CHAPTER 3

Gamification and Digital Game-Based Learning

If someone offers you an amazing opportunity but you are not sure you can do it, say yes—then learn how to do it later!

—Richard Branson

Motivation is such a huge part in what ends up differentiating student outcomes. Everyone has the ability to do fantastic work at a high school level. It's just, without the right teacher and the right motivation, you don't always get there.

—Bill Gates

In This Chapter:

- What is the foundation of gamification and digital game-based learning?
- How does game-based learning align with the digital age classroom?
- What examples exist of educators and learners using digital game-based learning?
- In what ways can you begin to explore using digital game-based learning in your educational environment?

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What Do We Know About Gamification?

Game theory, a term previously coined in the economic sector, uses gaming reward systems, social interactivity, problem-solving strategies, and challenges and competition models in a nongaming environment (Azriel, Erthal, & Starr 2005; Ehrhardt, 2008; Gros, 2007). Over the past several years, an increased interest in the application of game theory within the field of education has evolved. It is safe to say that almost every person—educator, parent, learner—has played games in his or her life; these might include tabletop board games, outdoor tag, single-player app games, or advanced digital role-playing games. From kindergarten through high school, innovative educators use various aspects of game theory to promote participation and learning in their classrooms. Specifically, within the language arts curriculum, educators develop and implement multimodal, game-based learning activities to enhance student motivation, reading comprehension, and vocabulary. *Digital game-based learning (DGBL)* can be used as a tool to develop content knowledge, learning strategies, motivation, social interactivity, creativity, and innovation; improve group dynamics; and prepare students for the digital age workforce (Bratitsis, Dourda, Griva, & Papadopoulou, 2014; Chin & Tsuei, 2014; Fernández-Manjón Sancho, Fuentes-Fernández, & Moreno-Ger, 2009). The literature on digital game-based learning is emerging and has yet to fully capture the potential benefits and implementation techniques of game achievement, critical thinking, reading comprehension, and learning motivation in the classroom.

Foundations of Game-Based Learning

The use of game theory in the classroom is still new; to date, the most common use of game theory is in the business world to bolster customer product consumption and employee morale (Azriel et al., 2005; Ehrhardt, 2008). Game theory did not really exist as a unique field until John von Neumann published a paper in 1928 (Tucker & Luce, 1959). He was a mathematics professor at Princeton University who sought to quantify the actions a player makes in a game that lead to a positive outcome (Dixit & Nalebuff, 2008). von Neumann (von Neumann & Morgenstern, 1947) primarily studied games that resulted as zero-sum games, wherein one player's successes result in another player's failures. von Neumann also studied alternate forms of competition through collaboration where one player's decisions in a game result in positive outcomes for themselves and other players (Dixit & Nalebuff,

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2008). Business owners adopted this gaming framework as a new coding for business transactions to motivate their employees and promote business sales. Employees were given incentives to motivate their production in the form of monetary or activity rewards (Deterding, Dixon, Khaled, & Nacke, 2011). From the goals of business to promote their product and encourage motivation, educators, who frequently may see disengagement in class and lack of motivation to complete tasks, have begun to adopt the practice of gamification.

Gamification

The term *gamification* was first used to encourage electronics manufacturers to improve their production using gaming tactics (Tulloch, 2014). The term, therefore, describes the process of using gaming mechanics in a nongaming context (Deterding et al., 2011). Mechanisms such as leaderboards, challenges, levels, badges, points, and rewards are frequently used by businesses to engage employees to bolster morale and production and certainly to stimulate customers to remain loyal (Tulloch, 2014). In the classroom setting, many teachers have integrated gamification practices insofar as the class itself becomes a game.

Game-Based Learning

Entering this multitude of innovative education practices, digital game-based learning (DGBL) gives educators a new platform to capture student engagement and facilitate learning in a way that mirrors student engagement outside the school environment (Chin & Tsuei, 2014; Sanford & Madill, 2007). Unlike gamification, game-based learning relates to the use of games to enhance the learning experience (Tulloch, 2014). Founded on game theory, which holds that people are intrinsically motivated by competition, achievement, status, and collaboration, DGBL activities are designed in a way that is similar to the daily social media activities that students encounter in their typical world: chat rooms, video games, film scripts, online blogs, graphic novels or comic books, text messages, and tweets (Azriel et al., 2005; Sanford & Madill, 2007).

