BEYOND EMPATHY

Games to Foster Teens' Social and Emotional Skills

KELLI N. DUNLAP & SUSAN E. RIVERS

INTRODUCTION

Game designers are masters at creating engaging experiences that fuel creativity and drive problem-solving. One area in need of game designers' expertise is creating games that advance teens' social and emotional skills. Social and emotional skills are critical for success in academics, relationships, and work (Gallop, 2013; Jones, Greenberg, & Crowley, 2015). These skills can be taught, as shown by evaluations of evidence-based social and emotional learning (SEL) programs integrated into elementary, middle, and high schools (Belfield et al., 2015; Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Taylor, Oberle, Durlak, & Weissberg, 2017). One study reports that every dollar invested in SEL programming yields an 11 dollar return for participating students (Belfield et al, 2015). Despite these positive outcomes, programs that contribute to social and emotional skill development have not been widely implemented in U.S. schools (Dusenbury, Weissberg, Goren, & Domitrovich, 2014; Rieber, 1996), especially high schools (Williamson, Modecki, & Guerra, 2015). These challenges create a ripe opportunity for games.

The connection between games and learning is well established (Botturi & Loh, 2008) and modern research has shown game-based learning to be an effective teaching tool for core academic

subjects (Din, Calao, Ward, Chiong, & Shuler, 2001; Ke & Grabowski, 2007; Moreno & Mayer, 2005; Yip & Kwan, 2006) as well as 21st-century skills (Qian & Clark, 2016) such as innovation, collaboration, and communication (P21, 2017). However, there is little research on game-based learning for social and emotional skills and even fewer games designed intentionally to build those skills. Digital games offer promise for disseminating at scale immersive learning environments for social and emotional skill practice for teens. Teens spend more and more time in virtual worlds (Twenge, 2017) and meeting them where they are offers a significant opportunity to engage them in their own development.

In this article, we explore the potential for teen players to develop social and emotional skills through gameplay. By identifying areas of overlap between best practices in game design and SEL programming, we propose a framework for analyzing existing SEL games and guiding the development of new ones. Our goal is to improve the quality and quantity of games wherein teens advance their social and emotional skills.

BEST PRACTICES IN GAME DESIGN AND SEL PROGRAMMING

In this section, we first identify specific elements that contribute to well-designed learning games and appeal to the needs and interests of teen players. Next, we delve into best practices that have emerged from SEL programming for teens.

Best Practices in Designing Learning Games for Teens

During adolescence, teens undergo significant biological, psychological, social, and cognitive changes that distinguish them from all other age groups (Steinberg, 2014). Teens' developmental needs include identity exploration, establishing independence, finding their place within the community, and social acceptance (Erikson, 1993). Embracing the developmental

needs of teens means creating games specifically designed to address their goals and interests. It is insufficient to "repackage" game content originally designed for younger audiences by modifying content to include "teen-friendly" language, imagery, or examples. Furthermore, such "aging up" of experiences designed for younger children may come across as patronizing or controlling to increasingly independent teens (Yeager, 2017).

With the developmental needs of teens in mind (e.g., identity exploration), we researched best practices for designing learning games (see Figure 1). Our review produced four general game design practices and three teen-specific strategies for developing well-designed learning games.

General Game Design Practices. First, a learning game must actually be a game. We ascribe to Salen and Zimmerman's (2003) definition of a game as, "a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome" (p. 11). System exploration—the cyclical feedback process of learning rules and relationships in the game world (Squire, 2011)—is cited frequently as a core component in well-designed learning games (Bogost, 2008; de Castel & Jensen, 2003; Gee, 2005; Leites, 2015; Rawitsch, 2017; Squire, 2011). Second, players should be both autonomous—able to make informed decisions (Brown, 2016)—and active agents (Gee, 2005)—feeling like their choices matter (Leites, 2015; Rawitsch, 2017). Third, games should present well-ordered problems which feel challenging but solvable (Gee, 2005). Fourth, failure in a game must be presented as a normal part of the experience that offers an opportunity to learn through feedback (Gee, 2008; Leites, 2015).

Teen-Specific Strategies. Three additional design strategies are critical for teen audiences. First, creating social spaces around and within learning games will foster and deepen learning (de Castel & Jenson, 2003; Leites, 2015; Rawitsch, 2017; Squire,

2011). Second, game spaces should address issues of pressing importance to teen players; specifically, they should allow for identity and role experimentation (de Castel & Jenson, 2003; Squire, 2011). Third, when designing for teens, games should allow for multiple ways to solve a problem or complete a challenge (de Castel & Jenson, 2003; Leites, 2015), not merely a linear pathway that lacks opportunity for exploration or player choice.

