online challenge questions. The teacher meanwhile is busy getting real time data on what skills and content each student is mastering and struggling with while also using small group instruction

and projects to engage students in applying problem identification and solutions skills through the use of authentic instructional activities.

In short, the teacher's role in learner-centered classrooms is that of a guide. Students do not need teachers to learn, but teachers are critical in guiding them through paths that will result in positive learning experiences. In learner-centered classrooms, teachers monitor student progress and provide direction. They find ways to help struggling students while challenging their higher performing peers. Since students are actively engaged in meaningful learning experiences, the teacher can move about the learning environment and engage those who need it most.

Skilled practice. Another thing games do well is constantly reinforce skills through practice. A typical side-scrolling adventure game, for example, one that generally uses third person perspective and complex button controls constantly gives participants tasks to perform. These tasks in turn revisit simpler skills but in more complex ways as the game develops. In most team sports, teams assemble outside of direct competitions (which could equate to tests) for the sole purpose of skill and strategy practice. In school this is often attempted through homework and the use of worksheets. Much of the independent work, however, doesn't usually reinforce basic skills in complex ways (e.g., Gardner, 2004; 2008; Liping, 2006). Instead, students are prompted to find more efficient ways of finding correct answers. This can manifest itself in the form of much-maligned collaborative work (often referred to as copying or cheating) or students discovering repositories of answers in the back of the book, in the internet, or with a calculator. Finding information in an efficient manner is certainly an important skill. Yet rarely is this the only skill that teachers want their students to acquire. Skills are preferable because they are more transferable to different endeavors whereas content is often restricted by its own context. According to Gee (2007) the "Practice Principle: Learners get lots of practice in a

context where the practice is not boring (i.e., in a virtual world that is compelling to learners on their own terms and where the learners experience ongoing success). They spend lots of time on task.” A key way to develop compelling work is to make it relevant to important problems to solve rather than lists of answers to find and memorize (McGonigal, 2011).

In practice developing projects and problem sets with compelling contexts to engage students in skilled practice relevant to the subject matter isn't all that foreign from what teachers already do. The struggle is figuring out what skills are needed; once this is determined, the skills can be mitigated by creating environments and experiences that require their use. Imagine an English Language Arts (ELA) course where there were no specific assignments with explicit due dates. Instead there was a list of accomplishments that students must complete in the first half of the year. Each student was required to write a: (1) position piece, (2) fiction piece, (3) poem, (4) descriptive essay, and (5) a professional letter and edit one piece of writing from each category written by a peer. In one sentence worth of planning, a collaborative environment was established where students can work at multiple levels while maintaining the learner-centered structure as discussed previously. But what skills are being addressed or developed? A cursory glance of requirements indicates that students were developing editing skills (error correction, proofreading, and grammar usage), interpersonal communication, collaboration, independent motivation, sentence construction, and time management. Perhaps the most important facet of this environment was that students worked in appropriate context, they wrote, talked, shared ideas and monitored their own and another's progress. Quite a set of important learning skills!

But what if you work to build this environment in a classroom comprised mostly of students who don't know what a position piece or a fiction piece of writing is? It cannot go without saying that this *what if* scenario presents a perfect opportunity to practice differentiated

instruction; wherein teachers instruct students in multiple aptitude or achievement groups. Some students may be working independently on projects if they need little guidance, while others may require more explicit instruction. This harkens back to Gee's (2007) principle of "Explicit Information On-Demand and Just-In-Time" where the students who need the explicit instructions are the only students who get it. It also sets up the next element of game structure, achievement levels.

