Using games to ignite teens' civic and social and emotional learning

Susan E. Rivers* and Michelle C. Bertoli

iThrive Games Foundation, Newton, MA, United States

National trends indicate a pressing need for more impactful civic and history instruction in U.S. secondary education settings. To address this need, we developed an innovative, game-based curriculum, called iThrive Sim, that uses tech-supported role-plays and evidence-based civic and social and emotional learning practices to support high school students in engaging with and comprehending civic and history texts and concepts while developing their social and emotional skills. In this article we describe the need, rationale, and co-design process for this game-based curriculum, its theoretical underpinnings, and its advantages for adolescent learners. We review preliminary pilot and playtesting data that demonstrate initial support for its efficacy and feasibility. Finally, we discuss barriers and additional enhancements and supports that could aid in confirming efficacy and scaling the approach.

KEYWORDS

social and emotional learning, adolescents, civics, game-based learning, curriculum

1 Introduction

As of this writing, history and civic education in the United States continues to stagnate. In 2022, 40% of U.S. students scored below proficient in U.S. history, and overall scores continued a decline first captured in 2014 (National Assessment of Educational Progress, 2023a). Eighth graders' 2022 civics scores fell for the first time, reverting to 1998 levels (National Assessment of Educational Progress, 2023b). Most states lack comprehensive civic education, and even those with curriculum that focuses on knowledge acquisition fall short of supporting the skill-building and agency required of civically engaged young people (Shapiro and Brown, 2018).

Each state determines requirements and standards for civic learning, which vary widely across the nation. Most states require only half a year of civic education in high school; only a small percentage require a full year. As of 2018, 20% of states had no civic education requirement for high school graduation (Shapiro and Brown, 2018). This is true despite the availability of rigorous standards for civic education in high school including The College, Career, and Civic Life (C3) Framework (National Council for the Social Studies, 2013). These standards provide an "Inquiry Arc" intended to encourage students' interdisciplinary development of mindsets and behaviors that support them to engage in civic life.

A 2020 report points to promising legislation in a handful of states committing to active and participatory civic education including "civic projects, service learning, student government, [and] debate training" (American Academy of Arts and Sciences, 2020, Section 6.5). The report notes that "The most promising new civics curricula…integrate core civic knowledge with hands-on experience in democracy itself" (Section 6.5).

In response to the demand for experiential civic education that enhances student engagement and learning, we created iThrive Sim, a game-based curriculum. iThrive Sim integrates C3 standards with social and emotional learning (SEL) and utilizes

technology-enabled role-play to offer compelling curricular activities. This method is designed to foster a collaborative and immersive learning environment that makes civics feel meaningful and relevant.

iThrive Sim combines two evidence-based approaches: SEL programming (Durlak et al., 2011; Cipriano et al., 2023) and digital gameplay (Topping et al., 2022; Barz et al., 2023). The goal of this synergy is to capture and hold the interest of teens while offering transformational experiences that strengthen relationships in physical and virtual classrooms. This innovative approach stands to advance U.S. civic education by inviting teens to build the tools, competencies, and experiences they need for constructive participation in democracy.

In this article we describe the framework underlying the design and implementation of iThrive Sim, preliminary pilot data, and how iThrive Sim's design addresses – and is being enhanced to further address – critical gaps in current secondary education civic offerings.

2 Pedagogical framework: teen-centered, strengths-based positive youth development

Effective civic education at the secondary level requires that we understand the unique needs and capabilities of the teen brain and that we tailor learning experiences to meet this special developmental moment. Over two decades of neuroscientific research reveals that childhood is not the only critical period for learning. The teen brain undergoes its last major restructuring starting in puberty, pruning synaptic connections that are used rarely, strengthening those that are used often, and increasing connectivity across regions (Lenroot and Giedd, 2006; Lenroot et al., 2007). The great plasticity (remodeling and growth) of the brain in the teen years makes it a period when individuals are exceptionally susceptible to external influences (Giedd et al., 1999; Steinberg, 2014; Giedd, 2015; Jensen and Nutt, 2015) and can "make enormous strides in thinking and socialization" (Giedd, 2015, p. 34) as well as "judgment, getting along with others and long-range planning" (Giedd, 2015, p. 35). Teens' emotion circuits are also particularly sensitive, making them a key pathway for sparking teens' engagement in learning (Pekrun, 2017).