Educators, of course, have been using games in the classroom for years, as they strive to engage students in meaningful and complex skill acquisition. Gee (2005,

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2008), who is a strong proponent of incorporating video games in modern education classrooms, explains that video games and other digital games are at their core educational experiences. In the digital arena, game-based learning arises from the belief that if teachers can make learning as engaging and motivating as a video game, students will be more willing to learn rigorous material (Eseryel, Law, Ifenthaler, Ge, & Miller, 2014; Gee, 2005). Players have to learn the rules of the game, which are oftentimes not fully explained at the beginning of the game, and maneuver their way through complex narratives to attain a preset goal, or in many cases, an unknown resolution to an authentic problem. When tied to the educational curriculum, game-based learning acts as a powerful learning tool because it engages students in their gaming milieu (Eseryel et al., 2014; Gee, 2005). Digital game-based learning provides students a unique, immersive experience that allows ample opportunities to frame learning experiences in terms of goals, apply previous knowledge for problem-solving, participate in social interactions, and provide and receive immediate feedback on their learning experiences (Gee, 2008). Using digital game-based learning strategies and platforms in conjunction with gamification techniques enriches the classroom experience and bolsters student learning and motivation (ClassCraft, 2014; Gee, 2005, 2008; Tulloch, 2014).

Of course, it is important to remember that gamification can occur in nondigital formats, with leaderboards, team competitions, and other activities. Schools have used competitions among grades (who can read the most books in the summer, for example); however, this chapter does focus on the ways in which digital technologies have changed the nature of gamification in our schools today.

Game-Based Learning Aligned with the Digital Age Classroom

Students in the digital age are voracious consumers of visual media; they seek entertainment from television screens and community interactivity from social media, and find comradery by participating in online gaming (Sancho et al., 2009; Sanford & Madill, 2007). As a result, we have seen a true shift in educational technology and pedagogy to a digital educational thrust in order to meet the changing needs and interests of current students (Eseryel et al., 2014; Gros, 2007; Sancho et al., 2009). We have progressed from the teacher standing behind the wooden podium, to purposefully circulating around the room, facilitating learning, and guiding

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students through their thought processes (Jong & Shang, 2015). Instead of vigilantly trying to stamp out gaming, teachers support learning goals for their students with digital game-based learning opportunities. The portable digital platform has made research and learning more accessible, immediate, and integrated within traditional curriculum (Gros, 2007; Prensky(a), 2001b; Sancho et al, 2009). Digital textbooks incorporate enhanced visual, audio, and video components to promote comprehension among diverse learners (Morgan, 2014; Sanford & Madill, 2007). The 2017 Horizon Report classified gaming and gamification as a *digital strategy* and stated,

> Digital strategies are not so much technologies as they are ways of using devices and software to enrich teaching and learning, whether inside or outside the classroom. Effective digital strategies can be used in both formal and informal learning; what makes them interesting is that they transcend conventional ideas to create something that feels new, meaningful, and 21st century. (Freeman et al., 2017, p. 38)

Tools for Formative and Summative Assessment

We know that digital games are frequently used for motivation, enhanced engagement, and persistence in learning (Burguillo, 2010; Dickey, 2007; Divjak, & Tomic, 2011; Esryel et al., 2014); however, many educators also use them for assessment. The A-GAMES project (Analyzing Games for Assessment in Math, ELA/Social Studies, and Science), which is a joint project between the University of Michigan and New York University, has been studying how teachers actually use digital games for assessment (Fishman, Riconscente, Snider, Tsai, & Plass, 2014). "Our objective in A-GAMES is to illuminate how teachers understand and make use of game features that support formative assessment" (p. 3).

In a recent study, Fishman et al. (2014) found that "The most frequent uses of games are to cover content mandated by state/national or local/district standards. In comparison, fewer teachers use games at least weekly to teach supplemental content" (p. 4). Additionally, 34% of those surveyed stated that they use the games at least weekly for formative assessment. One key finding, with implications for professional development and educator preparation is that "Teachers who use digital games to make instructional decisions on a daily basis are more than twice as likely

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to check for motivation and engagement during formative assessment than teachers who rarely use games to make instructional decisions" (p. 5). They also found that "Teachers who use digital games daily to document student progress are much more likely to use information from formative assessment on a daily basis to find or create alternative instructional strategies for a particular topic" (p. 5) and those who use digital games more frequently are those who are inclined to use the feedback to track students' progress.