Achievement Levels. Achievement levels may be the most critical element in game structure with relevance to education. Achievement levels are the *in game* assessment tools. Most video games have some way of constantly updating feedback systems that inform individuals of what they have accomplished; which skills were mastered and which advanced skills still remain. As a classroom teacher, feedback in an ongoing system was not something of which I was aware. However as a snowboard instructor, one of the paramount skills to develop is giving your students adequate, accurate, and immediate feedback. In addition, new educational policies have promoted higher standards and the use of high stakes exams which may create even greater discord among assessment measures and their functions in educational settings. Teachers learn that tests and quizzes identify what students know and provide details as to what content must be revisited. Tests and quizzes commonly comprise a significant portion of most teachers' grading system and there is often little time to revisit curriculum topics if low grades persist. As an aside I feel barriers are important in certain situations but subjecting every student engaged in compulsory education to barriers that impede their knowledge is short-sighted to say the least.

The feedback participants receive from most games, however, is immediate and directly relevant to the goal the participant was pursuing. It can be something as simplistic as solving a puzzle at a particular game level to something as intricate as swinging baseball bats correctly to

consistently hit pitches of varying speed and complexity. In either case, participants receive constant information be it from a coach/teammate or from a visual representation representing completion. In our schools student success is often tied to number or letter grades which are sent home four times each year often with comments attached. If students are diligent they can figure out their grades beforehand by keeping track of test grades, completed homework assignments, and other point categories. These students, in turn, are often identified as being responsible and well-prepared. In a game like *World of Warcraft*, an immersive Massively Multiplayer Online Role Playing Game (MMORPG), participants are told immediately how experienced another character is by noting the armor, weapons, and customization that are included on participants' avatars (in game characters). Helmets, armor, weapons, runes, and other unique features are issued as rewards for completing quests of varying difficulties not to mention that an individual is presented with an experience monitoring system, an achievement list, and attributes for learned skills. Gee (2007) noted that “[f]or learners of all levels of skill there are intrinsic rewards from the beginning, customized to each learner’s level, effort, and growing mastery and signaling the learner’s ongoing achievements. In some ways these intrinsic goals manifest themselves in the form of in game items, for the sake of social games this intrinsic reward can manifest itself with titled positions on a team; often participants with great skills are designated starters for their team meaning they are always first to play. For learners having definitive reachable goals is paramount to their continued motivation. The process of moving up in level or achievement strata not only gives students this type of definitive goal but also provides an environment that doesn’t punish mistakes or failures with severe consequences (McGonigal, 2013). Whereas a report card is a permanent and retrospective perspective on how students

performed over the previous 8- to 10- week period. Students are typically not motivated to go back and relearn material many of them weren't that interested in learning in the first place.

There are also some pitfalls and concerns with the achievement principle present in games. Bocska (2013), for example, warned against the strict use of badges and points (similar to simple ladders) as the only means for achievement recognition. While Bocska focused on a consumer model and customer loyalty programs the same pitfall can occur in a classroom. In an elementary classroom it is common to see some manner of leader-board, star, or point system displayed on a wall. In some ways this serves as a record keeping system for teachers and is designed to motivate students to compete with peers. As Bocska warned one may encounter "active disengagement when a customer realizes their behavior has been manipulated with no personal gain." Meaning the points or the leader-board have to mean something to individuals. Students filling up a homework chart should receive some special recognition or access to new content, responsibility, or privilege when sections are completed. Quite often little recognition is given to student accomplishments other than moving on to the next part of the curriculum. There is often too little celebration in our public school classrooms.

Hoffman and Nadelson (2009) argued that while games designed for entertainment are highly motivational and capable of maintaining participant attention, focus, and drive this motivation does not transfer effectively or easily to classroom settings because of stark differences in context. They stated further that "...games are unlikely to fulfill instructional expectations unless a direct relationship exists between the game and the learning context." This brings us to our next section on motivation.

