

MindShift

Guide to Digital Games + Learning

BY JORDAN SHAPIRO, ET AL.



About the MindShift Guide to Digital Games and Learning

As MindShift continues to cover many aspects of learning and the future of education, digital games have become a more widespread and critical tool in the learning and teaching experience. The MindShift Guide to Digital Games and Learning started as a series of blog posts written by Jordan Shapiro with support of the Joan Ganz Cooney Center at Sesame Workshop and the Games and Learning Publishing Council.

We've brought together what we felt would be the most relevant highlights of Jordan's reporting to create a dynamic, in-depth guide that answers many of the most pressing questions that educators, parents, and life-long learners have raised around using digital games for learning. What makes this guide unique?

- We take you several steps beyond looking up educational games in the app store and checking the number of stars they've been rated to gauge the benefits of a particular game.
- We provide a thoughtful, comprehensive look at games and learning, as well as specific examples.
- While we had teachers in mind when developing this guide, any lifelong learner can use it to develop a sense of how to navigate the games space in an informed and meaningful way.
- Our annotated Table of Contents gives you a window into the scope and content of each section.



Jordan Shapiro teaches at Temple University's Intellectual Heritage Department, where he's also the Digital Learning Coordinator. He is the parent of two boys (seven and nine years old) and the lead administrator at Project Learn School, an independent cooperative K-8 school in Philadelphia. His book "FREEPLAY: A Video Game Guide To Maximum Euphoric Bliss" considers how the games we play in our youth shape our adult lives. A forthcoming book on game-based learning, technology, and new educational paradigms is due to be released in the beginning of 2015. He is also a columnist for Forbes.com, covering ed-tech, parenting, and game-based learning.

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Examples of how teachers use games are embedded throughout the guide (including video examples), but this section takes an in-depth look at how some teachers are using games in the classroom and their real-life struggles and victories.

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INTRODUCTION

Getting in the Game

BY KATIE SALEN TEKINBAŞ



Jane Mount

For a long time, learning—school learning—has demanded something different. But that *something different* has sometimes been manifest in policies, which emphasize outcomes like standardized test scores, rather than a love of learning, and which result in experiences that are efficient (e.g. metrics driven) yet rarely child-centered. Such an approach to education doesn't so much discount engagement as a condition of learning as erase it altogether.

What if this theory was flipped on its head to posit that engagement is an absolutely critical condition for learning? That engaging a young person in learning is the first step in developing habits and skills that will support them in realizing their academic, civic, and career potential? That making learning irresistible can provide a context enabling young people to survive and thrive?

[The MindShift Guide to Digital Games and Learning](#) takes up this hypothesis as it explores the opportunities and challenges of game-based learning. The series offers a wonderful overview of the key ideas driving the application of games and their design to teaching and learning, within the domains of pedagogy, implementation, and assessment. Included are a useful summary of the research guiding the field and specific tips and tricks for using games in the classroom. Most importantly, the guide embeds throughout examples—from educators—of what the use of games and their design looks like in the classroom. This pairing of the pedagogical and practical makes the guide especially useful, as it shows and tells in a way that is simultaneously instructional and inspiring.

We know from research, however, that *doing* far outweighs both showing and telling when it comes to learning. One hope for this guide is that it enables educators and parents alike to explore the use of games in learning contexts that matter to them and the young people in their lives.

For many parents and educators, the appeal of games and digital media for learning centers on the novelty of the idea that activities that engage young people so wholly can be educational, too.

Games model learning by doing perfectly, as they demand the active participation of players all along the way. This is one reason games have such potential as tools for learning: they are really nothing more than complex problems waiting to be solved by players in a way that is both fun and challenging. These problems might take on the tone and texture of an ancient civilization, a horror film, an intergalactic space station, or a mafia headquarters. When designed well, games evoke a sense of transformation and change, as players push against the limits of the rules in creative and powerful ways. Some players of the game *Dance Dance Revolution*, for example, figured out that they could radically elaborate on the basic dance moves of the game as long as they stayed on beat. Locking, popping, and spinning quickly raised the bar for what *DDR* dancing looks like and the types of mad skills it really takes to play.

So, what might learning by doing look like for a teacher new to game-based learning? For some teachers it might mean starting with a game they know well, like a social game or board game they may have played with their family or friends. An educator familiar with the social game *Mafia* might have their students play the game as part of a classroom lesson on the judicial system, creating a context in which students experience what it feels like to be unjustly accused of a crime. It could mean having students play a digital game designed with specific learning outcomes in mind, like *Dragonbox* or *Crayon Physics Deluxe*, situating the play of the game within a curricular sequence. Or it might mean seeking out support resources from game-based, educator-focused online communities like *Edutopia* or sites like *iCivics* or *Teach with Portals*.

There's an increasing number of resources created by and for educators and parents in the games and learning sphere, including *video tutorials* that show how to roll out a game in the classroom, manage its gameplay, and assess student learning—three core practices that educators new to game-based learning often get tripped up by the first time around.

An educator comfortable with project-based learning might pick a sandbox-style digital game that comes with tools allowing it to be easily customized, and use it as the main production platform for the project. A *9th grade science teacher* in New York, for example, created a cell model in *Minecraft* that mimicked the real properties of a cell, and the real interactions between a cell membrane and the different chemicals used to extract DNA. Students experimented with the digital model prior to doing an actual DNA extraction in the lab.

Or a teacher might choose to design a game of his or her own, to meet a specific learning goal. The game could be digital or non-digital, and would ideally incorporate students in the process all along the way. Students love to be involved and can take on a range of roles, from brainstorming ideas for the game to playtesting it once it is up and running. One bonus of having students serve as playtesters is that this role also requires them to articulate what makes the game fun, engaging, and meaningful, helping them develop critical thinking and metacognitive skills. Most importantly, student playtesters easily transition into game masters, material keepers, and expert "demoers" who can introduce and explain the game to their fellow classmates.

The options are endless, really, limited only by a failure of the imagination or lack of support. This last point is critical, as teachers need time and space to reflect on their practice, as well as to work collaboratively to grow their ideas and interests. Guides such as this one can help educators connect to communities dedicated to growing game-based learning through research, development, and practice. Getting in the game is easy—all you have to do is engage.

Katie Salen Tekinbaş is a game designer at heart and the founding executive director of [Institute of Play](#), a non-profit doing work in games and learning. She is professor of Games and Digital Media at DePaul University and once co-designed a karaoke ice cream truck driven by a squirrel.



What the Research Says About Gaming and Screen Time

GAMES IN SOCIETY: WHAT THE RESEARCH SAYS

Games and learning advocates often come up against the video game stigma. Despite the fact that we've now seen decades of game play, and that a generation of gamers has grown up without a civilization collapsing, the bad reputation persists—and it's mostly based around fear.



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The recent APA (American Psychological Association) article entitled “The Benefits of Playing Video Games,” by authors Isabela Granic, Adam Lobel, and Rutger C. M. E. Engels, surveyed the landscape of video games. They identified four types of positive impact that video games have on the kids who play them: cognitive, motivational, emotional, and social. Here’s a quick rundown:

- Cognitive benefit: Games have been shown to improve attention, focus, and reaction time.
- Motivational benefit: Games encourage an incremental, rather than an entity theory of intelligence.
- Emotional benefit: Games induce positive mood states; and there is speculative evidence that games may help kids develop adaptive emotion regulation.
- Social benefit: Gamers are able to translate the prosocial skills that they learn from co-playing or multi-player gameplay to “peer and family relations outside the gaming environment.”

News stories abound: digital games make kids hyper, violent, stupid, anti-social. It’s not only that people are generally wary of the unfamiliar, we also live in a culture of heroism and progress that casts every innovation as a revolution. Rather than celebrating modification and iteration, we divide the world into what’s cutting-edge and what’s obsolete. We’re always afraid that the new school will completely displace an old school that we’re not quite ready to abandon.

The introduction of video games in the classroom does not need to mean the end of books. Blended learning will not necessarily replace the lecture. Games, however, can supplement time-tested pedagogical practices with new technological solutions to long-term problems. We can have the best of both the new and the old. Games can help educators answer the ongoing assessment question, develop kids’ metacognitive skills and empathy, and break down the boundaries between academic subjects. Still, not everyone’s convinced.

Recently, researchers have begun to look at the positive impact of games both in a general way and for learning in particular. The data is still sparse, but there are already some important takeaways.



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A survey done in Ireland, Online Gaming and Youth Cultural Perceptions, by Killian Forde and Catherine Kenny, suggests that kids who play multi-player games online are more likely to have a positive attitude toward people from another country: 62 percent of online gamers hold a favorable view of people from different cultures compared to 50 percent of non-gamers. Unlike school, where the diversity of the institution is rarely reflected by individuals' peer groups, interactive online gaming correlates with a more diverse group of friends.

Studies like these are generally held at face value, but critics of games are quick to point out that the violent ones are morally reprehensible. Though I'm not a fan of violent video games, studies have shown that there are even positive benefits from playing these types of games. One study, published [in Nature](#), showed that playing fast-paced "action based" video games improves "attentional processing" and also "induces long-lasting improvements in contrast sensitivity, a basic visual function that commonly deteriorates with age." Of course, the violent narrative content is not likely responsible for these benefits. It seems more likely that it has something to do with the fast pace which demands quick reflexes.



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The most convincing neurological [research shows](#) that video games contribute to neural plasticity because games provide “a multitude of complex motor and cognitive demands.” In this study, players played platformers such as *Super Mario Brothers* for at least 30 minutes a day for two months. They showed “significant gray matter (GM) increase in right hippocampal formation (HC), right dorsolateral prefrontal cortex (DLPFC) and bilateral cerebellum.” These are the areas of the brain “crucial for spatial navigation, strategic planning, working memory and motor performance.”

Like all forms of media, the benefits of games depend on the particular games and how they are used. “One can no more say what the effects of video games are, than one can say what the effects of food are. There are millions of individual games, hundreds of distinct genres and sub-genres, and they can be played on computers, consoles, hand-held devices and cell phones. Simply put, if one wants to know what the effects of video games are, the devil is in the details,” say Daphne Bavelier & C. Shawn Green, in [Nature Reviews Neuroscience](#).

GAMES IN THE CLASSROOM: WHAT THE RESEARCH SAYS

Any discussion of the function of game-based approaches in education should begin with the distinction between “gamification” and “game-based learning.”

Across the country, teachers are already using gamification in their classrooms every day. They “gamify” learning by replacing grades with levels and merit badges; or, rather than delivering lectures and then testing for retention, teachers create project-based units where completion, or the demonstration of mastery, is what allows the student to move on.