How Are Educators Implementing Gamification?

Gamification systems such as ClassCraft (2014) add an interactive, digital game layer on top of the existing course structure. Through the ClassCraft software, students are able to select and customize their own characters, which act as their avatars in the game (ClassCraft, 2014). Students may play individually or as part of a team, earning experience points and rewards based on classroom behaviors and use of class knowledge—they can alternately lose experience points and receive consequences if they misbehave in class (ClassCraft, 2014). Packaged within the game quests, students are learning and demonstrating course objectives, previously only assessed through traditional academic assessments. In the advent of the digital age, gamification platforms also include digital game-based learning activities, such as interactive online quizzes and academic quests.

Zieger and Farber (2012) conducted a study looking at whether seventh grade students, involved in studying the Constitutional Convention, would be able to transfer their traditional face-to-face cooperative strategies to an online multiuser virtual environment (MUVE) setting, and also whether they might become more civic-minded. The study found that "The virtual environment did provide an authentic setting for students to practice the civic lessons they learned academically. Student involvement in a participatory culture translated to an increased tendency to be civic-minded" (Zieger & Farber, 2012, p. 393).

An interesting attempt to narrow the achievement and readiness gap is being implemented through an innovative program in middle and high schools serving economically disadvantaged students in several U.S. states. The Globaloria program offers a game design intervention that aims to introduce innovative STEM

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curriculum, in which students develop functioning interactive web games by the end of the school year, with a goal to teach others about their chosen social-impact topic, often from their own lives. Minnigerode and Reynolds (2013) studied two students who were engaging in a collaborative game design within a formal elective game design class. They concluded that "on the whole, the team members demonstrated high levels of engagement with their chosen topic of dropout prevention, illustrated by their behavior, final accomplishment, and an analysis of their game" (p. 290).

It is important to think about what each game requires and how learners must be able to engage with it, and having supporting knowledge of what and how to play it. Weppel, Bishop, and Munoz-Avila (2012) worked with a program called MyRulerMaker, which strives to introduce middle school learners to artificial intelligence and computer programming. This program interfaces with IBM's CodeRuler (goo.gl/2qXYzU; the program is now called "developerworks" at ibm.com/developerworks) and the overarching goal is to defeat an opposing army and steal a flag, which requires programming in Java. However, the program is not immediately intuitive, and these researchers investigated if interrupting play to provide scaffolding was useful or disruptive to the students. They found that "more prescriptive support (regardless of intrusiveness) may have provided the students with the confidence and self-efficacy they needed to stay engaged. Levels of intrusiveness may have been less important because students seemed to seek out the support they needed" (p. 373).

An excellent example of gamification of an extremely complex issue is The World Peace Game. Educator John Hunter developed the World Peace Game, which offers a deep and elaborate political simulation that invites young students to explore a world not unlike our own, consisting of four or five prominent nations. As student teams direct each country, learners are encouraged to explore the global community and learn the nature of the complex relationships between nations, addressing social, economic, and philosophical issues.

In the White Bear Lake Area School, a third grade teacher, Mr. Pai, has been using game-based educational activities to make learning fun, but also to improve student achievement. He introduced the use of Nintendo DS, among other technology, into his daily curriculum. Students practiced math and language through the use of computer and video games. In just 18 weeks, his class went from below third grade

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level to the middle of fourth grade level. He states that he "continues to explore and use digital tools" (personal communication, 2017).

According to Thompson (2014), the popular online game Minecraft can help students learn to read. The game works similar to an infinite set of programmable LEGO blocks, and it is a way to instill spatial reasoning, math, and logic (see Cindy Duncan's Spotlight 1.5 in Chapter 1). Yet, in his review of its use, he is convinced that it presents "a culture of literacy" (Thompson, 2014, n.p.). The game does not have extensive instructions; thus, new players must find ways to learn about the rules and the best ways to play and win, and this often involves reading. There are of course YouTube videos of games and players, but there are many "how-to texts at Minecraft wikis and 'walk through' sites written by gamers for gamers" (Thompson, 2014). There are also guides and handbooks, which of course require reading. He also reported on one study by a literacy researcher at Sam Houston State University. "She monitored several 10th grade students at school and at home and saw that they read only 10 minutes a day in English class—but an astonishing 70 minutes at home as they boned up on games" (Thompson, 2014). One parent and educator stated that Minecraft also "teaches them about different materials, food, resource management, project planning, teamwork (if they use multiplayer), problem-solving, responsibility, and accountability for their animals" (Milanesi, 2017).