Teens have incredible learning potential and faster learning curves than adults (Jensen and Nutt, 2015); what teens spend their time learning really matters (Steinberg, 2014). Habits, experiences, knowledge, and impressions developed in teen years have the potential to influence individuals for a lifetime. Teens' unique developmental characteristics are a clear call to action to provide rich opportunities for the teen brain to "train its plasticity on the demands of the digital age" (Giedd, 2015, p. 37). We must offer high school students rigorous and transformational opportunities within supportive environments to see possibilities they never imagined, build skills, and deepen their understanding of the world and their opportunities and responsibilities as members of local, national, and global communities. Further, those opportunities should be compelling and playful, and should tap into and recruit emotions to fuel and supercharge learning.

Statistics on the state of teens in the United States suggest that much more can be done to support their learning and their social and emotional development. High school students overwhelmingly report feeling tired, bored, and stressed at school, especially those self-identifying as female or lower SES (Moeller et al., 2020). A majority of teenagers believe the country is deeply divided and express pessimism

about nation's current direction (Associated Press-NORC Center for Public Affairs Research, 2017). Meanwhile, civic knowledge among the U.S. population remains "dismal" (Annenberg Public Policy Center, 2019). Despite this lack of formal knowledge, many teens report having engaged in their communities via volunteerism or fundraising for a cause they care about (Associated Press-NORC Center for Public Affairs Research, 2017), indicating a desire for civic involvement that is not being fully leveraged or modeled in the classroom.

2.1 Social and emotional skill building

Emotions influence learning, including attention, motivation, use of learning strategies, self-regulation of learning, and achievement outcomes (Pekrun, 2017). Students' social and emotional classroom experiences have been linked to a range of outcomes including grades, study habits, and discipline records (Hamre and Pianta, 2001), as well as students' mental health and achievement motivations (Roeser et al., 2000) and the quality of teaching (Ladd et al., 1999; Juvonen et al., 2011). Across different age groups and over time, students' social and emotional skills are associated with greater academic motivation, greater engagement, and higher grades (Zins et al., 2004; Rivers et al., 2019). There is increasing recognition at the local, state, and federal level in the U.S. that for effective learning to occur, schools must meet students' social and emotional needs, both how students feel in school and their social and emotional skill development (Farrington et al., 2012; Jones et al., 2015; Office of the Surgeon General, 2021).

There is ample evidence that social and emotional skills, like empathy, perspective-taking, curiosity, decision-making, negotiation, stress management, and collaboration, can be taught (Durlak et al., 2011; Taylor et al., 2017; Cipriano et al., 2023) and that these skills benefit individuals over the lifespan and across domains (Jones et al., 2015). Cost–benefit analyses of such programs show significant return on investment (Catalano et al., 2012; Belfield et al., 2015). School-based SEL interventions – educational strategies designed to teach students social and emotional knowledge and skills, including self- and social awareness, self-management, responsible decision making, and relationship skills – can help teens acquire social and emotional competencies (e.g., Greenberg et al., 2003).

Yet, there exist few evidence-based SEL programs integrated into academic content that are specifically designed for teens (e.g., CASEL Select Program guide[1]; Williamson et al., 2015), despite the alignment between social and emotional competencies and college- and career-readiness standards (Johnson and Weiner, 2017) and a demand for evidence-based programs for students in their middle teen years (Office of the Surgeon General, 2021). The needs of students in upper grades (9th–12th)—e.g., agency, autonomy, respect—are distinct from those of younger teens and children (Nagaoka et al., 2015), requiring different approaches for supporting their social and emotional development (Yeager, 2017). In practical terms, teen students cannot feel that adults are manipulating or fixing them, telling them what to do, or treating them like children. The heavily teacher-led discussion and didactic nature of existing SEL programs runs counter to what

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1 https://casel.org

teen students will best respond to. SEL interventions that are effective with younger students in elementary and middle school classrooms (Williamson et al., 2015) cannot simply be aged up with teen-infused language and imagery (Yeager, 2017).

Game-based learning is especially well-suited for offering teens meaningful, immersive learning environments for discrete SEL practices.

2.2 Game-based learning

Teens play, learn, and connect with others in virtual spaces—including digital games and social media platforms—as much as in physical ones. Well-designed digital games have the potential to facilitate immersion and engagement as well as the development and assessment of social and emotional skills (Gee, 2003; Granic et al., 2014; Rivers et al., 2015; Dunlap and Rivers, 2018; Farber and Rivers, 2020; Farber, 2021).