Motivation. The way that games motivate participants is quite paradoxical. Any game, functions by consistently putting participants through increasingly challenging scenarios with

ever-increasing constraints (McGonigal, 2011). Take, for example, the classic video game *Tetris*. If you're not familiar Tetris was a game where different four block shapes descended from the screen and you moved them into place to form a solid line. Once a line was formed, all blocks in that line would disappear. Every time you made a total of 10 lines, the presentation rate at which pieces fell was increased. It was a simple game with a non-existent social component but it was a fan favorite. Years after its debut people still played Tetris. Today the game is played albeit with less frequency. And no one (i.e., it has been mathematically proven) has ever beaten Tetris. You can't win, you can only survive longer yet even a game this simple could hold the attention of gamers for hours.

But is it that simple? Just keep challenging people and they'll keep trying? Sadly no, Hoffman and Nadelson (2009) noted that, "[f]our factors contribut[e] to sustained engagement: socialization, physiological satisfaction, achievement motivation, and an appealing game environment." Applying these factors to Tetris (1) you could compare your score with your peers and hold bragging rights if you were capable of reaching the highest level; (2) if you are able to reach high levels or merely higher levels than you previously did it requires heightened or improved dexterity; (3) reaching higher levels is an elating experience; and (4) games like Tetris were seen as acceptable past times. McGonigal (2011) looked to game motivators such as satisfying work, experience and the hope of being successful, social connection, and meaning or being part of something larger than ourselves. The two perspectives are largely parallel. Both highlight some social element, individual achievement, measure of satisfaction, and elements which reach beyond the scope of the game itself. But while Hoffman and Nadelson and Chaplin (2011) felt that there was very little games can do to increase classroom engagement, Gee and McGonigal and others argued that either we can learn important lessons of engagement from

games or that we need to incorporate games themselves into more of our everyday practices; especially education (Brown, 2013; Carr-Chellman, 2010; Lewis-Harrington, 2013; Wesch, 2010).

The key as Gee pointed out is that we must find ways to make whatever we want to teach fit into engaging environments. Games have the intrinsic benefit of being for our own personal entertainment and therefore are designed to be engaging just like books, movies, concerts, and so on. But our curriculum was not designed to be intrinsically engaging. It is ironic that something so important, so vital to our own individual liberty and prosperity is designed to teach us to simply follow procedures (Robinson, 2006). Policy and standards in education insist that a certain level of content must be mastered for individuals to be successful. Unfortunately much of the content our students are learning today will be obsolete by the time they graduate. This is particularly true for content that can be easily accessed via the internet and cross-referenced for accuracy in much less time than it takes to go to a local library. The focus of education must shift away from rote knowledge and content and into generalizable skills and authentic learning contexts. Teachers must structure their environments for inquiry and provide opportunities for them to engage in real-life problem solving. Rather than simply talking about geometry and shapes, help student to use these tools to build something meaningful. It's not enough to talk about grammar without the context of communicating ideas and it's not enough to focus on specific academic subject areas above all others. We've long known and accepted in America that we're all individuals with unique passions, drives, and interests yet somehow there is a consensus that specific content is more important than others like English and math over athletics and art. If you design your classroom so that the students' work has a value outside of school as

well, you will motivate your pupils by giving them meaningful work and make each individual feel part of the larger world.

Using Games as Context

There is a lot to glean from games themselves as far as motivation and engagement go but what about the games themselves? Often it is wise to not reinvent the wheel since you would be using your creative capacity on something that is already well defined. As it turns out I'm not the first person to ask this question. Some are teachers looking for different ways to engage their students, some are researchers looking into what motivates our learning and engagement, and others are game-designers looking to communicate ideas about what they do best; make games. In this section, some examples of games are provided that may be relevant to a classroom context. In some cases games were designed specifically to teach specific concepts while others showcase how existing games can represent larger more complex environments and teach a wide variety of skills to participants.