Game-based learning, on the other hand, applies to using actual digital video games as a classroom tool—although traditional non-electronic role playing and board games work exactly the same way, but perhaps not as efficiently—and there are a slew of video games, digital applications (“apps”), and adaptive software platforms that can be used for instruction. Some are great, while others are not so helpful.

Game-based learning in the classroom can encourage students to understand subject matter in context, as part of a system. In contrast to memorization, drilling, and quizzing, which is often criticized because the focus is on facts in isolation, games force players to interact with problems in ways that take relationships into account. The content becomes useful insofar as it plays a part in a larger multimodal system. The game does one thing. The player responds with another. In order to beat the game, the player needs to master the system.

The way we understand the expectations and promises of today's game-based approaches will have a long-term impact on how we imagine and implement them in the future. It's critical that teachers, parents, and administrators understand not only the research, but also the way corporations, foundations, and research organizations are thinking about games and learning. There are big players involved in researching the benefits of game-based learning in schools. Companies and foundations like the Bill & Melinda Gates Foundation, the MacArthur Foundation, the Educational Testing Service (ETS), Pearson, Inc., Electronic Arts (EA), and the Entertainment Software Association (ESA) are all involved. Each has a different role in the matter and teachers have different perceptions of what those roles are.
(Note: Joan Ganz Cooney Center and the Games and Learning Publishing Council receive support from the Bill & Melinda Gates Foundation)

Some of the most significant research on game-based learning is done by [GlassLab](#) (the Games and Learning Assessment Lab), which was established with a "significant investment" from the Bill & Melinda Gates Foundation in cooperation with the MacArthur Foundation. GlassLab designs and implements game-based formative assessments which, [according to SRI](#), "are being developed in response to the climate of student disengagement that currently exists in many classrooms." The concept is simple: kids like video games and the hope is that "by applying Evidence Centered Design (ECD), the game-based formative assessments address the needs of both students and teachers for reliable and valid real-time actionable data within a motivating learning environment."

So far, the research seems to be showing success. The 2013 study, which is the most significant to date, [found that](#) "when digital games were compared to other instruction conditions without digital games, there was a moderate to strong effect in favor of digital games in terms of broad cognitive competencies."

"For a student sitting in the median who doesn't have a game, his or her learning achievement would have increased by 12 percent if he or she had that game," said Ed Dieterle, former Senior Program Officer for Research, Measurement, and Evaluation for the Bill & Melinda Gates Foundation, [in a MindShift article last year](#). In the world of education achievement, 12 percent is significant.

In the same study, SRI also looked at simulations, and in those studies, students improved by 25 percent. That's huge. But how do they define a simulation? Think of something that's more interactive than an animated anatomy lesson and less game-like than Nintendo's *Super Smash Brothers*.

The [SRI report describes it this way](#): "A computer simulation is a tool used to explore a real-world or hypothetical phenomenon or system by approximating the behavior of the phenomenon or operation of the system." According to the SRI study, a simulation differs from a game in that it does not employ a reward system based on points or "currency" and it doesn't have level-based achievement goals. In addition, simulations have an "underlying model that is based on some real-world behavior."

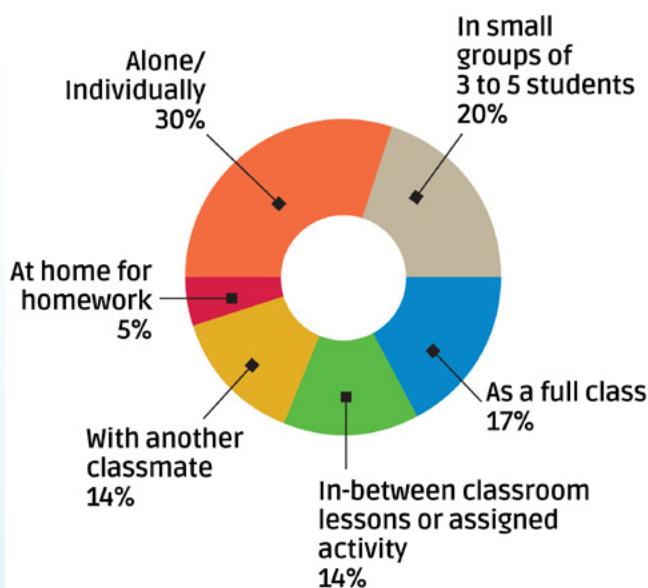
The [promise of game-based learning](#) lies in the premise that the technology provides an efficient and effective tool with which to replace a points-based extrinsic motivation system with a contextualized hands-on learning experience. Play is useful because it simulates real life experience—physical, emotional, and/or intellectual—in a safe, iterative and social environment that's not focused on winners and losers. The achievement lies in the act of learning and understanding itself. Whether or not we make a distinction between "simulation" and "games," the SRI study shows that interactive digital tools can offer an efficient means to provide effective contextualized learning experiences.

TEACHERS IN THE CLASSROOM: WHAT THE RESEARCH SAYS

For some of us, these findings are hardly surprising. Many teachers have already intuited how beneficial game-based learning can be: according to the recent survey of teachers conducted by Lori Takeuchi and Sarah Vaala at the [Joan Ganz Cooney Center](#), 74 percent of teachers report using digital games in the classroom and 55 percent of students play games at least weekly.

These teachers are not newbies. The 694 K-8 teachers surveyed have an average of 14.5 years of experience in the classroom. And 30 percent of the teachers said the games are equally beneficial for all students. But there also seemed to be a trend that identified games as most beneficial for “low-performing students,” for “students with emotional/behavioral issues,” and for “students with cognitive or developmental issues.” In other words, students who have been labeled and/or diagnosed because they struggle within the traditional school environment benefit from game-based approaches. From the study: “65 percent of teachers note that lower-performing students show increased engagement with content, versus only 3 percent who show a decrease.” This is good news.

How do you typically have your students use digital games?



[gamesandlearning.org](#)

Source: The National Survey of Digital Game Use Among Teachers is a project of the Games and Learning Publishing Council and produced by the Joan Ganz Cooney Center, with support from the Bill and Melinda Gates Foundation. See [gamesandlearning.org](#)

Among K-8 teachers who use digital games in teaching (N=513)

In addition, 53 percent of teachers find that video games foster positive collaboration between students. Anyone who has watched kids play video games together has seen this trend: They give each other tips and advice, they share tricks. They teach each other to understand the games’ systems. No wonder [gameplay YouTube videos are so popular](#). Digital Gaming inherently involves systems thinking, which is best taught through collaborative learning.

Still, 52 percent of teachers assign digital games as independent activities for students. Only about a third (34 percent) “assign digital games to groups of 3-5 students.” And only 29 percent “direct the whole classroom to use digital games together.”

It’s becoming more apparent that teachers will need to do more than just embrace new technologies. They will also need to embrace the epistemological foundations of these technologies. There are connected, networked ways of knowing that will dominate the digital future. Sharing and collaboration go hand-in-hand with integrating non-competitive and non-commodified ways of playing games.

The way students play and learn today is the way they will work tomorrow.



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SCREEN TIME AND YOUNG CHILDREN: WHAT THE RESEARCH SAYS

Most people agree that implementing game-based learning makes sense for older students, but what about really young kids? Do screens have a place in early childhood education? How young is [too young for screen time](#)? If you have small children, you know that this is a hot topic among new parents. Some moms and dads believe that screen time will ruin their children. Others see tablets as an exceptional parenting gadget, a tool that can teach, distract, and educate.

The [American Academy of Pediatrics \(AAP\)](#) recommends that children younger than two years old have no screen time at all. Infants probably get more than enough screen time already, just being pushed in a stroller through the electronics aisle at Target or peeking over their parents' shoulders. For older kids, AAP suggests one to two hours per day of electronic media. In addition, the AAP encourages parents to "establish 'screen-free' zones at home by making sure there are no televisions, computers or video games in children's bedrooms, and by turning off the TV during dinner."

But reducing the issue to an on/off switch oversimplifies things. When we understand the question of electronic media in such a polarized way, we are caught in the same way of thinking that can make screen time problematic. Tablets become like junk food, imagined as a temptation that children gravitate to but need to be protected from. On the contrary, it is only when electronic media is used to occupy children—like a babysitter that provides parents or teachers with an hour or two of peace and quiet—that justifying its use becomes more complicated.

Videos can often carry the same baggage. We sometimes think that the motivation for showing the class a movie is that the teacher's too busy to properly plan for the day. Or that maybe when the teacher needs an extra hour for grading and preparation, a documentary can keep the students occupied. Of course, this is not necessarily the case. There are certainly good pedagogical reasons to use video content in class.

Likewise, there are good pedagogical reasons to use video games and other electronic media in early childhood education. It is not about employing ed-tech for its own sake—as if gadgets automatically make things more innovative or somehow better—but rather about using tools that engage students toward specific learning objectives. Avoiding apps for reasons of nostalgia or simple resistance may cause otherwise dedicated educators to miss valuable early academic opportunities for their students.

The real question is not whether or not technology belongs in early childhood education, but rather, how can we leverage the efficiency of digital tools to best serve young learners? It needs to happen carefully. Although the iOS and Android app stores are both full of content labeled as “educational,” it is not all good content. Many literacy apps drill and practice letter recognition and sounds, but few are grounded in good pedagogical practices. Lisa Guernsey and Michael Levine [wrote in Slate](#): “Most of the top-selling reading apps appear to teach only the most basic of literacy skills. They lean toward easy-to-teach tasks, such as identifying the ABCs, but don’t address higher-level competencies that young children also need to become strong readers, such as developing vocabulary and understanding words in a narrative.” Just adding the alphabet to popular games like *Angry Birds* or *Temple Run* might make parents more willing to whip out their credit cards, but it won’t necessarily teach their children how to read.

Seeding Reading: Investing in Children’s Literacy in a Digital Age is a [new blog series](#) from New America Foundation’s [Education Policy Program](#) and the Joan Ganz Cooney Center at Sesame Workshop. The series (which has only just begun) looks at “early education and parenting initiatives that are harnessing new technologies.” It will also scrutinize “the marketplace of digital ‘reading’ products” and bring information and analysis about “research that may illuminate how communications technologies and digital media are affecting the learning of reading, the act of reading, and the reading brain, in both good ways and bad.” This will become a valuable resource for early childhood educators who want to explore the use of games and apps in their classroom.