Game-based learning refers, broadly, to an approach for using games to teach and learn. Games are complex systems (Salen and Zimmerman, 2004) which can be designed to support social and emotional skills related to interaction, connectedness, cooperation, and collaboration (Hromek and Roffey, 2009). Games reflect—and allow us to reflect upon—real-world sociopolitical systems. At their core and no matter how fantastical, games are systems that reflect and expand on truths about the lives we lead: they have rules, win/lose states, rewards, consequences, and many roles for players and other characters to fill. As players interact with game systems, they can learn and then manipulate and act within them in ways that comply with ("win states") or reject ("lose states") its rules and norms (Gee, 2003). Evidence continues to grow for the positive impact of game-based learning across subject areas (Topping et al., 2022; Barz et al., 2023) including civics (LeCompte et al., 2011; Farber, 2021).

Equally important, game-based learning has shown promise for positively impacting learners' engagement, attitudes, self-perception, emotions, and self-efficacy, and can support the development of social and emotional skills (e.g., Miller and Robertson, 2010; Wrzesien and Raya, 2010; Hung et al., 2014; Qian and Clark, 2016; Zheng et al., 2021; Nordlund, 2022; Reynard et al., 2022). Digital games provide an opportunity to focus on learning aligned with teens' dominant developmental needs of agency, respect, status, and belongingness (Jensen and Nutt, 2015; Yeager, 2017), and can facilitate self-directed learning, assessment, personalization, program fidelity, and student agency (World Economic Forum, 2016; Dunlap and Rivers, 2018; Farber and Rivers, 2020).

Role-playing games and simulations, compared to more traditional teaching methods, enhance participants' retention of information as well as their interest in and positive engagement with subject matter (e.g., Druckman and Ebner, 2008, 2013). Engaging in role-plays can prompt reflection and self-evaluation to support personal growth (Nelson and Blenkin, 2007; Ertmer et al., 2010), impact awareness of and attitudes about a politicized topic (e.g., news literacy, the First Amendment); and enhance components of self-efficacy including confidence that daunting challenges can be overcome (Rumore et al., 2016). Role-plays also can illuminate for participants the interdependencies of stakeholders involved in a local or global problem, highlighting the utility of collaboration and the need for diverse perspectives in problem-solving (Rumore et al., 2016). Tech-supported educational tools using role-play mechanics have shown promise for enhancing motivation and learning achievement (Zhang et al., 2021) and self-efficacy in relation to social and emotional skills (Albright et al., 2022). Play, more broadly, offers a unique and significant hands-on approach to learning, self-development, connection, and well-being across the lifespan (Brown and Vaughan, 2009).

3 Learning environment: iThrive Sim, a game-based learning approach for civics + SEL

iThrive Sim combines a tech-supported role-playing simulation structure and face-to-face interactions (in person or via video conferencing) to meet the needs of high school civic and history classrooms for hands-on learning experiences, genuine connection, structured interaction, and engaging learning (see Figure 1). The full iThrive Sim curricular package integrates standards aligned SEL, civic, and history content and activities with primary source documents that students analyze and apply during gameplay.

The foundation for iThrive Sim is the award-winning Situation Room Experience created and offered at the Ronald Reagan Presidential Library and Museum. Over 10,000 students have participated in the Situation Room Experience, and most report that it is one of the most memorable experiences of their school year. Researchers remark that the experience is successful in part because it requires students to construct knowledge and make meaning within a social context: "students quickly learn that a single right answer is not easily obtainable and that they must work collaboratively to put forth a meaningful decision" (Lorimer, 2019, p. 5). The simulation's realism and authenticity help students to understand "effective communication and its influence on critical decision making" (Lorimer, 2019, p. 6). And because, during role-playing, teachers step back and students lead the action, students rely on themselves and their peers to do the problem-solving, which helps them to develop self-awareness, self-regulation, and collaborative capacities (Lorimer, 2019). iThrive Sim makes use of new technology to scale the Reagan Library's in-person experience and offer an expanded game catalog.