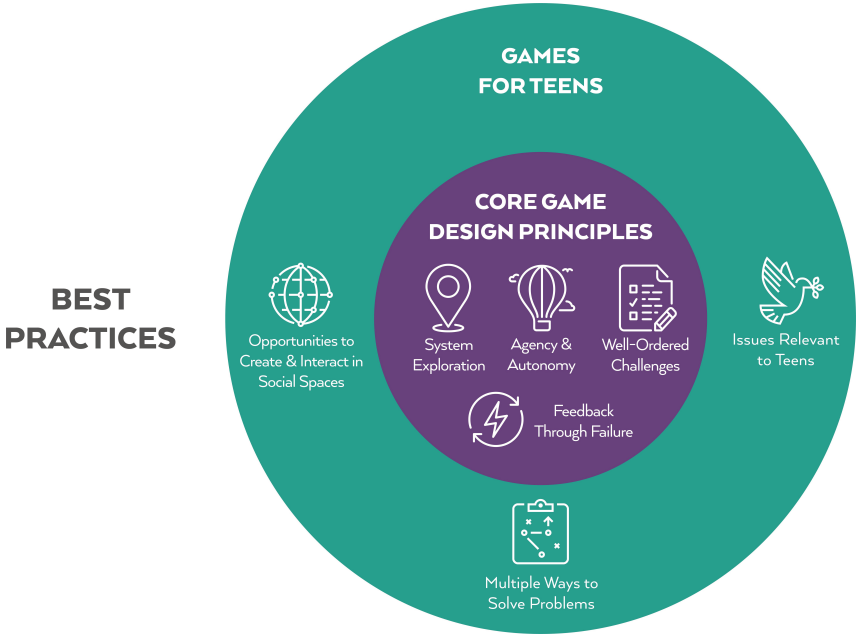

Figure 1. General Game Design Best Practices for Teen Players

BEST PRACTICES IN SOCIAL AND EMOTIONAL LEARNING

Social and emotional learning (SEL) refers to the cultivation of competencies critical to success in school, work, and life, beyond traditional academic learning (Smith, McGovern, Larson, Hillaker, B., & Peck, 2016). The five core social and emotional competencies that youth need to thrive in and beyond school are: 1) *self-awareness*: recognizing one's own thoughts and emotions

and their influence on behavior; 2) *self-management*: successfully managing one's own thoughts, emotions, and behaviors; 3) *social awareness*: perspective-taking, empathizing with others, and valuing diversity; 4) *relationship skills*: establishing and maintaining healthy relationships with others; and 5) *responsible decision-making*: making constructive choices around social interactions and personal behavior informed by ethical standards, social norms, and safety considerations (Collaborative for Academic, Social, and Emotional Learning [CASEL], 2018). Figure 2 illustrates these competencies.

Figure 2. The Five Social and Emotional Competencies (adapted from www.CASEL.org)

There are a few notable programs that effectively teach SEL and have shown positive outcomes for teens. Examining the common features of those programs provides a useful framework for designing settings that promote teens' development of their social and emotional competencies. Features of successful SEL programs include: 1) project-based learning, 2) sequenced SEL content, and 3) a safe, and nurturing environment with caring and supportive adults (Smith, McGovern, Larson, et al., 2016).

Project-Based Learning. Project-based learning is a teaching model which organizes learning around real-world, hands-on projects that have a long-term, complex, and challenging goal to achieve (Thomas, 2000). At the start of a project, teens learn basic skills needed to reach the goal and practice and build upon these

skills throughout the project's duration. For example, a project may have the goal of building a boat for communities located in flood-prone areas. Teens might first learn about flood-prone communities using research tools on the internet and use that foundation to write survey questions in advance of collecting data from community members. Before building the boat, they also would learn about safety procedures in a woodworking studio and how to use the tools in the studio. Experimentation is encouraged as teens test out different models in different conditions to ensure the models perform as needed (e.g., in this case, that the boat will float in flood waters). Developing each skill lays the foundation for completing the next part of the project, and prepares teens for later projects. Sequencing project-based content in this way enables repeated practice of skills in multiple contexts, provides interesting and complex challenges, and fosters teens' sense of ownership as they actively shape how the project progresses. Project-based learning curricula typically are designed so that teens transition from the private space of the program to public spaces where they demonstrate their skills through community engagement.

SEL Content Sequencing. Effective SEL programs draw from evidence-based practices and the science of emotions to inform the social and emotional content and skills that teens learn and practice. The sequencing of SEL content begins with basic skills and builds to more complex challenges. For example, teens learn the basics of effective communication (e.g., active listening, asking open-ended questions) before advancing to conflict resolution. The SEL content sequence is integrated into a larger project-based learning sequence and aligned with project milestones where SEL-related challenges, such as or frustration or stress, are likely to occur. Presentation of SEL content is coupled with intensive co-regulation with a mentor, a practice where adult mentors provide nurturance and support to the teen while simultaneously acting as a buffer between the teen and

environmental stressors (Smith, McGovern, Peck, Larson, Hillaker, & Roy, 2016). As the project-based content transitions into community engagement, teens develop a sense of how others perceive them and cultivate a perspective where they view themselves as skilled and as valuable members of a community. Through meaningful relationships with mentors and peers, and with validation from the community, teens are able to recognize their own mastery of social and emotional skills.

Safe, Supportive Spaces. Effective SEL programs feature safe spaces that provide opportunities for mentors and teens to develop positive relationships. Spaces are designed to foster regular check-ins with mentors that facilitate teens' sharing of thoughts and emotions, experimenting with roles and identity, and engaging in novel experiences which have a high probability for failure (e.g., testing the effectiveness of different boat models in the above example). Mentors address challenging social or emotional situations in real-time, allowing them to provide constructive feedback to teens when it is most salient. The high probability of failure provided by novelty creates frustration or stress, which helps teens gain experience in regulating strong emotions with support from a trusted adult. Embracing failure as a learning experience shifts the typical emotional reaction to failure and normalizes support-seeking behavior. The relationship is the foundation from which mentors model, facilitate, scaffold, and coach teens in responding productively to difficult situations. The relationship also serves as a safe space for teens to practice giving and receiving feedback to and from mentors.

MAPPING SEL BEST PRACTICES TO GAME DESIGN PRACTICES

Drawing from the previous section, we identify areas where game design and SEL program design overlap. We describe our analysis in detail here; the Appendix includes a summary table

of the analysis. The goal of this analysis is to create a framework which combines both areas of practice with an emphasis on embracing the developmental needs of teens.