In the meantime, there are already some great apps out there. *Learn With Homer*, for example, is an iPad app created by Stephanie Dua, a well-known education reformer. It provides a comprehensive contextualized literacy curriculum. “I know there’s a lot of great research on how to teach children to read,” says Dua. “But when my own daughter wanted to learn, I couldn’t find any suitable materials for parents. That’s when *Learn with Homer* was born. It brings the best early learning techniques together in one app.”

Learn With Homer does some of the same things a good kindergarten or preschool teacher would. It is interdisciplinary in that it “combines learning to read with learning to understand the world.” What does that mean? Kids are not only learning what the letter “A” sounds like and that “alligator” starts with “A,” but also taking virtual “field trips” to the zoo, where they learn about alligators. They also draw pictures, record their own voice discussing the subject matter, listen to stories, and play mini-games that emphasize the letters, sounds, and ideas.

In addition, there are less comprehensive options: apps and games that can supplement the great non-digital learning that's already happening in early childhood education. For example

- [*ScratchJr*](#) is an iPad app from MIT's Media Lab that lets 5-7 year-olds create games and stories using a simple drag and drop interface that is designed to provide the foundation for learning computer coding. Most of us consider coding to be part of computer science, but it is also a form of expression. It reminds us that [the distinction between STEM and ELA](#) is an arbitrary and often superficial one. Mitchel Resnick, head of MIT Media Lab's Lifelong Kindergarten Research Group and one of the creators of *Scratch* and *ScratchJr*, [says](#), "When people learn to write, they can share their ideas with the rest of the world. So too with coding." Good kindergarten teachers understand that for young students, literacy is as much about creating a love of formal self-expression and articulation as it is about learning to write letters on lined paper. Both are necessary.
- [*Kindoma*](#) combines video conferencing, screen sharing, and reading into a single app. It was designed with grandparents or traveling parents in mind. The idea was that you do not need to be right next to the child in order to both enjoy reading together. But there could also be many great classroom uses for this app. Imagine a fantastic twist on pen pals: Kindergarten teachers could partner with other classrooms in other parts of the city, other states, even on opposite sides of the country. Students could have online reading buddies through *Kindoma*. Creative teachers will imagine tons of innovative ways to use this platform.

There are plenty of games aimed at younger kids that can be part of a balanced approach to technology in early childhood education. Check out games by [*Toca Boca*](#), [*Toontastic*](#), or [*Motion Math*](#). Imagine ways to let these games supplement and enhance your well-worn curriculum.

At the same time, it's especially important—in a digitally-connected world where everything is always on—that we start teaching children the importance of text, language, and expression as early as possible. With so many options for stimulation and entertainment, it is all too easy to imagine a generation of children that grows up believing that YouTube videos replace books. One is not an alternative to the other; they are two different types of communication.

Using games and apps not only offers engaging opportunities for young students to acquire important academic skills, it also teaches those students to associate screens with refined cognitive skills. It reinforces the idea that screens are more than just distraction machines. Early education should provide a foundation for critical thinking, including thinking critically about technology and digital media.

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How to Start Using Digital Games for Learning

By now, you've probably read enough to be convinced that it's worth trying games in your classroom. You understand that games

- Are not meant to be robot teachers, replacing the human-to-human relationship
- Are tools that teachers can use to do their jobs more effectively and more efficiently
- Provide a different approach to developing metacognitive skills through persistent self-reflection and iteration of particular skill sets
- Offer experiential contextualized learning through virtual simulation
- Can also offer an especially engaging interdisciplinary learning space

There are so many great reasons to include digital games among classroom activities. But the landscape of learning games is very confusing and many teachers understandably have no idea how or where to begin.

Here are ideas for initial steps in using digital games in the classroom.

STEP 1: ASSESS YOUR RESOURCES

What platforms (hardware) do you have available in your class? Is yours a [BYOD \(bring your own device\)](#) classroom, or do you have school-owned hardware to work with? Will games be a full-class activity or just one station in a room full of learning activities?

Hardware is one of the biggest determining factors, and it will have a significant impact on the way you use games in the classroom. Each different platform has its pros and cons, and few teachers are actually in control of the purchasing decisions.

Brad Flickinger





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If you're fortunate enough to make decisions about which hardware to use, I'd recommend a variety—students shouldn't be siloed into one platform or another. Provide them with exposure to a variety of computing devices.

- **Tablets** work great for lots of different reasons. Whether it's an **iPad** or an **Android**, tablets offer a touch screen interface and are still mostly used for entertainment devices, which makes them a good choice for gaming, but not necessarily for word processing. The old paradigm of one desktop PC for everything is quickly being replaced by single-use devices. Tablets have the largest selection of educational games, and at this point, the majority of developers seem to be focusing their attention here. *Motion Math: Pizza!*, for example, is a great tablet drill and practice app that contextualizes basic arithmetic. And *Toontastic* is a simple drag and drop animation and storytelling app that will get even very young kids thinking about writing their own stories.
- **Laptops** have their virtues. There's no denying the convenience of a portable multi-use device with lots of processing power. There are different operating systems: **Windows**, **Mac**, **Chromebook**.
 - The Windows/Mac debate has been going on for decades. To me, it's like arguing between a Honda and a Mercedes: both can reliably get you from point A to point B, but the Mercedes has a lot of luxury additions that make the ride smoother. If you're willing to pay a premium for a more deluxe experience, go with a Mac. If not, the Windows laptop is sometimes a much more powerful option albeit with a bumpier ride.
 - Chromebooks are basically web browsers; they can run any web-based software, but little else. The advantage is less technical problems and a lower price point. The sacrifice is that you can't run a lot of popular software options. However, in the world of learning games, web-based options are more common than Windows or Mac specific options. The Chromebook, therefore, is adequate for many of the best learning games.
 - If you're using Mac and Windows, Spore is a popular game that introduces students to the basics of biological adaptation. Duolingo, maker of the popular smartphone language-learning app, also makes a web-based version that will work on any laptop (including Chromebooks). And Lightsail is web-based responsive literacy platform that many teachers rave about.
- There are **hybrids**, too, and the **Microsoft Surface** is the best example of a hybrid. It can function as a tablet or (with the keyboard attachment) as a full Windows laptop. Right now, most tablet game developers are not yet making Windows tablet versions, but this will likely change in the near future. Microsoft is very dedicated to serving the education market (check out *Bing for Education*, a truly ad-free, completely private search engine for students).

The key point here is that before you can even begin your search, you'll need to know how the hardware impacts your options.

STEP 2: FIND GAMES

Once you know what kind of hardware you have at your disposal, you can begin to search for games. But if you've tried to find apps for a smartphone, you know that searching the Google Play Store or the iOS App Store can be overwhelming; likewise, the Windows and Mac app stores can also be frustrating.

While all of these companies have added education-specific stores and/or categories, it still feels like shopping in a department store: the big players can pay for featured placement and some of the best independent options remain buried at the bottom of pages and pages of search results.

So: How can you get better, more reliable recommendations, or information about the lesser-known games that are available?

One option is to read blogs that regularly review learning games. MindShift has [a long list of game reviews and descriptions](#). You can also read my [Forbes blog](#), as well as columns in Edutopia, EdSurge, Edudemic, TeachThought, and Gamesandlearning.org.

Still, no matter how hard bloggers try to cover everything, the game developers who can afford expensive professional public relations firms are always going to get the most coverage. Where is a teacher to go for reliable information that puts students, rather than profit, first? My first choice is Graphite. (Disclosure: Graphite has a monthly app review column on MindShift that's not related to this series, and no paid advertising.)

Graphite is like Yelp—a crowd-sourced (in this case, teacher-sourced) site full of listings and ratings of educational apps and games. The site's objective, according to Seeta Pai, Common Sense Media's vice president of Research and Digital Content, is to reveal to educators the vast amounts of games out there's and to "raise the bar of quality in the marketplace." Teachers looking for the right app can filter Graphite ratings by platform, subject matter, and age level.

The most useful features are the editorial reviews and comments from other teachers who comment on the practicality and effectiveness of the games and apps. Take, for example, Slice Fractions, a short-form game that aims to teach fractions to students in grades 2–5. Graphite rates it highly in all three categories: engagement, pedagogy, and support. It lists pros and cons. The review categories—What's it like? Is it good for learning? How can teachers use it?—provide usable information written specifically for teachers. For example, user reviews are included: "[Visually based math app is like 'angry birds' for fractions](#)," writes one teacher from Virginia.

After you determine what kind of hardware you'll be using, Graphite is the easiest way to search for games. The only limitation is that the site breaks down games and apps into traditional education categories. This is great, but if it's your only source, you might miss useful but obscure ways of thinking outside the common learning paradigm. So it's also important to keep reading the blogs for outside-the-norm ideas. Because they're beholden to "newsworthiness," blogs tend to cover the more innovative, or seemingly revolutionary, ed-tech.

STEP 3: PLAY GAMES

After choosing a game, you have to play it. Really play it. Play it all the way through and make sure you know it intimately.

Games are not the same as textbooks or handouts. You don't prepare in the same way. This is not about just making sure you're familiar enough with the material that you can facilitate a class discussion. Nor is it about just understanding the mechanics well enough that you can provide technical support, helping your students understand how to operate the game. Instead, preparing to assign a game is about play.

Play is exploration. It involves imagination. It means investigating the world of the game and feeling the frustration, flow, and excitement that goes along with playing it. When you engage with the game, you not only try to see the game from the perspective of your students, you also understand how the game presents the material. Before students play, teachers can introduce concepts in ways that resonate with the game. After students play, teachers can refer back to the game's particular way of conceptualizing an idea. When great teachers use the games to introduce and/or reinforce material, those games become another extremely effective classroom project or activity. In order to do this, teachers need to play the games themselves. Or even better, when time permits, play alongside your students.

STEP 4: FIND SUPPORT

Game-based learning is getting very popular, but finding support remains difficult. Still, most education conferences are adding games and learning tracks, or at least adding games to their ed-tech tracks. In addition, most game developers recognize that professional development is one of the biggest obstacles to adoption, so they often provide video tutorials and other materials for teachers on their websites.

For more general support and resources, there are a number of websites cropping up specifically for the purpose of providing teachers with resources around ed-tech.