As students play iThrive Sim games and engage with curricular surrounds, they analyze and apply foundational source materials, historic events, and ideological frameworks in civics. While doing so, students explore possible solutions to persistent issues drawing on the nation's founding principles articulated in the Declaration of Independence and the U.S. Constitution. Because the games are centered on crises in democracy, students also put into practice critical competencies including regulating emotions, collaborating with others, exercising curiosity, and weighing competing priorities as they make difficult decisions. Students learn by *playing* decision-makers; in so doing, they see that they already *are* decision-makers.

iThrive Sim scaffolds learning experiences to invite students to:

FIGURE 1
Goals of iThrive Sim game-based civic curriculum.
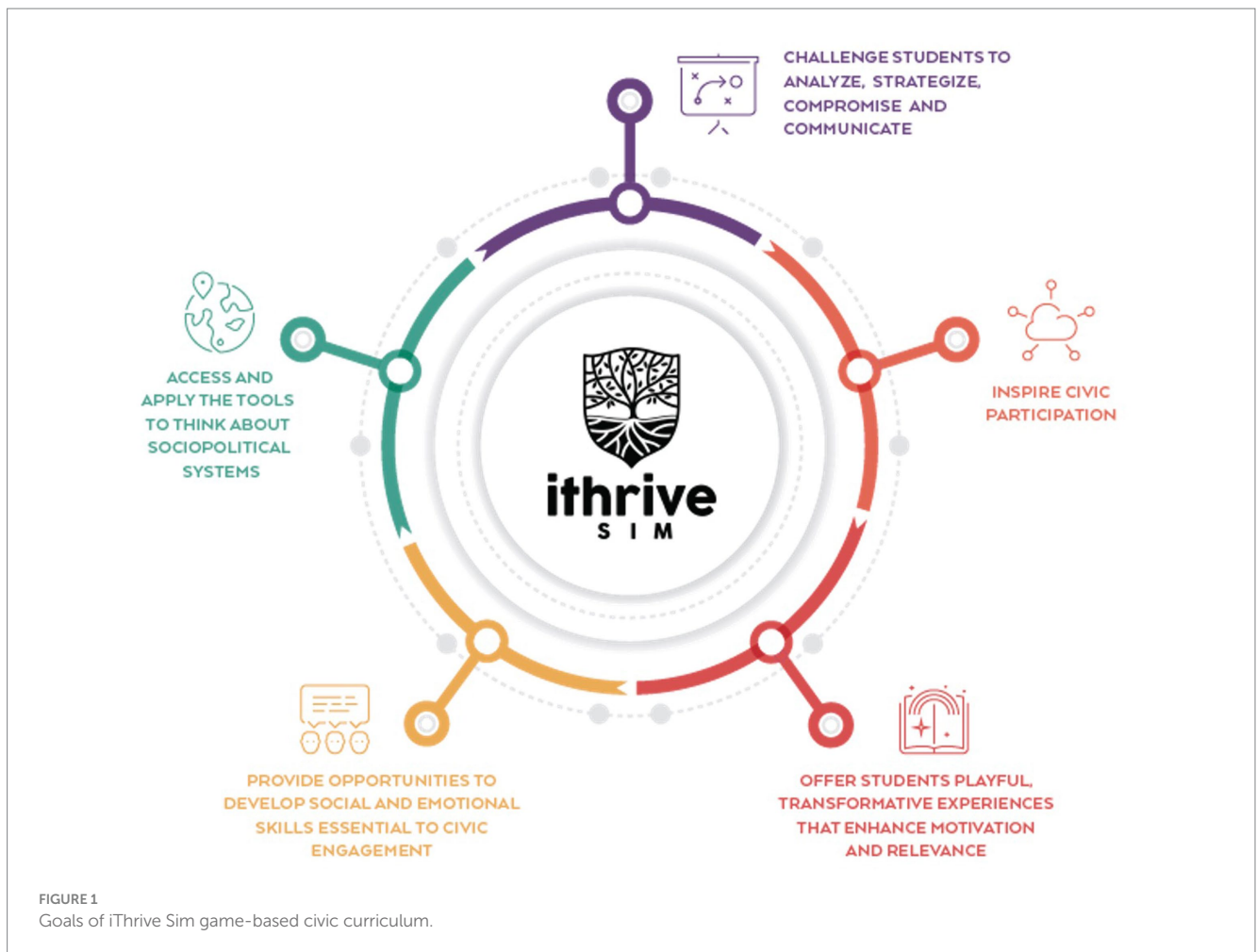
- Lead focused group discussions and debates on the themes of our nation's founding principles, history, and contemporary constitutional issues;
- Devise and defend arguments using primary historical and scholarly sources and data;
- Access and create content (e.g., memos, news articles, social media); and
- Make real-time decisions and experience consequences within the simulation.