Project-Based Learning and Game Design

The processes that comprise project-based learning are integral to effective game design. At the beginning of a game, the player is exposed to the mechanics (i.e., skills) fundamental to gameplay (i.e., run, jump, shoot, etc.). Mastery of these mechanics (skills) is required to progress in the game. Over time, these skills become more complex (i.e. double jump, sprinting, etc.) allowing for iterative practice of skills across multiple contexts. Games present the player with tasks that are challenging, complex, and interesting enough to elicit voluntary effort (Juul, 2010), often over a sustained period of time. Most games require players to exert both agency (the capacity to choose and a sense of control in the game world) and autonomy (the ability to make meaningful, informed decisions; Brown, 2016), both of which enable players to shape their game experience, even if the end-goal is predetermined. For example, the goal of *Halo 3* (Bungie, 2007) is always to save Earth from destruction by aliens, but decisions about what path to take and which enemies to kill are up to the player. In these ways, well-designed games and SEL programs both provide interesting, appropriately complex challenges which require agentic and autonomous engagement from the user and mastery and repetition of skills. The move from private space to community engagement also is reflected in communities that form outside of games. Most newcomers to an online community start out as readers and consumers of content; over time, they transition into more complex roles such as contributors, collaborators, and leaders (Velasquez, Wash, Lampe, & Bjornrud, 2014.

SEL Content Sequence and Game Design

Games, even single-player ones, are social spaces and can provide opportunities to practice social and emotional skills. Games like *Star Wars: Knights of the Old Republic* (Bioware, 2003) and *The Walking Dead* (Telltale Games, 2012) can create memorable moments which spur passionate social discussion (Leites, 2015) around morality and ethics. Games also can integrate social and emotional skills, such as communication and cooperation, into gameplay by giving players different access to information (Leites, 2015). For example, in *Keep Talking and Nobody Explodes* (Steel Crate Games, 2015) two players must work together to disarm a ticking time bomb. The catch is that only player one has access to the bomb while player two is the only one with access to the instruction manual. To figure out how to decipher the correct disarm procedure and win the game, each player needs to understand the other player's perspective and how to efficiently and effectively provide useful information before the bomb explodes. Games also provide opportunities for practicing social and emotional skills by being a shared point of interest around which players can gather outside of the game. For example, social sharing and connection can occur via online forums, live-streaming of gameplay, player-created tutorial videos, fan art or fanfiction, and the creation of custom content. Players can engage with the larger gaming community to share their performances, creations, and accomplishments and receive valuable feedback and validation from peers.

Safe, Supportive Spaces and Game Design

Games provide safe spaces for experimentation and risk-taking without fear of significant real-world consequences. When playing a game, players fail 80% of the time (McGonigal, 2011). In fact, games celebrate failure. Failing in good games is more than a lack of success; it often produces something extra (Leites, 2015). For example, failing to clear all the orange pegs in the game

Peggle (PopCap Games, 2007) results in over-the-top animations and playfully ridiculous music. Failing in *Peggle* can make players laugh. In other games, failure is an opportunity for improvement. In *Halo 4* multiplayer (343 Industries, 2012), for example, players see a "kill cam" after they die that shows where they were killed and how. Players respawn in a matter of seconds, and the information from the kill cam can be used to inform a player's next tactic or allow a player to communicate information about the enemy to her team. Kill cams are a common game design feature and the kind of constructive feedback they provide is both timely and useful, and reframes failure into a confidence-building experience.

Games in isolation do not provide the type of in-depth emotional bonding between teens and mentors characteristic of successful SEL programs. However, they can serve to facilitate relationships and provide additional engaging opportunities for constructive feedback. For example, bonding over a shared gameplay experience is a powerful social and emotional connector. Seventy-six percent of parents say they play video games with their children because it is a way to socialize and interact with them (Entertainment Software Association, 2016). Games are also a significant part of developing and maintaining teen peer relationships. Seventy-eight percent of teens report feeling a stronger sense of friendship and connectedness when playing online games with friends (Lenhart, Smith, Anderson, Duggan, & Perrin, 2015).

Streaming platforms like Twitch, YouTube, and Mixer foster the formation of participatory online communities (Hamilton, Gerretson, & Kerne, 2014), public spaces designed for "voluntary, informal, and happily anticipated" social gatherings (Oldenburg, 1999 p. 16). These social gatherings can range from a dozen viewers watching a single person play to millions of fans tuning in to cheer for their favorite player or team. Thirty-six million people watched the League of Legends World Finals in 2015,

about five million more than watched the 2016 NBA finals (Walker, 2016). During streams, viewers are actively participating by interacting with the streamer or other viewers through a chat interface, they are not merely passively watching events unfold. In fact, feeling connected to a community and experiencing a sense of belonging is the most significant motivator for live-stream viewership (Sjőblom & Hamari, 2016).

Summary

Both game design and effective SEL program design offer teens the opportunity to learn by doing. They each have the potential (in the best cases) to provide a supportive, responsive environment, give consistent and constructive feedback, and facilitate meaningful relationships (although this is not always the case; Busch, Bordeaux, & Consalvo, 2016, have written extensively about toxic game culture). These structures promote experimentation, exploration, socialization, and self-improvement. The parallel design practices for games and SEL programs create the foundation for our Game-Based SEL Framework.

GAME-BASED SEL INTERVENTIONS FOR TEENS

To gain a deeper understanding of how SEL content and themes are converted into rule-based game systems, we scanned the field for games that integrated evidence-based, teen-focused SEL practices and analyzed them through the lens of our framework. Because we only found two examples of evidence-based SEL games, we expanded our search to include games that addressed SEL concepts but may not have intentionally been designed to incorporate best practices in SEL. In this section we first analyze the two evidence-based SEL games and then a set of games that offered SEL growth opportunities for teens.