Using Pre-Existing Games

Ananth Pai

In our first example a third grade teacher by the name of Ananth Pai used pre-existing education games almost exclusively. Within the class students are consistently playing games, sometimes on laptops, other times on handheld console devices like the Nintendo DS. Students are given goals and directions by Mr. Pai but for the most part they are autonomous in their learning; Autonomous but not wholly independent! Students are playing online educational games, sometimes competing with students from across the globe in comparing fractions, counting, multiplication, and even civics, English, and music. The latter three are quite interesting as Mr. Pai talks about a lesson on civics where one of his students brought up the idea

that everyone in school has a right to technology. In Pai's understanding we have a right to education but technology is a privilege so the next day he removed all technology from the classroom and explained the difference between rights versus privileges. In response, students protested, wrote songs, and even created their own petition. Mr. Pai's own website (<https://sites.google.com/site/teamdrillhead/>) boasts classroom topics of "Health and Well Being, Inquiry, Literacy, Math, Presentation, and Skills for Life; not the typical curriculum we think of in most elementary schools. According to Mr. Pai, his class has had great success on the state assessments as well.

Terry Heick

In this classroom we have an even greater stretch where a teacher uses games not specifically designed to teach basic skills. Here we find games like *Limbo* and *Little Big Planet 2* that are being used in at least three ways. First, as entry points to literary concepts that Heick is teaching. For example, he uses clips and limited game play to introduce students to the concept of literary tone. Second, Heick uses games to provide students with voice and advocacy around their interests. This is often focused more on male than female students. He has found that when given opportunities to discuss personal interests (including their favorite video-games), his normally disengaged students often become actively involved in class discussions or even just letting them brainstorm games that fit into the current topic. Finally, Heick uses games for their inspirational qualities. Games like *Skyrim* which place participants in a highly immersive virtual world are able to hold student attention for hours as they work to construct game avatars (or virtual representation). Gee (2007) recognized games' abilities to let participants explore new domains and identities as a valued gaming principle. An opportunity which many English Language Arts teachers strive for when they teach about voice, tone, and self expression.

Jeff Brain

In Mr. Brain's classroom a game called *Magic: The Gathering*, a trading card game is used in a myriad of ways. It is used as an *entry point* to complex ideas, as well as a *tool* to provide student voice and inspiration. In one example Mr. Brain uses a collection of cards for a database management lesson. He gives students an assorted collection and they must make a searchable database in which each card can be searched by its various characteristics. Most often cards are used in probability and statistics lessons where students are given specific cards and must find out the appropriate number of cards to have in a pile to generate a specific probability outcome. He also uses the actual game-play to teach fair play, group dynamics, working together and other humanities. From the social studies perspective, Mr. Brain breaks down the five color symbols on the cards and discussing how primitive tribes started to use colors to describe elements. Further the colors or cards themselves can be used as writing prompts for personal, creative, and expository writing assignments.

Spades

Finally, a study by Schademan (2009) looked at young African-American men and the culture developed around a game called *Spades*. Spades is a card game using a standard deck of 52 playing cards and much like Euchre is an offshoot of Whist which later became Bridge. Schademan looked at this particular demographic because typically it is an underrepresented demographic in science professions and science achievement. On one hand Schademan found that often African-American students have few role models in the science fields and as such do not aspire to become part of the scientific elite. But as Schademan uncovered it's not due to a lack of requisite skills.

Schademan located this group's skills for scientific thinking and reasoning not in the classroom but in the cafeteria. Each day these young men would play Spades, which is played in pairs and a lot of interesting connections were made. In order to be an expert Spades player, as many participants were, they had to develop multiple resources. They had to make accurate observations about their own cards and use that limited information to discern facts about their teammates and opponents' hands. Also there were patterns or lines of play that must be learned since those patterns give even more information about what cards remain hidden and who has them. This all ties to the idea as Schademan says that

Like the Spades players, scientists always operate from an incomplete picture of reality. Successful scientists are those who combine their understanding of empirical evidence and use their imagination and creativity to see past the evidence at hand and use it to make inferences about an imagined reality. (2009)

The most startling realization Schademan purports is that we have a group typically marginalized away from science professions due to cultural bias. But when we look deep into the actual culture of these young men we find that they themselves develop the requisite skills of science unknowingly through a game. Now Hoffman and Nadelson may argue that there is no guarantee that skills acquired from Spades will transfer to instructional outcomes. Therefore, if it does not happen naturally, then it may need to be orchestrated to some extent by those in charge of instruction. That just may be the inspiration at least one individual needed to see themselves as a potential scientist someday in the future.