Students' role-playing interactions are supported by iThrive Sim's built-in game mechanics. For example, iThrive Sim pushes information at key moments via social media and news feeds that students must evaluate and discuss. The platform alerts students to both individual- and group-level decisions that must be made, decisions that impact what happens next in the game. The game prompts students to discuss their choices and make complex decisions while a visual timer counts down the minutes and seconds to zero. In addition to providing a feedback summary for each player decision, the games also feature a feedback meter. In *iThrive Sim: Leading Through Crisis*, students gauge their success as government officials based in part on the "public trust" meter, which responds to the transparency and trustworthiness conveyed by students' decisions.

iThrive Sim is accessed on a web-based platform via internet-connected, 1:1 devices (e.g., laptops, tablets, or smart phones). The

simulation platform uses a sleek, user-friendly interface (see Figure 2) to mimic the game environments today's students are accustomed to. iThrive Sim meets known system requirements of schools, can be easily added into school's "approved" websites so it is not blocked, and uses limited bandwidth to ease implementation by under-resourced schools and out-of-school-time settings. Surrounding curricular materials are freely available and include social and emotional and civic learning reflection worksheets, character sheets, and graphic organizers.

3.1 iThrive Sim games

iThrive Sim games invite students to play central roles within narratives based in history and current events. The games are co-developed with end-users, as Figure 3 illustrates. At every stage, we work closely with educators, students, and humanities scholars to select a set of civic principles (such as relevance to a Constitutional amendment), identify the feel of the moment (chaos, uncertainty, threats to freedom), determine the larger context of events (such as the nation's economic stability or relationships with foreign nations), and identify primary sources connected to that event such as news articles, video, diaries, interviews, memoirs, court transcripts, etc. The understanding garnered from this process is used to build, with our professional writing team, a contemporary game that illuminates the
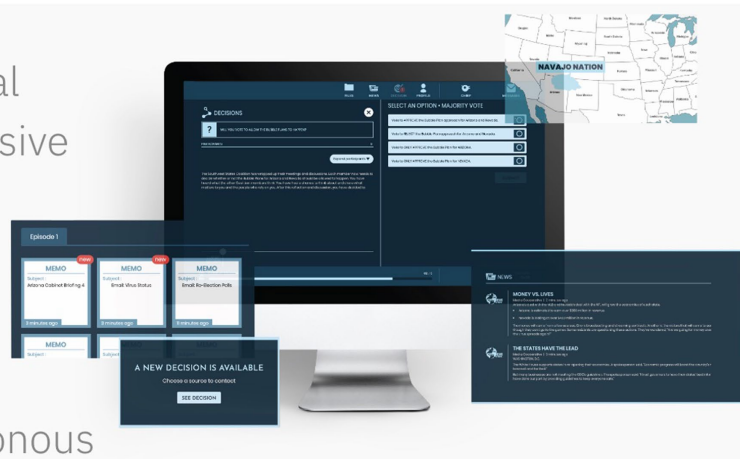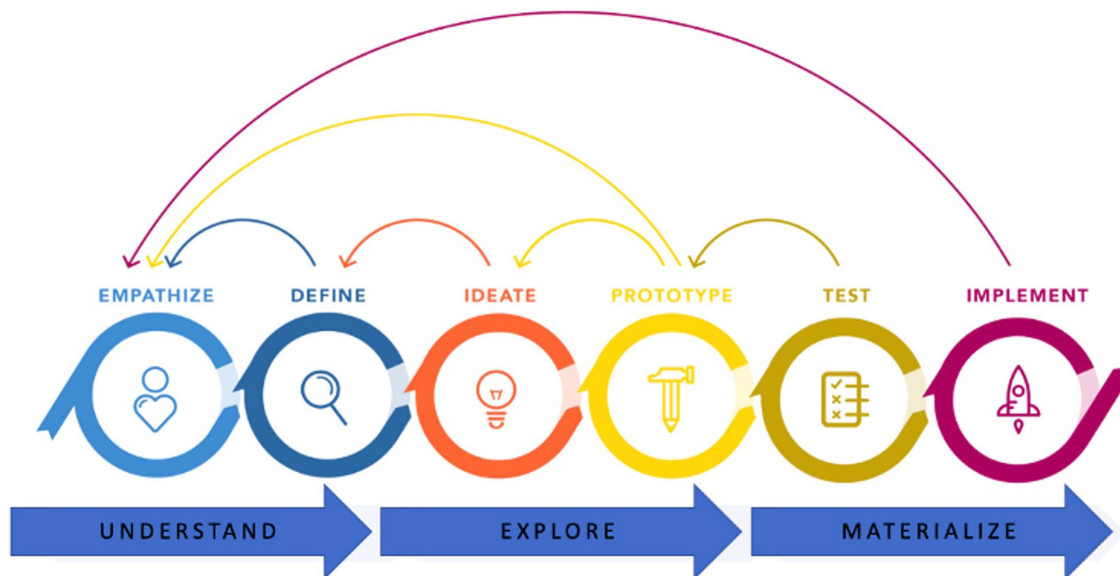
FIGURE 2
iThrive Sim platform.