- Two sites that are specifically focused on games in the classroom are [Playful Learning](#) and [Educade](#). Both are full of articles, videos, and other resources that can help you think of creative ways to integrate games into your teaching. For example, learn how to use the game [Quandary](#) to teach ethics. Find lesson plans for [using Angry Birds as an intro to Physics](#). They also have reviews that can help you choose a game.
- The [Joan Ganz Cooney Center at Sesame Workshop](#) and the [Institute of Play](#) are also good places to look for information and support. The Joan Ganz Cooney Center focuses on research and evidence around digital media and learning. The Institute of Play is focused on helping to bring a game-based mindset into our common education practices.
- Check out [TeacherQuest](#) for game design inspired professional development, or the [MobileQuest CoLab](#) for a two-week summer camp-like introduction to game-based curriculum design and ed-tech integration.
- It can feel overwhelming to consider adding learning games to the classroom. But once you get started you'll be amazed at the results. But don't be afraid to jump right in—it's worth the effort!

STEP 5: SEE HOW OTHERS DO IT

It might help your comfort level if you see how some colleagues are doing it.

Joel Levin



The Joan Ganz Cooney Center has a great video series about how teachers are using games in the classroom. In this video, Joel Levin talks about the way he uses *MinecraftEDU* in his second grade classroom. He's clear that it involves creating a structure with boundaries and designing activities that provide meaningful learning experiences for the students.

Ginger Stevens



See how Ginger Stevens uses games for sixth grade special education at Quest to Learn school. The immersive environment that she spotlights in this video is especially interesting; it reminds us that game-based learning doesn't always mean kids glued to a computer screen.

Reach For The Sun



Lisa Parisi describes how she uses games freely available from BrainPop in her fourth grade classroom. Note how she ties it together with project-based learning. Plus, she describes the transitions from board games to digital games.

Steve Isaacs



Seventh and eighth graders learn computer science and coding in Steve Isaacs' classroom. He uses *Gamestar Mechanic* to teach game design. But it goes beyond the computer. His students write up game plans first and workshop the games together after they're built.

Check out the entire series [Teaching With Games: Video Case Studies](#) to get an idea of what other teachers are doing with games in the classroom.



How to Choose a Digital Learning Game

Games are great tools that can add a spark of new vitality. But how do you go about choosing the right game? What criteria should you use to pick a game for your classroom?

Many teachers are excited about trying games in the classroom but don't know where to begin.

The landscape of [learning games is vast and confusing](#)—and it's growing and changing rapidly. Moving at the pace of the software industry, games are often updated and iterated so that new versions replace familiar ones before you've even had a chance to implement them in your classroom routine.

And teachers have busy schedules. We have barely enough time to complete our prep or even to provide students with as much written feedback as they deserve. Exploring such unfamiliar territory as games for learning takes a considerable investment of time and energy. For overscheduled and underpaid teachers, available time and energy is already scarce, and face-to-face classroom time is our top priority.

On the other hand, not exploring, updating, and reinventing our teaching strategies can cause us to miss valuable opportunities to reach students. We all chose teaching because we love it, and a good teacher is constantly motivated to improve the classroom experience.

CHOOSING GAMES: INITIAL CRITERIA AND DISTINCTIONS

Selecting the right game can be like walking the teachers' tightrope. Both engagement and academic rigor need to be priorities, but there is often tension between them.

This is the same tension an English teacher might be forced to mediate when picking a text. For example, as much as I might want to assign James Joyce's "Ulysses" to a class of sixth-graders, the chance that it will engage them is pretty slim. They would likely struggle with the complexity of the language and we would hardly be able to address the theatics. It would be an uphill battle against student boredom that would not serve anyone.

A great literature curriculum considers the particular students in the class and chooses books that are simultaneously fun to read, academically challenging, and provide important canonical touchstones that can help contextualize future learning. Satisfying any one of these criteria, without the others, is problematic. The same is true for learning games. But for some reason, when it comes to games, many teachers are confused about the difference between "cool" and "fun."

Cool and fun are not the same thing. Cool has to do with a game's aesthetics: the art, sound design, characters, narrative, et cetera. But a game does not need to be cool in order to be fun. Don't be seduced by the spectacle. Making coolness a priority is tantamount to choosing to teach literature with *People* magazine because the students like to read it. Sure, pop culture gossip would satisfy the engagement criteria, but it wouldn't satisfy any of the other academic criteria.

Think about games the same way. There's nothing wrong with cool, but if it's our primary criterion, we are catering to our students instead of challenging them. Don't meet the students where they are: Help them to move incrementally from one place to another. Look for games that are fun rather than games that are cool.



Brad Flickinger

THE MECHANICS MATTER MOST

The best learning games are always fun. Try playing them yourself and see if *you* enjoy them. No matter how advanced your understanding of the subject matter, a [good game should still be fun](#). I've understood algebra and number partitions for decades, but *DragonBox* and *Wuzzit Trouble* are still challenging puzzlers that I like to fiddle with on long airline flights. All good games offer challenges in intuitive ways. In fact, this is the reason games work so well for learning: Players are intrinsically motivated to identify and succeed at understanding the game's mechanics.

"Mechanics" are what game designers call the collection of rules and structures that produce the actual gameplay. The mechanics organize the game's components in the way that defines how a player's actions will have an impact. In good learning games, the subject matter is always embedded into the mechanics themselves. Learning to navigate the game's mechanics and learning the academic subject matter are one and the same.

Bad games sometimes attempt to simply graft a topic onto existing game mechanics. They might add vocabulary words to *Angry Birds*, or multiplication tables to *Temple Run*. It never works. The best learning games teach in the same way good teachers teach: They don't trick students into being interested, they help students find genuine excitement in learning a subject.

ARE YOU COMFORTABLE?

In order to find genuine excitement in learning a subject, students need to be comfortable with the game. In order to leverage the potential of learning games in the classroom, teachers need to be comfortable, too. When choosing a game for the classroom, you'll need to assess comfort levels. And the factors that influence a teacher's comfort level are not necessarily the same factors that will influence the students'.

For students, playability is the most important comfort factor. If the game is too complicated, they'll spend more time trying to play than learning from playing. Look for [games that seem simple to play](#). Paradoxically, the games that seem the simplest are usually the most complex. That's because they do a good job at instructing students slowly. They teach one action at a time, in baby steps, until the complex world of the game seems intuitive. Suddenly, the students get it. And simultaneously, because the mechanics and the academics are intertwined, they've succeeded in meeting the learning objectives.

In order to facilitate this, teachers need to be comfortable, too. You should be comfortable not only playing the game, but also integrating it into your curriculum. Make sure that you remain in the curricular driver's seat. Don't allow the game to dictate the curriculum, nor the assessment strategy.

From a curricular perspective, the best implementations see learning games as just one of many learning activities. The combination of activities is designed to offer multiple entry points to a key academic lesson. Each entry point is a perspective—a single lens into a complex subject. Allowing any one perspective to dominate the conversation does your students a disservice. Look for games that enhance what you already do, not for games that disrupt your current strategies.

When it comes to assessment, many [games have robust back ends](#) that provide assessment data about the students that play them. The data can be extremely useful, providing information about your students that is applicable well beyond the game itself. Teachers, however, need to make sure they're comfortable with the game's assessment strategies. Don't allow the game to tell you how to assess, make sure it strengthens your current practices.

Remember, the games are tools to make your work more efficient and effective. Make sure you're using the game, and that the game is not using you. And make sure you explain to your students how and why the game fits into the larger context of the classroom.

Students might play the game willingly, but that doesn't mean they understand how it relates to the other activities. Take the time to explain why you've chosen the game. Or, even better, let it be a class discussion. Ask your students to discuss what they've learned from the game and how it fits into the larger class context. You'll likely discover that the game is working in ways you never could have imagined.

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CHOOSING GAMES: FURTHER CRITERIA AND DISTINCTIONS

What criteria matter when considering learning games?

- First, ask the broad questions: How and when a game can be used?
- Then, be more specific: What kind of game is best suited to particular learning objectives?

When teachers plan activities for the classroom, we're usually constrained by the school schedule. Time is set aside for class and we need to work within this framework. Teachers, therefore, think in blocks of time; video game developers don't. Most video games are played over a longer period of time, often broken down into smaller individual sessions.

Think about the earliest iterations of *Super Mario Brothers*. Although you may play only for 30 to 40 minutes at a time, the game remembers your progress and you can come back to start again from just where you left off last time. Gamers remain on a long continuum toward mastery. How does such a journey translate into the classroom?

In their report, [Games for a Digital Age: K-12 Market Map and Investment Analysis](#), the Joan Ganz Cooney Center makes the distinction between **short-form** and **long-form** games. They point out that in a day that's divided into 40-minute class periods, "transition time and time for instruction or discussion connected to curricular material frequently leaves only 20 to 30 minutes for actually using a learning game." Short-form games can easily fit within that time frame, but long-form games require a multi-period commitment.

Short-form games tend to resemble the kinds of casual smartphone games that even adults tend to fiddle with during idle time. [Wuzzit Trouble](#), for example, the game *Keith Devlin* created in order to allow students to actively experience number partitions, can occupy a player for hours, or it can be played for 10-15 minutes. Played in small doses, short-form games can serve as great interactive examples, reinforcing and supplementing a teacher-driven curriculum. Short-form games tend to work best for learning when they're focused on a specific skill set or concept. Think of them like brief simulations.

- For argumentation and rhetoric, check out GlassLab's [Mars Generation One: Argubot Academy](#). The game was designed by GlassLab, in collaboration with NASA. It is aligned with Common Core ELA standards and infused with STEM content. *Mars Generation One* is a role-playing game that combines a space-age storyline about building a Mars colony with great animations. While we ordinarily demand that students demonstrate argumentation skills in expository writing, modern education practices rarely approach it in such an explicit way.

"By teaching ELA standards through a STEM-themed storyline, the game is fundamentally interdisciplinary in all the right ways," wrote Patricia Monticello Kieylan, a San Francisco classroom teacher who reviewed the game for [Graphite](#). "Showing students how these skills bridge disciplines is a critical lesson, and that point is deftly delivered."

- For environmental science, try Filament Games' [Reach For The Sun](#). This resource management game is designed to teach plant life cycle sciences and photosynthesis. Players are challenged to "become a plant" and balance resources like starch and water. "Extend your roots, sprout leaves, and make your flowers bloom before winter hits."

Long-form games tend to be more open-ended and intricate. These games often start simply and expand over time, so they can easily form the backbone of an entire curriculum. The Joan Ganz Cooney Center reports that recent research “points to the significant engagement factor produced by long-form learning games.” The coherent unification around both short-term and long-term goals leads increased motivation and ongoing commitment to class projects. In addition, long-form games tend to foster skills like “critical thinking, problem solving, collaboration, creativity, and communication.”

- Games like Muzzy Lane’s *Government In Action* provides an immersive experience for students by allowing students to “role play a member of Congress as a way of exploring American Government.” Students sponsor bills, trade in influence, awareness, and approval. The game simulates meeting with lobbyists, donors, and volunteers. The object is to get reelected to office. It is a strategy game that requires students to become familiar with the mechanics and processes of U.S. government.