Evidence-based SEL Intervention Games

Ripple Effects. *Ripple Effects* is a digital online platform designed to teach teens social and emotional skills through evidence-based behavioral interventions using videos, vignettes, motion graphics, collectibles, and achievements (Ripple Effects, n.d.). Its interactive design and teen-specific focus have been researched rigorously. Efficacy studies show that after using *Ripple Effects*, teens' grades improved as did their empathy and problem-solving skills (De Long-Cotty, 2008). Our review of *Ripple Effects* using the Game-Based SEL Framework led us to conclude that despite its breadth and inclusion of gameful elements, it does not meet several basic characteristics of games (see Table 1). Instead of a system with conflict, challenge, and complexity, *Ripple Effects* provides teens with a collection of interactive apps. Although it proved to be effective as an intervention, *Ripple Effects* fails as a game.

Zoo U. In contrast to *Ripple Effects*, *Zoo U* (Centervention, 2014) provides a legitimate game structure. 3C Institute's *Zoo U* was designed for children aged seven to 12 years. It is an online, flash-based game that uses 2D cartoon graphics and takes place in a school for aspiring zookeepers. It integrates evidence-based SEL content (DeRosier & Thomas, 2017) into its subject matter and gameplay, including the five social and emotional competencies (CASEL, 2018) and effective program features (Smith, McGovern, Larson, et al., 2016a). Studies of *Zoo U* demonstrate its ability to improve children's social skills and enhance social knowledge, functioning, and self-confidence (Craig, DeRsoier, & Watanabe, 2015).

Zoo U offers a series of scenes that players must complete, beginning with lower-level scenes that unlock higher-level scenes. Each scene presents a stand-alone challenge the player must navigate, such as how to interact with a bully or discovering the food preferences of an elephant, using a point-and-click

interface and through the selection of presented narrative options. The scenes serve as an initial assessment of the 6 skills *Zoo U* aims to teach and measure: emotion regulation, impulse control, communication, empathy, cooperation, and social initiation. Players are encouraged to solve the problems in *Zoo U* "just like you would if they happened at your real school" (Centervention, 2017, page 2).

Overall, *Zoo U* meets several criteria of the Game-Based SEL Framework, especially when compared to *Ripple Effects* (see Table 1). The game is designed to develop players' skills by presenting increasingly challenging obstacles across a variety of contexts. The SEL content is integrated into the game's mechanics enabling players to practice skills and learn from their mistakes without fear of real-world consequences. Players are able to choose how to interact with the world and what skills they want to focus on, allowing the player a moderate amount of autonomy to shape their learning experience. However, because players are instructed to interact in the game based on what they would do "at your real school" the playfulness of the game is removed. It no longer is a safe space that encourages and supports failure. Moreover, *Zoo U* is not appropriate for teen audiences. The zoo theme and animal characters are childish, the content is best suited for elementary school scenarios, and the game's purpose is obvious (learn these skills, do what you would do in the real world). These characteristics of the game, even with "aged up" content, likely would feel patronizing to teen players.

Other Games With SEL Growth Opportunities for Teens

Given the lack of evidenced-based SEL intervention games appropriate for teen audiences, we broadened our scope to include less rigorously researched games intended to provide teens with social and emotional growth opportunities. These types of games are often classified as "empathy games." Vander Caballero, founder of Minority Media and creator of *Papo & Yo*

(Minority Media, 2012), defined empathy games as those "…in which conflict resolution is not achieved through power-up mechanics" (Bartleson, August 7, 2014, p. 20). In his 2014 GDC talk, Cabellero cited games such as *Gone Home* (Fullbright Company & Majesco Entertainment, 2013), *Papers, Please* (Pope, 2013), and *Brothers: A Tale of Two Sons* (Starbreeze Studios, 2013), as core examples of the presence, power, and profitability of empathy games. Other recent examples include *Beyond Eyes* (Tiger and Squid, 2015), *That Dragon, Cancer* (Numinous Games, 2016), and *Life is Strange* (Dontnod Entertainment, 2015).

Empathy games are an invitation to experience thoughts, feelings, and worldviews which are different from one's own, and rely on many components of SEL outlined in Figure 2. Practicing this kind of perspective-taking is crucial to developing more complex skills like empathy and social awareness, but whether or not empathy games teach or develop these kinds of skills is unclear. We sought to identify games whose goal was to teach and develop social and emotional skills in teens, but may not be promoted publicly as SEL games. We consulted the Games for Change website (Games for Change, 2018) to identify games that might fall into this category and, from the 48 educational games listed, we identified *SuperSight* (Preloaded, 2012) and *Tracking Ida* (Tracking Ida Team, 2017) as games that address one or more components of SEL. We analyzed each using the Game-Based SEL Framework.

SuperSight. *SuperSight* is a browser and mobile game for teaching resilience, self-control, and self-determination to teens aged 14-19 years. Players play as a masked avatar journeying through "Mount Wrong," where each enemy represents a different negative thought or emotion: anxiety, inflexibility, worry, isolation, and hopelessness. The goal of the game is for the player to vanquish these inner demons by destroying waves of enemies through attacking, charging, or using special abilities. If a player completes a level, the guiding NPC, Wise Guy, shares a

piece of wisdom related to the monsters the player just defeated; for example, "Agility of the mind triumphs over Stronghorn stupidity," where Stronghorn refers to the enemy representing inflexibility. If the player loses, the message "You were overwhelmed" appears on the screen, followed by gameplay tips presented as supportive wisdom from Wise Guy: "Dash at these troubles to break them up. And use your special powers, my apprentice."