FIGURE 3
iThrive co-design process from Gibbons (2016).

civic principles, recreates the feeling of the time, and reminds participants that leaders rarely deal with one crisis at a time.

Each iThrive Sim game is developed in such a way that civic content and SEL opportunities are "baked in" from the beginning. Games are designed to be played within a single 40-min class period, with some offering two episodes to be played across two days. All games start with a baseline set of multimedia materials containing information about the situation at hand: documents, images, audio files, and videos delivered via the web-based platform. As students play, they encounter primary source documents (e.g., excerpts from constitutional amendments) as well as contextually grounded news stories, memos, photos, and (for contemporary games) social media content that is both pre-populated and written by fellow players. Students use the information they access to fuel their real-time interactions with fellow players and to make decisions that move the game forward. In addition to talking directly to each other, students can choose to message one another through the platform as they weigh which information to share, with whom, at what moment, and for what purpose to meet their characters' goals.

Prior to the start of each game, students are assigned characters to play. They have access to character profiles that describe their character's values, goals, alliances, and rivalries. Offering character descriptions is important not only because it helps to create dramatic tension to make the role-play more immersive, but also because it offers a jumping off point for meaningful social and emotional reflection in discussions and extension activities that follow the simulation. Playing a character allows students to shed some of their habitual ways of being, or to consider those habits more deeply, in the

service of greater self-awareness and a larger possibility space for who and how they can be and interact in circumstances that require creative problem-solving.

3.2 iThrive Sim curricular surrounds

Each iThrive Sim game is accompanied by a set of curricular surrounds informed by the C3 Framework (National Council for the Social Studies, 2013). The surrounds, designed to fit within teachers' existing curricula, have been constructed carefully in collaboration with educators to help ensure that the experience of playing iThrive Sim is impactful and meaningful. They provide an evidence-based structure and approach to contextualize the game in a way that allows students to deepen their learning of the civic content and to transfer what they have learned to their real lives and to other humanities courses. More specifically, the curricular surrounds:

- Provide necessary background information, such as events that have taken place in the story before the point where the game begins, and conceptual and graphical aids like maps, graphs, videos, and excerpts from historical documents;
- Include activity guides to extend and enhance learning, such as an exercise in spotting questionable news stories or a lesson on how to use primary sources;
- Offer prompts and external resources such as archival databases to allow teachers and students to meaningfully debrief and reflect upon the experience, give and receive feedback, and extend and apply learning after the simulation ends; and
- Are flexible, allowing teachers to adapt the preparation, discussions, and learning extensions of the simulations to their students' particular needs.

To support humanities educators in accessing and using these materials, iThrive Sim curricular surrounds are freely available and downloadable at: www.ithrivegames.org/ithrive-sim.

3.3 Example iThrive Sim curricular unit

In the curricular unit, *iThrive Sim: Leading through Crisis*, students play as members of the Crisis Management Team for the President of the United States. Students are tasked with responding to complex challenges at home and abroad. Students analyze data, reference primary source documents, explore the 25th Amendment and the workings of the executive branch of the U.S. government, and collaborate to chart a path forward through a set of high stakes-decisions. Working in partnership with the education team at the Ronald Reagan Presidential Library and Museum, we developed curricular materials around the overarching inquiry, "Does the Constitution effectively guide decision-making in a crisis?" Following the inquiry-based social studies approach, there is not one right answer to this question; students can answer it differently and be "correct" if they provide relevant evidence from the primary sources and their lived experience in the simulation.