Designing Games for Learning

Lastly we look at some cases where games have specifically been designed for use in the classroom or around a particular topic.

Brenda Brathwaite

Brenda is a game designer. One day her daughter came home and described the *middle passage* as she had learned about it in school that day. But there was something missing from the conversation, some level of understanding was missing because as she talked about how people were picked up in Africa and traveled by boat to Europe and then to the Americas her daughter made it seem more like they were going on a cruise and less that they were being taken as slaves. Conveniently her daughter asked her if she could go play a game after talking about what she had learned. So Brenda decided to create a game which would teach what actually happened on the middle passage. The game was simple, using small wooden pieces, dice, and index cards but quickly into the game her daughter made the comment “we’re not going to make it” as not even halfway through the journey most of the people who had been picked up on the boat had perished. As they played the game more and more realizations about the middle passage were made and both of them came to tears discussing some of the issues.

Brenda has since created several games which tackle a wide range of challenging historical events. From slavery and the middle passage, to the Holocaust, the Trail of Tears, and even a game covering the issues of her Irish families heritage and the Potato Famine. But one does not have to be a game designer to come up with games such as Brenda did. In many cases you can present your students with a topic or historical event and direct them to create their own game around the topic.

Reese and Wells

Reese and Wells (2007) are English language teachers who developed a card game which focuses on conversation development. Basic game concepts are similar to the card game Magic: The Gathering in terms of game-play, but this self-developed game costs much less to use in the

classroom. Students are given various conversation cards that are structured to represent different parts of a discussion (e.g., starting the conversation, showing agreement, and summarizing main points). Teachers can change or discard old cards, create new ones, and even change rules to foster the type of conversation desired. Ultimately the goal of the game is to develop conversation skills as well as public speaking and other qualities.

Students are required to use phrases printed on cards to start statements when communicating ideas about required readings. If a student doesn't have any cards to play, such as an eager student who always has their hand raised to answer every question, they cannot offer a response. There are of course ways to generate more conversation cards, so that students are still able to participate. But this serves in two ways to facilitate reluctant participants into group discussions. On one hand, students who don't often venture opinions are given structured ways to form ideas and since it's part of a game the pressure to be always correct is reduced. As students get more comfortable with the game it takes on a more interactive role by giving students rebuttal cards which allow them to challenge others' ideas

Barber and Maiers

Barber and Maiers (2007) also developed a game which challenges students to delve into the wealth of information uncovered within the human genome project. In one way games like this and Fold It, games that have received substantial attention in the press have helped scientists to understand some very complex elements in protein-folding and at the same time served as valuable learning tools for students worldwide. In this scientific game students and scientists try to discover new polypeptide sequences and achieve the highest score by creating various genetic codes. Reports suggest that the project has elicited numerous substantive ideas from students and scientists alike.

Final Thoughts

My hope was that at the very least this guide would serve as a collection of ideas for teachers to find new and exciting ways to engage and challenge their students in meaningful learning activities. Further I hoped that games would be seen as a new and legitimate medium of culture with value and importance. I take solace in the fact that at one point much of the same dismissive nature and derision directed at games was once directed at books and now books in all genres are studied in schools across the globe. Games can be the next medium. They can provide entertainment like movies, books, and plays but also engage us in ways that parallel our daily lives and connect us to the world beyond. Games have a long history among many civilizations. They Olympic Games continue to serve as a model of interconnectedness and unity and honor and sportsmanship. All educators should look to games as a medium which can make even the most complicated ideas accessible and interesting.

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