The underlying learning goal of the game is to teach teens skills for regulating thoughts, emotions, and behaviors. Our framework analysis suggests that *SuperSight* falls short for several reasons (see Table 1). First, *SuperSight* delivers SEL content almost entirely through narrative statements provided by Wise Guy rather than being integrated into the gameplay itself. SEL content is limited to a few sentences presented to players about the importance of mindfulness or reflection. For example, after defeating multiple waves of Fearlines, feline-like creatures that represent anxiety, Wise Guy says, "Apprentice. You have learned the hard way that fear is like a cat: it thinks it's the boss but it won't get fat unless you open the tins. …". Enemies represent maladaptive strategies and power-ups reflect coping strategies, but there is no inherent or intuitive connection between what the player *does* and what the player *learns*. After completing the game, the player has only learned to identify specific enemies, select the most effective power-ups to battle each one, and click (or tap) the enemies in a strategic order to defeat them. Further, the message that some emotions are "wrong" while others are "right" perpetuates destructive stereotypes about emotions, which have the potential to cause real harm (see Kindlon &Thompson, 1999, for the dire consequences of hiding real feelings due to social pressures, judgement, and stereotypes).

Tracking Ida. *Tracking Ida* is an alternate reality game (ARG) for high school students based on the life of pioneering investigative journalist Ida B. Wells. Because the game is an ARG, it was

reviewed based upon available game documents and video recordings of gameplay. The premise is that Ida secured in a large wooden trunk important information about lynchings in Memphis. Players must unlock the trunk and each of its inside compartments to uncover the documents and solve the case. *Tracking Ida* does more than just present players with puzzles to solve; it challenges players to start an investigation of their own where they explore, problem-solve, and interview sources.

ANALYSIS OF GAMES USING THE GAME-BASED SEL FRAMEWORK

✗ MINIMAL OR NON-EXISTENT ✓/✗ PRESENT ✓ FEATURED

COMPONENT	R (RIPPLE EFFECTS)	Z (ZOO U)	S (SUPERSIGHT)	T (TRACKING IDA)
Designed for a teen audience	✓	✗	✓	✓
Integrates evidence-based SEL content accurately	✓	✓	✗	✗
Is a complex system comprised of interesting, meaningful choices (Complexity)	✗	✓/✗	✓	✓
Players are active, influential agents within the game space (Autonomy & Agency)	✗	✓	✓	✓
Players start with basic mechanics or knowledge which scale in difficulty and complexity in response to actions (Challenge)	✗	✓/✗	✓	✓
Skills are practiced and revisited across multiple contexts (Iteration)	✗	✓	✓	✓
Social and emotional content is embedded within gameplay via mechanics, narrative, cut scenes, etc. (Integration)	✓/✗	✓	✓/✗	✓
Challenges faced can provide opportunities for social and emotional growth experiences within and around the game (Identity)	✓/✗	✓	✓/✗	✓
Provides opportunities to connect and learn from more experienced players (Mastery)	✓/✗	✓/✗	✓/✗	✓/✗
Supports and encourages sharing of personal accomplishments, performances (Supported Sharing)	✓/✗	✗	✓/✗	✓/✗
Facilitates social interaction and meaningful relationships (Connection)	✓/✗	✓/✗	✗	✓/✗
Provides an environment where the process of learning from mistakes is valued and supported by the group (Productive Failure)	✗	✓/✗	✓	✓/✗
Feedback is timely, consistent, constructive, and accurate (Constructive Feedback)	✗	✓	✓/✗	✓

Table 1. Analysis of Games Using the Game-Based SEL Framework

Although not specifically labeled an SEL game, *Tracking Ida* stands up very well on the Game-Based SEL Framework. It provides a series of challenges that allow players to build up the skills required to overcome them. SEL content is integrated seamlessly into project-based goals. The game requires extensive problem-solving, cooperation, communication, and teamwork to unlock Ida's secrets, drawing on relationship skills and

responsible decision-making. The game includes community and performative sharing as players explore their surroundings and conduct and film interviews with role-playing volunteers. Players connect and bond with one another through the shared experience of overcoming a complex and interesting challenge.

SUMMARY AND FUTURE DIRECTIONS

Social and emotional skills are critical to teen thriving, yet teens' access to social and emotional learning opportunities is limited. Games are a popular and widespread medium for teen engagement and have been found to be effective as learning tools. By examining best practices for designing learning games and key features of successful teen SEL programs, we propose the Game-Based SEL Framework for including and evaluating social and emotional skill development and growth opportunities in games for teens.

Our exploration of the SEL game space yielded several interesting findings. First, there was a significant amount of overlap between SEL best practices and established game design practices. Some commonalities, such as learners/players being active agents pursuing a goal, were expected. Other similarities were less obvious, such as social and emotional content being embedded directly into both game and SEL program designs. Instances where SEL practices and game design did not align illuminated areas where SEL best practices could improve SEL game experiences. For example, the deep, meaningful relationships developed between teens and mentors in SEL programs underpin the effectiveness of modeling behavior change. Games and the spaces around them can be highly social and facilitate the development of deep relationships, but the component of having a trained mentor to model adaptive behaviors is missing. In fact, none of the SEL games we analyzed provided this feature. For developers interested in creating SEL

games, meaningful interactions should be integral to the design process.