When a role-playing game like this supplements typical classroom content, students see how their new knowledge manifests as better in-game performance. They learn how the government of the United States works through the experience of digital simulation rather than through memorizing textbook blurbs and taking quizzes. The knowledge is contextualized and the motivation is intrinsic.

- Long-form games, such as Amplify Learning’s *Lexica*, are great for teachers who are really comfortable with video games and have dependable access to newer hardware. Players free classic book characters that have been trapped in an imaginary library by an evil empire. By reading the books, students learn what kinds of powers the characters can offer them. They are motivated to save the characters and to do so they need to read the books. *Lexica* is so comprehensive that the sheer scale of complexity may be overwhelming for someone not yet comfortable with digital games. There are even mini games that, like everything in *Lexica*, require familiarity with the characters and plots of classic books.

Crossover Creative Game-based Platforms can fit into either one of these categories. They are flexible in the way they can be implemented. *Minecraft* is a great example of a game that can be used as either short-form or long-form. Teachers can create short one-time simulation-based assignments, or longer multi-period projects.

Game design and coding platforms, such as *Gamestar Mechanic*, *Scratch*, or *ScratchJr*, also cross over and can be used in either short-form or long-form applications. Teachers could introduce these platforms early in the year so that kids become familiar with the interfaces; then the platforms can be used throughout the year for a variety of projects that don’t even have to be related to one another.

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CHOOSING GAMES: WHAT IT CAN LOOK LIKE IN YOUR CURRICULUM

You could try a game-based curriculum, like the [MIND Research Institute's ST Math](#), which offers a playful game-based program that teaches mathematical concepts without using words. I visited one kindergarten classroom where [ST\(spatial temporal\) Math](#) was part of the curriculum. The kids called it "Jiji math" because of the adorable animated penguin. Jiji the penguin is not only the *ST Math* mascot, but also a critical part of the program's pedagogy by providing informative feedback. When the answer is right, the penguin can move across the screen; when it's wrong, he can't. When informative feedback works, students are no longer motivated by transactional rewards. Instead, they are intrinsically motivated to solve the problems, not to pass the test.

ST Math has all the bells and whistles of cutting-edge software but it is not revolutionary. That is, despite being digital, it remains grounded in three classic principles of good teaching: interactivity, informative feedback, and intrinsic motivation.

So how does the teacher incorporate the games into the curriculum? "Video games allow me to keep some students working on academic content while I give other students personal attention," said Lisa Pack, the classroom teacher. She made her rounds, moving from one station to another, giving focused attention to each student that wasn't working with Jiji. Then, after 15 or 20 minutes, she rotated some students off Jiji and moved others on. She immediately worked with the students who had been working with Jiji and then she continued to make rounds of the room. Sometimes she worked directly with groups of students, other times with individuals.

CHOOSING GAMES: FINAL DISTINCTIONS

There are also different **genres** of games.

- **Puzzlers** are probably the most familiar kind of game. They involve identifying a pattern or system and arranging objects according to a certain set of rules. *Tetris* is not only the best-selling video game of all time, but also a fairly simple puzzle game. Many games that began in non-digital versions—solitaire, mahjong, Sudoku—are also puzzlers. In fact, almost all games have an underlying puzzle structure. Otherwise, they'd be completely random, with no patterns whatsoever, and not much fun.

All video games, like puzzlers, are about pattern recognition. And once the player understands the pattern, the challenge comes from either more intricate puzzles (more complicated levels), or from changing the speed or circumstances in which the player needs to solve the puzzle.

When this happens, these games become

- **Drill and Practice Games.** Great games like *DragonBox Algebra* and *DragonBox Elements* combine drill and practice with increasingly difficult puzzles. Both of these types of games are especially well suited to mathematics. Traditional manipulatives and non-digital games are plentiful in math because those skills are easily translated into simple patterns. Video game technologies allow developers to design interactive versions of classic math problems.

When developers add compounding puzzles to be solved through a series of moves, these games become

- **Strategy Games.** Strategy games are also often multi-player. And when it comes to learning games, it's common for them to be focused on history. Games like *Historia* or *Making History* can offer experiential simulations of historical events. When students control the armies, key moments in geopolitics suddenly feel substantially more dynamic than just a chronological account of battles. Games like these work well when implemented alongside traditional lecture and research strategies. The long-form strategy games offer an engaging motivation for students to understand and internalize the material.

Some strategy games ask players to embody individual characters. These become

- **Role-Playing Games.** Think of *Dungeons and Dragons*. Digital role-playing games are very similar to dice-based role-playing games. Digital platforms, however, make the logistics easy and efficient. No need for tons of cards, binders of scenarios, and little pieces; these things can be employed virtually.

[*Mission US: Cheyenne Odyssey*](#) is a great example of an educational role-playing game. As the game is described, players become Little Fox, a Northern Cheyenne boy whose life is changed by the encroachment of white settlers, railroads, and U.S. military expeditions. Think of it as a historically accurate digital *Choose Your Own Adventure* book that takes place between 1866 and 1876. Students imagine themselves in the role of a Cheyenne youth. It makes something that seems initially foreign immediately relatable. All of the *Mission US* games are free and come with exhaustive teacher guides.

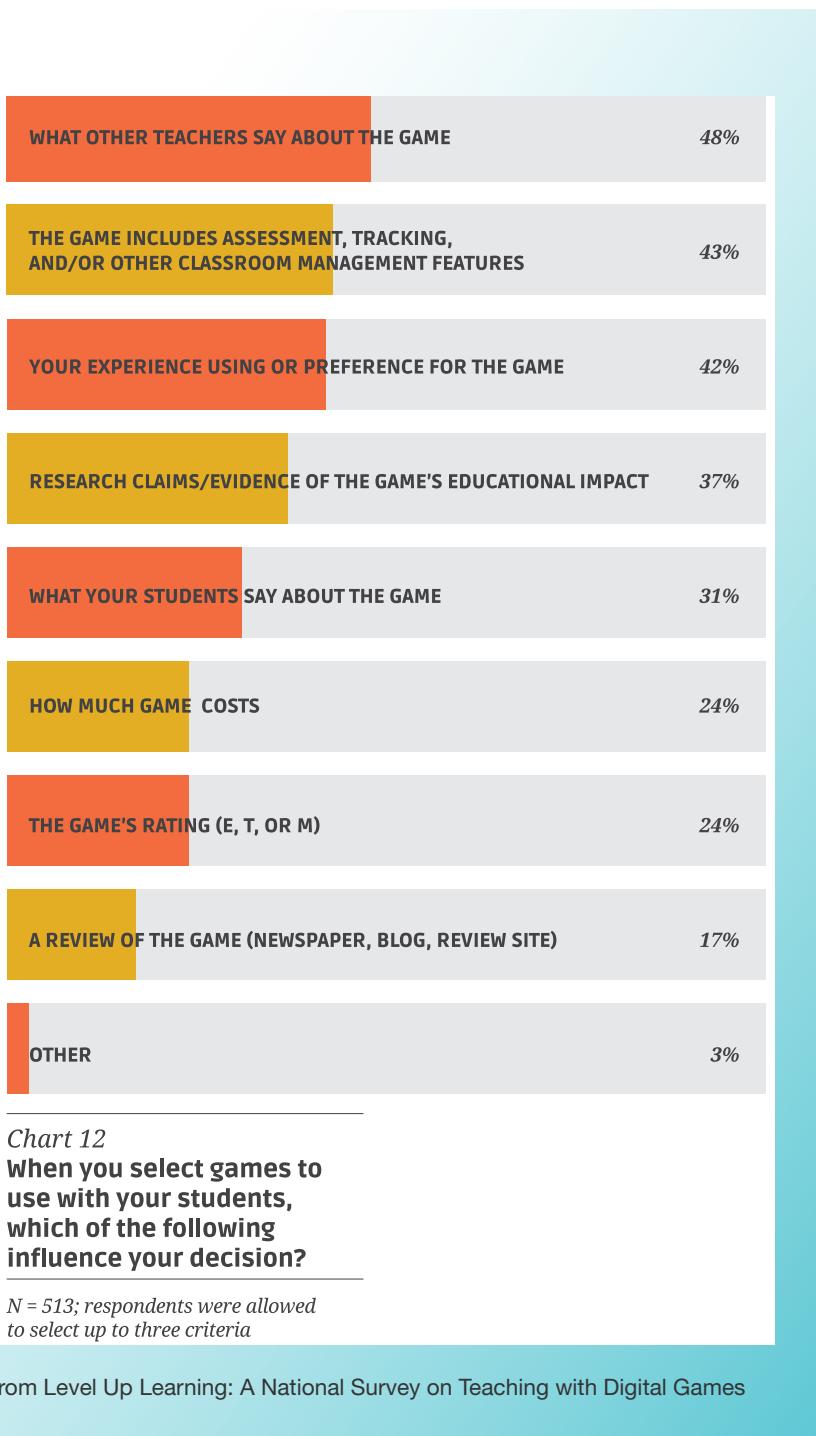
Some games offer a world of experience without clear objectives. These are called

- **Sandbox Games.** *Minecraft* is the most well known example of a sandbox game. Just like its life-world namesake, *Minecraft* is an open-ended creative space but with virtual shovels. Certainly the block world has unique properties (physics engine), but players can do whatever they want within those parameters. [*MinecraftEdu*](#) is a classroom-ready modification of the popular sandbox game, and is not only less expensive than the commercial version, it also provides many tools that empower teachers with the ability to adapt gameplay to established class curricula.

Joel Levin, one of the creators of *MinecraftEdu*, [uses it with second graders](#). But it works with students of any age. What makes *MinecraftEdu* great for teachers is the same thing that makes it so popular among gamers: It is so open-ended that the possibilities are only limited by your imagination. When I was a student, we held mini Renaissance Faires and built toothpick bridges. We were always limited by time, space, and resources. In today's equipped classrooms, both teachers and students build entire multi-player worlds full of interactive scenarios. For example, when I visited the [Quest to Learn](#) school in New York City at the end of their school year, I saw final projects that used *Minecraft* in their presentations. One class used *Minecraft* polar ice blocks to model the potential impact of global warming. Another demonstrated their understanding of urban water treatment and sewage engineering by building a working system out of pixelated blocks and then simulating rainfall and flooding.