Thompson concluded, "I'm praising Minecraft, but nearly all games have this effect. The lesson here is the same one John Dewey instructed us in a century ago: To get kids reading and writing, give them a real-world task they care about. These days that's games" (2014, n.p.).

It is important to recognize that gamification, while fun, can also tackle very serious issues. As a timely example, consider the experiences of immigrants. The National Endowment of the Humanities (NEH) has supported and funded digital games, including Mission US: City of Immigrants (mission-us.org/pages/landing-mission-4), a game about the immigrant experience. Learners play as Lena Brodsky, a Jewish immigrant in 1907 New York. Taking on this persona adds an element of empathy as students realize how difficult it can be to assimilate to a new country. There are also games about the revolutionary war, escape from slavery, the Great Depression, and more; each game includes an educator guide.

Other options for using gamification to address complex issues includes Papers, Please (papers-please.en.softonic.com), a serious game about being a border patrol agent checking passports in a fictional Communist nation in 1982.

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Educator Preparation and Professional Development Use

Many educators are learning about gamification and digital game-based learning through their teacher preparation programs, or through professional development opportunities at their schools, or that they seek out. Matthew Farber has become an expert in the use of digital game-based learning and describes his experiences. His latest book (Farber, 2018) will be especially helpful to all educators interested in the topic.

SPOTLIGHT 3.1

How Games Can Be the Centerpiece of a Lesson

Matthew Farber (@MatthewFarber), University of Northern Colorado

The Tribe is an affinity group of likeminded game-based learning practitioners that includes teachers, academics, and game designers. As a member of this community of practice, I sought to understand how my colleagues use games for the systems of their classrooms. This led me to study their methods, with the intent of parsing out important lessons learned, and to share best practices in game-based learning.

The Tribe is composed of connected learning practitioners who meet at conferences and online and play games together, as well as openly share ideas. They do not assess student play; instead, they measure learning transfer through the creation of their own assessment strategies, which are typically reflection-on-action practices such as exit ticket questions or journal writing (Schön, 1983). Rather than fetishize gamification approaches (e.g., the use of digital badges and leaderboards to create a reward-based engagement model), The Tribe embraces play theory modalities, setting up affordances that enable students to move through a personalized zone of proximal development, from novice to master, via game mechanics (Vygotsky, 1978). Their classrooms are also gameful, displaying an embrace of self-determination theory: students have a sense of

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"competence, autonomy, and relatedness" (Deci & Ryan, 2000, p. 57). The Tribe represents the interaction of expert teaching and high-quality gaming.

Best practices in using educational technology often means that technology is used as a tool for learning—not as the focal point of class instruction. For example, when making a green screen video, students insert different locations in the background of videos; the application used (e.g., DoInk or WeVideo) should not matter. The learning goal is to create an authentic learning experience, not to become proficient in a particular technology.

Adapting video games to meet a teacher's specific curricular objectives can run contrary to the educational game market, which can fetishize teacher dashboards that report personalized analytics on student game achievement. For the most part, these teachers do not wholesale adopt games to teach specific skills, such as typing; instead, they adapt games to fit the learning goals and targets. For example, professor Chris Haskell began with the digital rocket simulation game, which is intended to teach physics and rocketry. But Haskell (2015) had his students play in two teams, using two computers, role-playing as the U.S. and the Soviet Union. Students took on roles, like spies and media, to simulate the Cold War space race. Here, Haskell adapted and appropriated a STEM game to be used other than the designers may have originally thought possible. Haskell calls this *contextual transposition*, "when you take an environment intended for one thing and you co-opt it to be for what you want it to be" (Farber, 2018).

Much like close reading and analyzing a novel, members of The Tribe use the systems in story-driven games to be the centerpiece of lessons (Farber, 2018). In this sense, video games are read like *digital texts*, which can "provide students with mediated experiences" (Shaffer, Nash, & Ruis, 2015, p. 10). Let's take Tribe member Steve Isaacs (@mr_issacs). A video game and development middle school teacher in New Jersey (and ISTE's 2016 award winner for Outstanding Teacher), Isaacs has his students play the classic video game Oregon Trail. Then, like a book club, students analyze the experience, including the game's goals, the narrative elements, and the core mechanics or actions of play. Next, his students write and publish game reviews on blogs. Finally, his students play the Oregon Trail map on Minecraft: Education Edition, making their own versions by modifying or "modding" and hacking the game.