Second, games developed intentionally to be evidence-based SEL interventions embodied fewer core game-based social and emotional practices compared to the other learning games we evaluated. In fact, *Tracking Ida* met the most criteria on our Game-Based SEL Framework, while the evidenced-based teen intervention (*Ripple Effects*) met the fewest. This may reflect the tension between making a great intervention and making a great game. The SEL intervention games we reviewed used standardized SEL content and were designed to capture data proving that the learner achieved the specified standards. Capturing outcomes were key; game components, such as mechanics or narrative, were molded to meet those outcomes. Conversely, the two other learning games featuring SEL content were not beholden to standards nor outcome measures proving that the game successfully effected change in the player. Instead, they focused on experiential features and used game components that emphasized playful engagement. In short, the goal of the game—evaluation versus experience—guided the prioritization of game content.

Games are expensive to make and development costs increase when additional goals, such as learning goals, are introduced. This is especially true for games designed to assess player behavior or learning. Introduction of assessment can fundamentally change the way games are designed and how players interact with them, creating another area of tension between evaluative goals and game design best practices. In general, games are a safe space where players can and will experiment, test boundaries, and even intentionally fail; none of which are behaviors desired during traditional evaluation. Two strategies that have been used to address this problem are 1) letting players know they are entering a context with expectations different from normal gameplay, or 2) picking

specific game mechanics and tying them to learning objectives so the claim can be made that a player completing X task is correlated to X standard (White & Javornik, 2017). Both strategies have their drawbacks, however. By informing players that they should actually avoid play behaviors, such as experimentation and boundary testing, the first strategy calls into question whether or not the experience continues to be a game (a challenge we observed in our analysis of *Zoo U*). With the second strategy, there is a level of abstraction between what the player does in the game and how that action relates to learning objectives which may weaken claims made about the relationship between gameplay and learner outcomes.

The Game-Based SEL Framework provides guidance in analyzing the strengths and weaknesses of games for helping teens develop social and emotional competencies. Using the framework revealed specific elements which could be improved upon to increase engagement with, and practice of, social and emotional skills. For example, if a teen version of *Zoo U* were to be developed, players' ability to explore the system, to fail along the way for learning, and to share accomplishments should be considered. In planning new games, we propose that the framework can serve as an evidence-based checklist for game designers and experts in SEL interested in developing SEL-related games.

One important limitation of the Game-Based SEL Framework is that it lacks input from teens, the very group we aim to serve. Next important steps are to get on the ground to work with, listen to, and design with teens to devise a (perhaps) complementary framework for the criteria they believe to be essential for learning, exploring, and building their social and emotional skills. If we are not designing with teens, how can we design for them? Toward that end, we are focused on creating user-centered designs by working with teens to learn what they believe to be meaningful game-based experiences—those

moments of discovery and insight that lead to growth in self-awareness, self-management, social awareness, relationships, and decision making. Learnings will be paired with the evidenced-based framework presented here to further a shared understanding of how to design games for teens' social and emotional learning.

REFERENCES

343 Industries. (2012). *Halo 4* [Video game]. Microsoft Game Studios. Redmond, WA.

3C Institute. (2015). *Zoo U nominated for "Most Significant Impact" award by Games for Change*. Retrieved from https://www.3cisd.com/Zoo-U-SEL-game-nominated-for-G4C-award

Bartleson, E. (August 7, 2014). Empathy games. *Control International.* Retreived from https://issuu.com/controlmagazine/docs/controlinternationalsummer2014-scre

Belfield, C., Bowden, A. B., Klapp, A., Levin, H., Shand, R., & Zander, S. (2015). The economic value of social and emotional learning. *Journal of Benefit-Cost Analysis, 6*(3), 508-544.

Bioware. (2003). *Star Wars: Knights of the Old Republic* [Video game]. Lucas Arts. San Francisco, CA.

Bogost, I. (2008). The rhetoric of video games. *The ecology of games: Connecting youth, games, and learning* (pp.117-140). Edited by Katie Salen. The John D. and Catherine T. MacArthur Foundation Series on Digital Media and Learning. Cambridge, MA: The MIT Press. doi:10.1162/dmal.9780262693646.117

Botturi, L., & Loh, C. S. (2008). Once upon a game: Rediscovering the roots of games in education. In C. T. Miller (Ed.), *Games: Purpose and Potential in Education* (pp. 1–22). New York, NY: Springer Science.

Brown, J. (2016, March). The Illusion of Choice. *Game Developers Conference*, [Conference presentation]. San Francisco, CA.

Bungie. (2007). *Halo 3* [Video game]. Seattle, Washington: Microsoft Game Studios.

Busch, T., Boudreau, K., & Consalvo, M. (2015). Toxic gamer culture, corporate regulation, and standards of behavior among players of online games. *Video Game Policy: Production, Distribution, and Consumption, 6*, 176.

CASEL. (2018). *Core SEL competencies*. Retrieved from http://www.casel.org/core-competencies/

Cabellero, V. (2014). *Empathetic games are here to stay! What's next?* [Video file]. Game Developers Conference 2014, San Francisco, CA. Retrieved from https://archive.org/details/GDC2014Caballero

Centervention. (2017). Zoo U: Scripted introduction. Retrieved from https://www.centervention.com/wp-content/uploads/2017/01/Zoo-U-Scripted-Introduction.pdf

Craig, A. B., Brown, E. R., Upright, J., & DeRosier, M. E. (2016). Enhancing children's social emotional functioning through virtual game-based delivery of social skills training. *Journal of Child and Family Studies, 25*(3), 959-968. doi:10.1007/s10826-015-0274-8

Craig, A. B., DeRosier, M. E., & Watanabe, Y. (2015). Differences between Japanese and US children's performance on "Zoo U": A game-based social skills assessment. *Games for Health Journal, 4*(4), 285-294. doi:10.1089/g4h.2014.0075

de Castell, S., & Jenson, J. (2003). Serious play. *Journal of Curriculum Studies, 35*, 649–665. doi:10.1080/0022027032000145552

De Long-Cotty, B. (2008). *Can computer-based training enhance adolescents' resilience? Results of a randomized control trial*. Poster session presented at the 2007 Annual Meeting of the Society for Prevention Research. Washington, D.C.