Just as there are many apps and platforms designed to teach kids coding, there are also many apps and platforms that make it easy for kids to

- **Design their own games.** Created by [E-Line Media](#) and the [Institute of Play](#), with initial funding from the [MacArthur Foundation](#), *Gamestar Mechanic* is currently used in more than 7,000 schools, with over 600,000 youth-created games published and played over 20 million times in 100+ countries. It was created, the company states, “with the understanding that game design is an activity that allows learners to build technical, technological, artistic, cognitive, social, and linguistic skills suitable for our current and future world.”



Gamestar Mechanic is a web-based software platform with a drag-and-drop interface that makes it simple for kids to make their own games. Successfully manipulating *Gamestar Mechanic* requires that students learn pretty sophisticated “systems thinking,” or systems-based problem solving. “Game mechanics” learn to adjust settings and manipulate the relationship between components within a particular framework.

This list is certainly not exhaustive, but it's a good foundation.

Keep in mind: The common attribute of all effective learning games is that they simulate systems. They teach students how to understand academic concepts in relationship to the world around them. Certainly this increases engagement and retention, but what really matters is that it is about using knowledge in [an interdisciplinary way](#).

Digital or analog, game-based or not, good teaching and learning is about building social awareness, considering the individual's impact on a wider world.

Let this list be a starting point to help you to choose appropriate games for your classroom.

CHAPTER 4

Overcoming Obstacles For Using Digital Games in the Classroom

Even for educators who are excited about using games in the classroom, questions inevitably come up around the very real obstacles to implementation, and strategies for overcoming them.



Laurie Sullivan

There's not much that can be done to ameliorate this obstacle, though for motivated teachers, resources like [Donors Choose](#) and other crowd-sourced fundraising sites can certainly provide some options. The majority of tablet games are fairly cheap, ranging from \$1 to \$10. Many are also free, such as [Quinstimate!](#), a game that introduces students to estimation skills. The cost of using any kind of new tool in school can be prohibitive, but for educators who want to make it happen, trying free games is a great first step.

A [recent survey](#) from the Games and Learning Publishing Council asked 694 teachers to identify and rank the major barriers to using games in the classroom. Here are the top 10 obstacles they list, and ideas about how to overcome each one.

1. INSUFFICIENT TIME

Forty-five percent of teachers reported that insufficient time is a barrier to implementing game-based teaching strategies. But this concern presumes that video games would take time *away* from instruction.

It's a matter of changing tactics and presumptions: Games can be integrated into everyday curricula because they enable teachers to [present academic concepts in a contextualized, experiential way](#). Imagine games like activities or projects that can either reinforce or introduce new concepts.

2. COST

Forty-four percent of teachers reported that cost is prohibitive. It's all too true that teachers lack the financial resources they need and often use their own money to purchase supplies.

3. LACK OF TECH RESOURCES

Thirty-five percent of teachers surveyed reported that they lack the technology resources to introduce game-based teaching strategies. But this might have to do more with perception than reality.

Though some tech corporations may push the notion that one-to-one device-to-student ratio is necessary, I don't think that's the case. Teachers can go a long way with learning games with just a few devices. Students can play the game in groups, collaborating and working together. Follow it up with a group writing project to describe how the game impacted students' thinking about the subject matter. Have one group work on this while the others do non-digital activities. Rotate your students from one project to another.

4. HARD TO FIND GAMES THAT FIT CURRICULUM

Thirty-four percent of teachers reported that it's hard to find games that fit the current curriculum.

Check out [Graphite](#), [Playful Learning](#), and [Educade](#) for ideas. All three of these sites allow you to filter information about games by traditional subject areas and by grade level. Remember that the best way to use games is as a supplemental reinforcement for your traditional teaching. Don't look for games that will teach your curriculum. Instead, look for games that might approach the same subject area from a different perspective.

5. EMPHASIS ON STANDARDIZED TEST SCORES

Twenty-nine percent of teachers reported that an emphasis on standardized tests makes using digital learning games difficult.

Game-design companies have been addressing this by attempting to align games with standards. Filament Games, for example, offers many learning games and each one includes a "standards map." Check out their [PLEX Life Science suite](#) of games and how they map to various sets of science standards. These are fun, playful games that don't "teach to the test," but do align directly with state standards.

6. NOT SURE WHERE TO FIND QUALITY GAMES

Twenty-seven percent of teachers reported that they don't know where to find quality games. The big app stores don't help much either; they want to sell games and apps more than they want to help students.

See the sites listed above (number 4). All three of these sites offer sophisticated ways to filter search results and find specific games. Also, read [How To Choose A Learning Game](#) for more ideas.

7. NOT SURE HOW TO INTEGRATE GAMES INTO INSTRUCTION

Twenty-three percent of teachers reported that they're not sure how to integrate games into instruction—thus the need for this guide!

You'll find ways to implement game-based learning, and understand the theoretical, pedagogical, and practical uses. In this guide, we show how to apply games to [math](#) and [humanities education](#), as well as how games can facilitate [interdisciplinary learning](#).

8. UNFAMILIAR WITH TECHNOLOGY

Seventeen percent of teachers reported that they're unfamiliar with technology.

That's okay. Most of the writing about game-based learning focuses on digital media, but the truth is that you don't necessarily need devices. At the Quest To Learn school in New York City, [game design is a way of thinking, a paradigm](#). A great deal of their curriculum uses paper-based games rather than digital games. Check out their [print and play](#) games. There's also the great [Socratic Smackdown](#), which makes it easier to add games to your classroom without technology.

9. LACK OF ADMINISTRATIVE SUPPORT

Fourteen percent of teachers reported that lack of administrative support when it comes to games in the classroom.

But with more and more data to support the use of games, teachers can use the new research to convince administrators. For example, an [SRI research](#) report showed that students on the median [score 12 percent better on standardized tests](#). This kind of research can help you make a strong case with your administrator for using digital games to enhance learning.

10. LACK OF PARENTAL SUPPORT

Nine percent of teachers surveyed reported a lack of parental support for games in the classroom.

That's clearly not the majority of parents' perspectives, as evidenced by the small percentage; what's more, a Joan Ganz Cooney Center report, [Learning at Home: Families' Educational Media Use in America](#), showed that more than half (57 percent) of parents say their children have learned "a lot" from educational media. Still, teachers may have to account for their use of games for learning, and in those cases, I suggest you start slowly, demonstrate to parents (as you may have done with administrators) why you're using these tactics with evidence to back it up, and you'll prove over time how well it's working.



How Teachers are Using Games In The Classroom

Profile: ILLINOIS

BY KATRINA SCHWARTZ

Zack Gilbert teaches Ancient Civilizations at a middle school in Normal, Illinois. He's been using game simulations in his classroom since 1995, but when he started playing the commercial game *Civilization IV* for fun, he immediately [recognized its potential](#) to get 6th graders hooked on history.

INTRODUCING GLOBAL HISTORY

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"Especially for ancient civilizations, you want to make it as exciting as you can," Gilbert said. "This is their first real taste of history for the world; most kids have no concept of what the history is in other countries." When playing *Civilization*, students build up their own civilizations in different time periods, making choices in five different categories: government, legal, labor, economy, and religion.



"It gives the kids a visual," Gilbert said. "They're actually acting out and making decisions on things that people who lived thousands of years ago would have had to make." He acknowledges that games like *Civilization* aren't appropriate for class use all the time and he doesn't use them exhaustively. However, getting kids excited about the high stakes that historical figures faced is a great jumping off point for writing assignments, discussions, and interactive learning.

"When they're building their first city they have to look at the terrain around them, they have to look at the resources to see if this is a good place to build," Gilbert said. Students often make mistakes in the game and Gilbert restrains himself from correcting them immediately, instead letting them figure out where they went wrong. Students often build their cities on flood plains and watch as their citizens get sick and die; they now understand viscerally the devastation that choice would have brought to ancient civilizations. That experience prompts them to try a different approach next time.

STATE STANDARDS AND TEACHABLE MOMENTS

"It all starts connecting," Gilbert said. "When you get into the game it all connects to the state standards." For example, if students build monuments in the game, they're using math skills, but also thinking about the artistic relevance of such a symbol. "You as the teacher need to know what your goal is for them and then set them up so they can succeed," Gilbert said. "If you have a good enough game, they're going to gain more knowledge than you expect."

Sandbox games [see Chapter 3] are Gilbert's favorites; there are lots of ways to win or lose and students get to show off their creativity and critical thinking. He also thinks commercial games are some of the best tools because of their rich graphics and strong game mechanics. *Civilization* is sometimes criticized for not being historically accurate, but Gilbert sees that flaw as a teachable moment. "You can turn the things that might not be necessarily correct into learning experiences," he said.

TIME CONSTRAINTS VS. STRUGGLING LEARNER VICTORIES

Like many other teachers, Gilbert says it can be hard to integrate games into the curriculum when the focus is overwhelmingly on standards and state tests. "Things are becoming more regimented in the classroom," he said. He understands that many teachers don't have time to rework their whole curriculum to include games, especially if they themselves aren't comfortable with digital game play.

Still, Gilbert points out that the hardest part of any teacher's job is reaching a variety of learners, all at different stages of development and academic skill—and he's noticed that while not all his students love playing video games for class, struggling learners often come out of their shells and prove they can deliver some of the most innovative solutions. Succeeding in one area of class helps them gain confidence for other tasks, like writing and group projects.

This anecdotal observation bears out in the Joan Ganz Cooney Center research, which found that 55 percent of teachers who use digital games report they are a good tool for motivating low-performing students. Teachers see this motivation translating into academic performance too: 78 percent of teachers using digital games saw improved performance on curricular subjects due to gameplay and 71 percent saw improvement in extracurricular subjects.

Maison elfique



Profile: NEW YORK

BY KATRINA SCHWARTZ

Tony Mai experimented with some digital games in his middle school English Language Arts classroom as part of a pilot project at Junior High School 259 William McKinley in New York City. His principal chose him to participate because Mai's comfortable with technology and likes to play video games himself.

SKILLS IN THE REAL WORLD VS. EDUCATION BASICS

One game he chose, *Sports Network 2*, required students to take on the roles of employees at a media company marketing a product to a younger audience. In addition to the virtual gameplay, students had to do offline research on solutions they could use within the game. *Sports Network* is aligned to Common Core ELA standards, but places the skills within the context of real life tasks. "They had to read fake email and highlight important things on screen," Mai said. "I saw improvement with students' ability to figure out difficult vocabulary words using context clues." He also said students stayed more motivated.

The immersive quality of the game deeply engaged students and showed them how the skills they were learning applied to the real world, Mai said. But it was those same game qualities that made him wary that he wasn't covering the basics. The more that a game maps exactly to the standards, the less game-like it becomes, he acknowledged, and the more it resembles educational software, not a game.