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> Isaacs, like many game-based learning experts I studied, uses video games as the hub of his lessons, much like a teacher would use traditional media, such as books or film. Oregon Trail is a model—a centerpiece for Isaacs' instruction, all surrounded by the authentic and meaningful assessments he designed.
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Other institutions are also working to help teachers learn how to use games, as it is clear this is necessary. "Well-designed games provide scaffolding and motivation for a player to learn skills and apply knowledge in service of meeting specified goals … However, how games are implemented in classrooms affects the learning and engagement outcomes and therefore their efficacy," reported Rosenheck, Gordon-Messer, Clarke-Midura, & Klopfer (2016, p. 33). For example, the University of South Australia's Connect program is offering professional development for secondary school teachers and students across the country that helps them develop engaging projects that incorporate tools such as 3-D printing and electronic games while exposing them to career choices (unisa.edu.au/UniSA-Connect). Curtin University has developed a challenge-based learning game within a global context, which is an extension of problem-based, project-based, and contextual teaching and learning in higher education. It supports global collaborative team problem-solving experiences (academicexperts.org/conf/site/2017/papers/51013)

Fitting Gamification into Your School: Getting Started

There are many ways to get started. One way you might try to introduce gamification to your class community is through competition by teams, rather than individuals, so that rewards go to collaborative teams. You might set a goal that is reachable; for example, perhaps the class can earn an extra recess if a certain percentage passes a test or completes their work on time. This supports the idea that students are mastering material, and students are more likely to help each other.

One way to support gamification is through badging. Gibson, Coleman, and Irving (2016) present three primary roles of using digital badges to support learning:

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> bringing *visibility* and *transparency* to learning, teaching and assessment; *revealing meaningful, identifiable and detailed aspects of learning* for all stakeholders; and providing *a new mechanism to recognize skills, experience and knowledge* through an open, transferable, stackable technology framework. (p. 115)

Another option might be to gamify homework, which can encourage persistence and responsibility. How about a treasure hunt? Quests? Or perhaps you will choose to try all of the above. Acedo (2017) suggests, "Gamification uses game elements such as challenges, feedback, levels, creativity, and rewards to motivate students to learn, and master concepts," and he offers these 10 ideas to gamify specific parts of your teaching:

1. Make Students Co-Designers
2. Allow Second Chances. And Third.
3. Provide Instant Feedback
4. Make Progress Visible
5. Create Challenges or Quests Instead of Homework and Projects
6. Give Students Voice and Choice
7. Offer Individual Badges and Rewards
8. Have Students Design a Classwide Skills and Achievement System
9. Implement Educational Technology
10. Embrace Failure; Emphasize Practice

Thus, some educators may gamify in individual areas, and others may choose to tackle the entire classroom milieu. Heidi Lihou is a sixth grade social studies teacher at Sitka School District's Blatchley Middle School; she attended a conference and that experience changed her educational pedagogy and practice as she began to gamify her entire classroom.

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SPOTLIGHT 3.1

Gamification works!

Sitka School District, Sitka, Alaska

Heidi Lihou, Teacher, Sixth Grade Social Studies

I am lucky to have the opportunity to teach about my passion—ancient civilizations! I have also been able to incorporate this passion with a second love of mine—games. Two years ago, I was looking for something to revitalize myself and my classroom. I attended a Schoology workshop presented by Beth Box, a Florida middle school civics teacher who had gamified her entire class. I left her presentation feeling inspired and armed with examples and practical knowledge. I went home and spent the entire summer designing my gamified classroom. I created a scenario in which the world as we know it had been destroyed by a black hole, instigated by CERN (the European Organization for Nuclear Research). This resulted in the bending of time and space so that an emperor from China might be walking down 5th Avenue in New York with peasants from the French Revolution! Today's countries were wiped out. It was time for a new empire to emerge and rule the world! This wove geography and history together with challenges to encourage students' inquiry and engagement.