DeRosier, M.E., & Thomas, J.M., (2017). Establishing the criterion validity of Zoo U's game-based social emotional skills assessment for school-based outcomes. *Journal of Applied Developmental Psychology*. doi: 10.1016/j.appdev.2017.03.001

Din, F. S., Calao, J., Ward, K., Chiong, C., & Shuler, C. (2001). The literature. *Child Study Journal, 31*(2), 95-102.

Dontnod Entertainment. (2015). *Life is Strange* [Video game]. Square Enix. Shinjuku, Tokyo.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development, 82*(1), 405-432. doi:10.1111/j.1467-8624.2010.01564.x

Dusenbury, L., Weissberg, R. P., Goren, P., & Domitrovich, C. (2014). State standards to advance social and emotional learning. *Collaborative for Academic, Social, and Emotional Learning*. Retrieved from http://www.casel.org/wp-content/uploads/2016/06/casel-brief-on-state-standards-january-2014.

Entertainment Software Association. (2016). *Essential facts about the computer and video game industry*. Retrieved from http://essentialfacts.theesa.com/Essential-Facts-2016.pdf

Erikson, E. H. (1993). *Childhood and society*. WW Norton & Company. New York.

Fullbright Company. (2013). *Gone Home* [Video game]. Majesco Entertainment.

Gallup. (2013). 21st century skills and the workplace. Microsoft Partners in Learning and Pearson Foundation. *21 St Century Skills and the Workplace*, 1–19.

Games for Change. (2018). Retrieved from http://www.gamesforchange.org/play/

Gee, J. P. (2005). Learning by design: Good video games as learning machines. *E-learning and Digital Media, 2*(1), 5-16. doi:10.2304/elea.2005.2.1.5

Gee, J. P. (2008) *Good video games + Good learning*. New York: Peter Lang.

Hamilton, W. A., Garretson, O., & Kerne, A. (2014, April). Streaming on twitch: fostering participatory communities of play within live mixed media. In *Proceedings of the 32nd Annual ACM Conference on Human Factors in Computing Systems* (pp. 1315-1324). ACM. doi:10.1145/2556288.2557048

Jones, D. E., Greenberg, M., & Crowley, M. (2015). Early social-emotional functioning and public health: The relationship between kindergarten social competence and future wellness. *American Journal of Public Health, 105*(11). doi:10.2105/AJPH.2015.302630

Juul, J. (2010). The game, the player, the world: Looking for a heart of gameness. *PLURAIS-Revista Multidisciplinar, 1*(2).

Ke, F., & Grabowski, B. (2007). Gameplaying for maths learning: Cooperative or not? *British Journal of Educational Technology, 38*(2), 249-259. doi:10.1111/j.1467-8535.2006.00593.x

Kindlon, D. &Thompson, M. (1999). *Raising Cain: Protecting the emotional life of boys.* Ballentine Books. New York.

Leites, J. (2015). *Making educational games for adolescents that don't suck* [Video file]. Casual Connect USA 2015. San Francisco.

Retrieved from https://www.youtube.comme/watch?v=24hFRt2vBvw

Lenhart, A., Smith, A., Anderson, M., Duggan, M., & Perrin, A. (2015). Teens, technology and friendships. *Pew Research Center*. Retrieved from http://www.pewinternet.org/2015/08/06/teens-technology-and-friendships/

McGonigal, J. (2011). *Reality is broken: Why games make us better and how they can change the world*. Penguin. New York.

Minority Media. (2012). *Papo & Yo* [Video game]. Minority Media. Montreal.

Moreno, R., & Mayer, R. E. (2005). Role of guidance, reflection, and interactivity in an agent-based multimedia game. *Journal of Educational Psychology, 97*(1), 117. doi:10.1037/0022-0663.97.1.117

Numinous Games. (2016). *That Dragon, Cancer* [Video game]. Numinous Games.

Oldenburg, R. (1999). *The great good place: Cafes, coffee shops, bookstores, bars, hair salons, and other hangouts at the heart of a community*. Da Capo Press. Cambridge, MA.

P21. (2017). *Framework for 21st century learning*. Retrieved from http://www.p21.org/about-us/p21-framework

PopCap Games. (2007). *Peggle* [Video game]. PopCap Games. Seattle, WA.

Pope, L. (2013). *Papers, Please* [Video game]. 3909 LLC. Saitama, Japan.

Preloaded. (2012). *SuperSight* [Video game]. Retrieved from http://www.gamesforchange.org/play/supersight/

Qian, M., & Clark, K. R. (2016). Game-based learning and 21st century skills: A review of recent research. *Computers in Human Behavior, 63,* 50–58. doi:10.1016/j.chb.2016.05.023

Rawitsch, D. (2017). *Classic game postmortem: Oregon Trail* [Video file]. Game Developers Conference, San Francisco. Retrieved from http://www.gdcvault.com/play/1024251/Classic-Game-Postmortem-Oregon-Trail

Rieber, L. P. (1996). Seriously considering play: Designing interactive learning environments based on the blending of microworlds, simulations, and games. *Educational Technology Research and Development, 44*(2), 43-58. doi: 10.1007/BF02300540

Ripple Effects. (n.d.). *Ripple Effects for teens*. Retrieved from https://rippleeffects.com/PDFs/RE%20Teens.pdf

Sjöblom, M., & Hamari, J. (2016). Why do people watch others play video games? An empirical study on the motivations of Twitch users. *Computers in Human Behavior, 75,* 985-996. doi:10.1016/j.chb.2016.10.019

Smith, C., McGovern, G., Larson, R., Hillaker, B., & Peck, S. C. (2016). *Preparing youth to thrive: promising practices for social and emotional learning*. Washington, DC: Forum for Youth Investment.