TIME IS THE BIGGEST BARRIER

Also, playing the game took precious time and Mai slowly started to fall behind the other 8th grade ELA teachers on the mandated curriculum. "It does take someone who's willing to make sure the rest of the curriculum is covered while using these games in the classroom," Mai said. Teachers are under a lot of pressure to make sure they cover a jam-packed curriculum that can make any game feel like one more thing to do, something extra or supplemental.

"At the end of the day if the teachers know that their curriculum already addresses all the other standards, then they won't feel there's a need for the game in the classroom," Mai said. That's why he thinks games with robust data tracking and clear corollaries to standards will get the most teacher buy-in. "Teachers want to be able to see the gains that students are making on a specific skill and be able link it to a specific question or part of the game," Mai said.

START WITH SHORT-FORM

Concerns about time and explicit instructional standards being met is mirrored in the Joan Ganz Cooney Center report. "Few teachers are using learning games of the immersive variety, the kind that lend themselves to deep exploration and participation in the types of activities that set digital games apart from more didactic forms of instruction," writes Lori Takeuchi in the report's executive summary. "Most teachers instead report using short-form games that students can finish within a single class period. While lack of time is a likely explanation, teachers may also find shorter-form games to be easier to map to curriculum standards."

Profile: CONNECTICUT

BY PAUL DARVASI

How would Homer have told the story of “The Odyssey” as a game? What would participatory learning look like in ancient times? Learning about the lessons raised in classics like “The Odyssey” is getting a fresh perspective, thanks to a handful of educators who have started experimenting with how alternate reality games (ARGs) can be used as an immersive learning system that combines rich narrative, digital technology, and real-world game play. John Fallon, a Fairfield Country Day School teacher and game enthusiast, brings game-based learning to “The Odyssey” with a game he designed called *Dolus: Finding the Journal of Odysseus*.

A BRIDGE BETWEEN PAST AND FUTURE

Many educators today struggle to keep the classics relevant for a generation reared in the fast paced world of Internet and video games, and Fallon’s game bridges the classical past with the digital future for his Grade 7 English students. Rather than merely reading about the adventures of Odysseus in English class, students can walk a mile in his shoes by channeling the skillset of the Greek hero who masterminded the Trojan Horse and outwitted the Cyclops. Students must exercise critical thinking, resilience, and creative problem solving to succeed in an ARG.

The idea came to Fallon while playing *The Secret World*, a video game that incorporates real-world browser searches to help solve puzzles. “It all hit me at once,” remembered Fallon. “The portability of cross-media ARG puzzles, the use of real world information in a fictional game world, and the ancient Siren-song of puzzle solving. Immediately, the game about the crafty thief who stole the journal of Odysseus was born.”

WORLD-BUILDING COLLABORATION

Fallon drew his students into the game’s narrative with a bogus BBC News story about the theft of recently-discovered ancient Greek manuscripts. A riddle concealed within the article led players to master thief Dolus, who challenged them to follow his trail of clues and re-assemble the lost journal of Odysseus. Clues and puzzles were distributed across QR codes, password-protected videos, PDF files and a variety of Web 2.0 tools. He also enlisted his school’s IT department and fellow teachers to help deliver hints in a variety of unexpected ways. One puzzle required finding a Freemason symbol, which a few perceptive players discovered pinned to the lapel of their History teacher, a practicing Mason. Once they gave him the correct password, and passed a quick test on Masonic iconography, they received a key to help them unscramble a cipher that unlocked the next step.

Sticking to the “this is not a game” ethos common to ARGs, Fallon feigned ignorance and never admitted to knowing anything about the month-long caper. “Students had to identify, research, and master a variety of different codes and ciphers. They had to parse difficult riddles—with no guidance from me—and solve multiple phase problems and then synthesize their findings to succeed,” said Fallon.

This type of elaborate puzzle solving is standard fare for mainstream ARGs. Originating in the early 1990s, ARGs are designed and run by development teams called “puppet masters” who combine the digital and the real to deliver intricate narratives that blur the line between reality and fiction. Players enjoy a great deal of agency as they solve elaborate puzzles while they negotiate a world of phony websites and documents, midnight phone calls, and park bench envelope exchanges, to name a few of the tactics that can make these games indistinguishable from everyday life.

Educational versions of ARGs tend to be scaled down to accommodate specific learning objectives and operate safely within a school setting. Fallon’s model shows that any motivated teacher can design and run an ARG without programming skills, specialized technical knowledge, or a big budget; and free or inexpensive user-friendly, web-based tools and digital software put this gaming option realistically within educators’ reach. Additionally, the modular nature of ARGs lets educators decide how simple or complex they want to make their game, and allows them to choose elements that best suit their unique circumstances.

While ARGs can be played from elementary school to college, most existing educational examples are found in middle schools. “It’s a developmental period of transition where kids begin to build and exercise critical thinking skills,” said [Dr. Tanner Higgin](#), who helped produce the *United Colonies* ARG. “They are still relatively untainted by the social pressures and inhibitions that set in with growing older and they are also less entrenched/acclimated to the traditional school model.” Despite the paucity of studies specific to educational ARGs, this new learning system combines three ingredients whose benefits are supported by a growing body of research: [game-based learning](#), [embodied learning](#), and the use of [transmedia](#) in education. Jane McGonigal, author of “Reality is Broken,” draws one distinction between video games and ARGs:

Historically, in fact, most ARGs, like most computer and video games, have been designed simply to be fun and emotionally satisfying. But my research shows that because ARGs are played in real-world contexts, instead of in virtual spaces, they almost always have at least the *side effect* of improving our real lives.

A MODEL OF MOTIVATION

ARGs are not for everybody, but Fallon noted students who were not typically motivated in his class kicked into high gear, some laboring into the wee hours at home to untangle a conundrum. To succeed in *Dolus*, students had to evince the very qualities that helped the cunning Odysseus to prevail on his journey. “Odysseus is mortal and without superpowers but, above all, he’s a tenacious problem solver,” explained Fallon. “He is put into seemingly impossible situations and, through sheer human ingenuity and persistence, he finds a way out.”

Students wrote their own creative adaptations of “The Odyssey” to conclude the unit. Fallon noticed a substantial improvement in the quality of the students’ work over past, more traditional, deliveries of the lesson. “They did a better job of making their individual versions of Odysseus more clever and better problem solvers rather than just a cardboard cutout hero who bashes his way through problems. This likely stems from having experienced some difficult problem solving of their own in similar circumstances.”

The multidisciplinary potential for these games ranges far beyond English class, as ARG narrative and content can be tailored to accommodate a broad range of subjects and learning outcomes.

A RETHINKING OF ROLES

Some educators are convinced that ARGs have huge potential to invigorate learning environments, but there are some [implementation challenges](#):

- Administrators operating in a risk-averse climate of national standards and testing want to see clearly defined learning outcomes and assessment strategies to accompany any new teaching strategy.
- ARGs also take time to plan, and require that teachers think differently about how they deliver their instructional material.
- Good ARGs are often custom crafted to specific classrooms and schools, making them difficult to transfer into new environments, Fallon said.

Further study, experimentation, dedicated technology and user-friendly ARG designs will not only help overcome hurdles, but also open the door for other dynamic, immersive games that combine digital media and reality.

ARGs may also occasion a rethinking of the roles of teachers and schools:

- United Colonies is a product of the collaboration between educators and game designers; a model espoused by schools like Quest to Learn in New York City and CICS ChicagoQuest in Chicago. These charters might be forecasting a future where game and learning environment designers become standard personnel who work in conjunction with teachers in schools and districts, making initiatives like ARGs more feasible.
- Alternately, John Fallon is a model of the autonomous teacher-designer, who relies more on holistic creativity and resourcefulness than specialized knowledge.

Teachers may welcome the opportunity to engage their students and invigorate their practice with a unique creative outlet. Perhaps we need only take a page from Odysseus's book and, like our students, push the creative boundaries, problem solve, and overcome adversity with resilience.

John Fallon



Profile: ALBERTA, CANADA

BY KATRINA SCHWARTZ

Students in Caryn Swark's grade six class in Alberta, Canada come to school and immediately find themselves immersed in a fictional world where the king has been kidnapped and they must rescue him. Students have avatars and throughout the year they "level up" as they master different skills.

GAMIFYING CLASS

This gamified environment is part of the class DNA, so it's no surprise that Swark is also using digital games to help students engage and connect with the material she's teaching. "There's a lot of games that are basically worksheets in disguise," Swark said. "I try to avoid those games as much as possible. They're not really games and kids aren't stupid." Like Zack Gilbert in Illinois, Swark believes there are lots of educational merits to some commercial games, especially if teachers think expansively about how to build on game narratives and skills.

Swark uses Nintendo DS games like *Professor Layton and the Curious Village*, a game that is basically like reading a novel embedded with math problems and puzzles. The first time she played it, Swark was struck by how similar some of the puzzles were to things she had asked students on worksheets. When kids play *Professor Layton*, they are doing lots of reading and math, but they like it.

Similarly, *Prodigy*, a commercial math computer game, is built around a wizarding world where students do battle by solving math problems. Swark wishes the math were a little more integrated, but students still find the game fun and engaging. "Instead of thinking about a checklist of curricular needs that I have to meet, I think about how this fits into what I need," Swark said.

PAYOUTS IN PERSISTENCE AND ACCEPTANCE

She has found that not only are kids more interested in what they're learning through gameplay, but they stick with tricky problems longer, work together better, and are more open to trying over and over again. The stakes are lower when a student fails within the game and Swark doesn't see any of the test anxiety that has begun to plague her students.

"Framing things in terms of game play helps get through blocks for kids who get to grade six and are already convinced that they can't learn," Swark said. She's seen her weaker students gravitate towards gameplay and make significant gains. Games are one part of her year-long goals to break students of the notion that they will fail even if they try.

As a female teacher and a "gamer," Swark has often found bringing games into the classroom helps her connect more to her male students. Additionally, students who are alienated socially have become popular because of their abilities to help others in games like *Minecraft*.

Swark got inspired to try games in her classroom after reading Lee Sheldon's book, "The Multiplayer Classroom: Designing Coursework as a Game," and jumped in feet first. She's built on her success and retooled her failures, just as she's asking her students to do with their schoolwork. Parents and administrators have been more supportive than she expected, so she's even suggested that parents of struggling readers use fan fiction to encourage reading.