Students have the opportunity to earn experience points (XP) as they complete class assignments. These XP allow students to "level up." They begin as Hunter Gatherers, move up to be Farmers, and so on. Eventually students can become a Master of Time and Space, the highest level. Students can also earn achievement points (AP) by demonstrating mastery of key concepts and standards on assessments. These AP are used as currency in my game. I use Schoology to create an electronic store. Students can purchase virtual villages, buildings, technology, Wonders of the World, etc. Students also love the ability to attack or burgle other students' villages. Of course, I offer defensive walls and anti-theft systems to thwart such attacks. An electronic leaderboard updates live as well, thanks to Google Docs.

The students love the way this works and get quite caught up in learning the history and geography as they are engaged in progressing through the game. The only response from families has been positive since the learners enjoy this so much. Two things really support this adventure: first, it is important to have

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a good learning management system (LMS), as there are many things to keep track of and to organize. Second, it is essential to have a supportive administration. Although Sitka is not yet a 1:1 district, the administration gave me a cart of laptops for my classroom and we use them almost every day.

If you are considering gamification yourself, my advice is to do it! Spend a few minutes investigating those teachers who have gamified their classrooms; many of them have published their ideas, tips, strategies, and examples. You don't have to travel this road alone, nor start from scratch. Be organized and deliberate in your planning as well. This will save you time and energy in the future. And most of all—have fun! You and your students will not regret it.

Summary

This chapter presented the concept of gamification, which includes using games for engaging students in content materials. It can also be used as a strategy to make a game out of an entire classroom. The educators who use gamification report that while students do engage in deeper learning for longer periods of time, it is their enthusiasm for learning that is most striking to them. The chapter suggested ways to begin small, by gaming small parts of the learning environment and places to learn more about the topic. Educators who employ the ideas of game-based learning and gamification will be incorporating the following ISTE standards for students and for themselves as educators.

ISTE STUDENT STANDARDS ADDRESSED IN THIS CHAPTER

Standard 1: Empowered Learner	Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.
Standard 4: Innovative Designer	Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
Standard 5: Computational Thinker	Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
Standard 6: Creative Communicator	Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

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ISTE EDUCATOR STANDARDS ADDRESSED IN THIS CHAPTER

Standard 1: Learner	Educators continually improve their practice by learning from and with others and exploring proven and promising practices that leverage technology to improve student learning.
Standard 5: Designer	Educators design authentic, learner-driven activities and environments that recognize and accommodate learner variability.
Standard 6: Facilitator	Educators facilitate learning with technology to support student achievement of the 2016 ISTE Standards for Students.
Standard 7: Analyst	Educators understand and use data to drive their instruction and support students in achieving their learning goals.

Questions and Reflections

- Is the idea of gamification something you think could improve students' enthusiasm and persistence for learning?
- What are some of the concerns you have about implementing this digital strategy in your classroom, school, district, or community?
- Are there local resources or individuals who might assist or inform your school or colleagues about gamification?
- What safeguards are necessary to protect privacy within a gamified classroom?
- Can you identify one area where your grade- or subject-level teachers might work together to gamify an assignment or a project? Is there something the entire school might work toward together?

Further Resources to Get Started

Open Educational Resources (Free)

Wikispaces
(gamifi-ed.wikispaces.com) This article offers an introduction and overview of gamification.

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The Arab-Israeli Conflict Game
(aic.conflix.org) This free game provides authentic problem solving and practice in politics.

Taleblazer
(taleblazer.org) Find interesting games for your students.

PBS LearningMedia
(www.pbslearningmedia.org) Provides resources for the classroom.

Education Arcade
(education.mit.edu) A rich site from MIT that includes dozens of games for learners of all ages.

Gaming Can Make a Better World
(www.ted.com/talks/jane_mcgonigal_gaming_can_make_a_better_world)
An excellent TED talk about gamification by Jane McGonigal.

The Ultimate Guide to Gamifying Your Classroom
(www.edudemic.com/ultimate-guide-gamifying-classroom) This offers ideas and support for introducing gamification into your classroom or school.

Further Resources (For Purchase)

Globaloria
(globaloria.com) Power up any brain with excellent computer science courses for grades K–12 and engage all students in computer science education.

Top Hat
(tophat.com/blog/gamification-education-class) This site offers support and assistance for gamifying your curriculum.

BrainPOP
(www.brainpop.com) A commercial system to support learning games.

World of Warcraft
(worldofwarcraft.com/en-us) This is one of the most popular games and offers a chance to teach strategy and collaboration to students.

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