Smith, C., McGovern, G., Peck, S.C., Larson, R., Hillaker, B., & Roy, L. (2016). *Preparing youth to thrive: Methodology and findings from the Social and Emotional Learning Challenge*. Washington, D.C.: Forum for Youth Investment.

Squire, K. (2011). *Video games and learning: Teaching and participatory culture in the digital age*. New York, NY: Teachers College Press.

Starbreeze Studios. (2013). *Brothers: A Tale of Two Sons* [Video game]. 505 Games. Stockholm, Sweeden.

Steel Crate Games. (2015). *Keep Talking and Nobody Explodes* [Video game]. Steel Crate Games. Ottowa, Ontario.

Steinberg, L. (2014). *Adolescence* (10th ed.) NY: McGraw-Hill.

Telltale Games. (2012). *The Walking Dead* [Video game]. Telltale Games. San Rafael, CA.

Tracking Ida Team. (2017). *Tracking Ida* [Video game]. Retrieved from http://www.indiecade.com/games/selected/tracking-ida

Taylor, R. D., Oberle, E., Durlak, J. A., & Weissberg, R. P. (2017). Promoting positive youth development through school-based social and emotional learning interventions: A meta-analysis of follow-up effects. *Child Development, 88*(4), 1156-1171. doi:10.1111/cdev.12864

Thomas, J. W. (2000). A review of research on project-based learning. Retrieved from http://www.bie.org/images/uploads/general/9d06758fd346969cb63653d00dca55c0.pdf

Tiger & Squid. (2015). *Beyond Eyes* [Video game]. Team17. Wakefield, U.K.

Twenge, J. (2017). Why Today's Super-Connected Kids Are Growing Up Less Rebellious, More Tolerant, Less Happy–and Completely Unprepared for Adulthood–and What That Means for the Rest of Us. Atria Books. New York.

Velasquez, A., Wash, R., Lampe, C., & Bjornrud, T. (2014). Latent users in an online user-generated content community. *Computer Supported Cooperative Work (CSCW), 23*(1), 21-50. doi:10.1007/s10606-013-9188-4

Walker, A. (June 2016). More people watched League of Legends

than the NBA finals. *Kotaku*. Retrieved from https://www.kotaku.com.au/2016/06/more-people-watched-league-of-legends-than-the-nba-finals/

White, D., & Javornik, J. (2017). *Games industry circle with Filament Games: VR for learning* [Webinar]. Retrieved from http://youtu.be6MBrzRJUawk

Williamson, A. A., Modecki, K. L., & Guerra, N. G. (2015). SEL programs in high school. *Handbook of Social and Emotional Learning: Research and Practice*, 181-196. Guilford Press. New York.

Yeager, D. S. (2017). Social and emotional learning programs for adolescents. *The Future of Children*, 73-94. Retrieved from https://labs.la.utexas.edu/adrg/files/2013/12/5-Adolescence-Yeager-2.pdf

Yip, F. W., & Kwan, A. C. (2006). Online vocabulary games as a tool for teaching and learning English vocabulary. *Educational Media International, 43*(3), 233-249. doi:10.1080/09523980600641445

APPENDIX

Analysis of SEL and Game Design Best Practices

	Opportunities Offered to Teens in Effective SEL Programs	Common Feature	What Games Offer to Players
Project-Based Content Sequencing	● Work on complex, interesting, and appropriately challenging goals	Complexity	● Explore a complex systems comprised of interesting choices directed toward a goal
	● Choose how to achieve project goals	Agency & Autonomy	● Be active, influential agents within the game space
	● Build on existing knowledge and skills, engaging in more complex challenges over time	Challenge	● Develop knowledge and skills over time through increasingly complex challenges
	● Practice skills across multiple contexts with many opportunities to embrace failure and experimentation	Iteration & Feedback	● Test developing skills frequently, using failure as an opportunity to learn, improve, and try again
SEL Content Sequencing	● Build on existing social and emotional knowledge and skills and engage in more complex challenges over time	Integration	● Engage in social discussion spurred by memorable moments, differential access to information, or differentiated expertise
	● Practice social and emotional skills within the context of projects and in the community	Identity	● Play in multiple ways to allow for experimentation with various identities in a group, encouraging the set up and negotiation of social structures as part of play
	● Confront social and emotional difficulties while adults model and teach use of social and emotional skills, developing mastery	Mastery	● Connect with other players in a variety of spaces to showcase progress
Safe, Supportive Spaces	● Learn to trust and express thoughts, feelings, and experiences in a safe place provided by mentors	Socialization and Sharing	● Engage in social interaction and develop meaningful relationships through the social affordances within and around the game
	● Develop deep relationships with mentors who provide modeling, coaching, facilitation, and scaffolding	Connection	● Create a sense of community and belongingness through the online communities that form within and around the game, especially those which encourage players to learn from one another
	● Embrace failure and experimentation with support from peers and mentors	Support-Seeking	● Derive meaning and value from mistakes by rewarding effort and incremental progress toward goals
	● Provide and receive constructive feedback with peers and mentors, which is critical for personal growth, skill development, and forming mutually supportive relationships	Constructive Feedback	● Receive feedback that is timely, useful, and builds confidence