A PLACE TO START

But not all teachers work in such supportive environments. In those cases, or when an educator is more hesitant, Swark recommends that teachers check out game rating sites like [Graphite](#), run by the nonprofit Common Sense Media, to choose games that clearly align with the grade and standards they teach. She also says it's easier to start with overtly educational games and work up to the more open-ended games.

Lastly, she says there's a lot to learn from other educators. "There's a lot of people online who are doing this stuff," Swark said. "They're making lesson plans involving games and you can find those and then you don't have to spend the time playing a video game for hours."

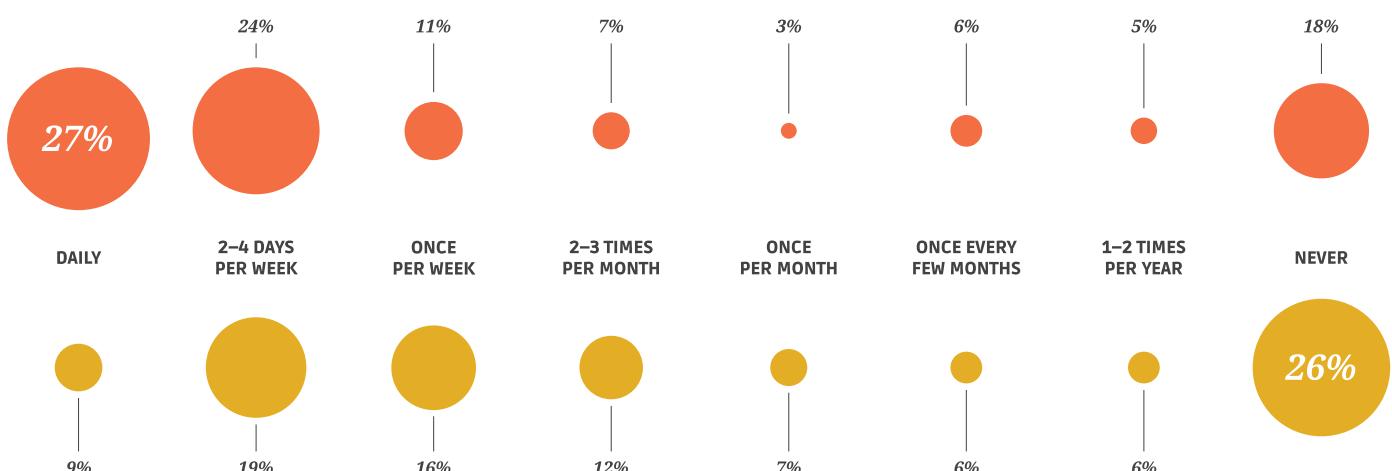


Chart 1
Frequency with which
teachers play and teach
with digital games

N = 694

From Level Up Learning: A National Survey on Teaching with Digital Games

Profile: BERGEN, NORWAY

BY PAUL DARVASI

A group of Norwegian high school seniors sit in a religious studies class, absorbed by a moral conundrum unfolding in the midst of a zombie apocalypse. Their teacher, Tobias Staaby, is screening a scene from the critically acclaimed video game, *The Walking Dead*, which depicts a knotty ethical dilemma confronting the group of rag-tag survivors: Supplies are running low and only four food items are left to ration, but there are 10 hungry mouths to feed. Who should eat? The grumpy old guy? The injured teen? The children? The leader?

Once the students reach a consensus, they have to justify their choice with one of the concepts they've learned from moral philosophy. Was their decision guided by situational ethics, utilitarianism or consequentialism? This is one instance of how commercial video games are used at [Nordahl Grieg Upper Secondary](#), a public high school located in the coastal city of Bergen in Norway.

BUILDING A SCHOOL FOR THE FUTURE

Two years before the school opened in 2010, Principal Lin Holvik was mandated to build a school for the future, and she focused on creating both the physical and curricular space for teachers to experiment with video games. The vision materialized into a modern building encased in high glass windows and translucent interior walls that convey an atmosphere of transparency and openness which reflects the school's pedagogical philosophy. "We have a sociocultural view of learning," explained Holvik, "and believe in sharing and constructing knowledge together. We also strongly encourage innovation and believe that freedom to fail should be much more emphasized." And so fittingly, video games have been used to help foster [collaboration](#) and an appreciation for the [art of failure](#).

"We have been well aware of and interested in the potential of games in school for a long time," Holvik added, describing how video games were part of the school's DNA. So when English and Social Studies teacher Aleksander Husøy approached her about using the history simulation game, *Civilization IV*, she welcomed the opportunity with open arms.

Doug Kline



THE WORLD AT YOUR FINGERTIPS

Husøy pioneered teaching with video games at Nordahl Grieg, paving the way for his colleagues to follow suit. Like many teachers today, he's a lifelong gamer who credits his playing history-based video games as a factor in his decision to major in political science. He teamed up with colleague Vegard Relling and used *Civilization IV* as the linchpin in a four-week cross-curricular unit combining Norwegian, English, and Social Studies.

The first obstacle was getting students up to speed with the game's elaborate interface. This might seem like time away from "real learning," but studies increasingly support the idea that learning to play a complex game is, in and of itself, a valuable exercise in cognitive calisthenics. To ease the familiarization process, experienced players were strategically grouped with novices, which Husøy observed altered the class's social dynamic. "Students became more willing to share and collaborate through working with this project. There grew a community spirit that occurs when a group of people are doing something unique together." This unintended consequence played well into the school's sociocultural aim of co-constructing knowledge.

Civilization IV proved useful in fulfilling both the English language and culture elements required by the curriculum. Playing through empire simulations helped students better understand British colonialism, the spread of English, and US cultural hegemony. As for language acquisition, Husøy explained that the game "introduces fairly advanced terminology in small chunks at a time, making it well suited for vocabulary work."

The game's diplomacy mechanics and customizable scenarios facilitated the study of international relations in [Social Studies](#). The class built simulations then played through various outcomes to unpack [contemporary conflicts](#) and reflect on resolution strategies. "Though the model is not a perfect representation of the real world, the game gives students a deeper understanding of the subject matter," said Husøy. He feels that *Civilization* holds a unique value in letting students experiment with "what if" scenarios to see how changing variables like political structures or social policies affect and alter the course of a nation.

The unit concluded on a metacognitive note, as students reflected on gender issues in games, video game addiction, and the unique affordances and limitations of video games as a medium.

REDUCING RESISTANCE IN PHYSICS

Encouraged by Husøy's work, physics teacher Jørgen Kristoffersen decided to experiment with *Portal 2*, a venture that came at no cost due to the [free educational licenses](#) available from Valve, the game's publisher.

Portal 2 challenges players to solve elaborate puzzles in order to escape the labyrinthine Aperture Science Laboratory complex. Players manipulate cubes, redirect lasers and tractor beams, time jumps, and teleport through walls, all of which rely on the game's physics engine.

Kristoffersen's class played with variables affecting in-game object behavior and freely designed physics experiments with *Portal 2*'s flexible level editor. "Should we have a large mass and height? Drop 50 kilograms from 50 meters? Oh, the air resistance kicks in—let's shorten the height," said Kristoffersen, illustrating how his students toyed with the power of gravity.

"Real world experiments are important and the game can't replace them," he said, "but the game gives students a different perspective on the laws of physics, where mechanics are simulated by a computer to create a realistic gaming environment. It can also be a great source of discussion when the laws of physics are broken!" Students think about how the simulation deviates from reality, and transforming what might be perceived as a game's shortcoming into a critical thinking opportunity.

HUNTING, GATHERING AND SURVIVAL

Also inspired by Husøy, Tobias Staaby uses video games to teach units ranging from ethics to narrative and cultural history. “I wanted to use video games as something more than [chocolate-covered broccoli](#),” he said. “It’s important that video games are regarded as useful and engaging learning tools in their own right.” To that end, he uses popular commercial games that would not outwardly seem suitable for the classroom.

Elder Scrolls V: Skyrim, the sword and sorcery action role-playing game, is set in a rugged, Scandinavian-inspired wilderness that echoes Norway’s natural landscapes. Staaby leverages this connection to teach [Norwegian romantic nationalism](#), a 19th century independence movement that set out to document uniquely Norwegian cultural elements and natural settings to affirm their national identity. Like their historic predecessors, students explore the wilds of *Skyrim* in search of features and landscapes that aligned with the aesthetics of romantic nationalism. “Video games do not give you the answers up front. You have to look for traces of national romanticism in *Skyrim*. It does not come by itself,” explained Staaby, identifying a video game’s potential for an active and participatory approach to learning.

Staaby also used the post-apocalyptic zombie survival game *The Last of Us* in his literature class. Critics swooned over its intricate storyline and engaging character development, which his students studied much as they would any traditional work of literature—with a few differences. They played the first eight hours at home, and then completed the game together in class. During class play, Staaby reported that his students applauded, were visibly moved and reduced to absolute silence in the game’s final moments. “These were all events that I could not imagine having happened if we watched a movie or read a novel together.”

A GLOBAL MODEL FOR GAME-ENHANCED LEARNING

In each case, game-based learning seems to be a misnomer, as the learning is not based on games, but enhanced by them.

Commercial games were repurposed and modified to support curricular goals, as opposed to driving them. Of course, learning can and should also be based on games, as they are valid texts that can be studied in and of themselves, but it is important to see video games as elastic tools whose potential uses exceed their intended purpose.

The Norwegian Center for ICT in Education, which works on behalf of the Ministry of Education, now takes video games seriously, and has designated two officials, Jørund Høie Skaug and Vibeke Guttormsgaard, to undertake a national project to integrate games in schools. “With a great team of young teachers with game experience, and with time to plan and develop their game pedagogy, Nordahl Grieg now shines as an example and an inspiration to other schools,” said Guttormsgaard. Skaug added that they are developing a teacher guide for the games *Civilization*, *The Walking Dead* and *Portal 2*, in collaboration with the gamer-teachers at Nordahl Grieg.

The school’s transparent walls not only speak to its open approach to learning, but also invite the rest of the country—and perhaps the world—to look inside and see how video games can play an important role in the school of the future.

Mind Shift

Guide to Digital Games + Learning

GAMES +
LEARNING



WRITTEN BY

Jordan Shapiro
Katie SalenTekinbaş
Katrina Schwartz
Paul Darvasi

PHOTO CREDITS

Getty
iStock
Brad Flickinger
Erin Scott
Laurie Sullivan
Maison elfique
Doug Kline

EDITED BY

Tina Barseghian
Ki-Min Sung

COPY EDITING BY

Reece Michaelson

DESIGNED BY

Zaldy Serrano

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