The game and the curricular surrounds draw on text from the Constitution—Article 2, Section 2 and the 25th Amendment, Section 4—as well as the Presidential Succession Act of 1947 to orient students

to the role of the president's cabinet, generally, and their role in making determinations about who holds power during a presidential crisis. Students work with an SEL decision-making map and rubric to reflect on, assess, and guide their own decision-making behavior before, during, and after the game. The decision-making map features a decision tree format that guides students through simple prompts, performance challenges, and strategies for improvement. For instance, a student who says "yes" to the prompt, "I examined my options" should be able summarize the main differences between their choices. If they cannot, they could choose a strategy like looking up terms they do not know or coming up with a pro and con for each option. In another surrounding activity, students review archival footage of former Secretary of State Alexander Haig actively misinterpreting the 25th Amendment after the shooting of President Reagan and critically compare his statements against primary sources.

The curricular unit is designed for students to internalize and apply primary sources while also grappling with the gray areas in interpreting the intentions of the Constitution's authors in an unprecedented crisis. Students self-assess how successfully they made decisions in the game as they played members of the president's inner circle. They consider how useful the 25th Amendment was in guiding their choices and predict and analyze the consequences of their decisions for themselves, their fellow Crisis Management Team members, the president who appointed them, and the American public to refine their own skills.

4 Results to date

iThrive Sim shows promise for transforming the educational experience for high school students and teachers. The platform has won awards including a 2021 gold medal award from MUSE, a bronze award in the 2021 GLAMi Award Interactive and Immersive category, and finalist awards from 2021 EdTech Cool Tool Award in two categories (Games for Learning/Simulation Solution and New Products and Services). Over 5,000 students have engaged in iThrive Sim's game-based curriculum to date.

In the spring of 2020, 60 students in a Los Angeles high school participated in a pilot test of *iThrive Sim: Lives in Balance*. In this unit, students play as state governors or a representative of the federal government to explore the tensions between federalism and states' rights during a deadly global pandemic. Students responded to open-ended survey questions about their play experiences. Data were coded for recurring themes related to learning outcomes. Two primary learning outcomes were identified: students reported gaining (1) knowledge on the inner workings of politics and government and (2) a better understanding of decision-making processes that consider multiple perspectives. This qualitative feedback offers preliminary insights into the promise of this game-based approach to civics and SEL. Students shared via open-ended reflections that the simulation urged them to think critically and creatively, saying, "I learned about the different concerns and facts to consider when it comes to the decision making process in government and the types of powers the states in the U.S. have," "It's a great activity to put the outbreak into perspective and put you in a situation where you are forced to think outside the box...," and "I realized there's not really a right choice, just a smart move." Students also reported that the game supports collaboration and perspective-taking: "I learned that in order to achieve

a better outcome you have to work together no matter the title you are assigned with" and "It opened my eyes to both sides of the issues." In playtesting two additional iThrive Sim games since 2020, 490 students have completed surveys immediately after playing. Over 85% of them indicated that they would recommend the Sim to other students (i.e., chose a 6 or higher on a 10-point scale where 0 = absolutely would not recommend and 10 = absolutely would recommend).

Educators also endorse iThrive Sim. They have said of *iThrive Sim: Lives in Balance*, "It's exactly what we need in classrooms, structured debate." They reflect on the simulation's value for amplifying student engagement, teamwork, critical thinking, negotiation, and empathy, sharing:

- "The simulation was extraordinary. I had a difficult time in engaging and having students collaborate with each other through distance learning. Observing the simulation, I saw firsthand how effective it was at engaging students and how great it was at collaboration."
- "You do not see that fire very often in kids."
- "Students learned how to effectively communicate with each other; to only say what is needed to be said. They learned how to navigate and persuade others to join their stance using facts."
- "It's critical thinking. It prompts [students] to take responsibility for [and] advocate a perspective based on source information."
- "[Students] learned just how difficult it is for people in government to create a solution, while also realizing the dangers of such a decision."

5 Discussion

Early pilot and playtesting data from limited student and teacher samples suggest that iThrive Sim is an engaging way to learn civics and U.S. history, and that it allows for meaningful connection with peers and practical experience applying social and emotional skills like thoughtful decision-making, perspective-taking, and collaboration. Using technology offers scaling potential and practical, real-time assessment opportunities, the lack of which has stymied the dissemination and impact of school-based interventions (AEI/ Brookings Working Group on Poverty and Opportunity, 2015; World Economic Forum, 2016). Simulations and other next generation learning methodologies also hold significant potential to support social and emotional skill development (e.g., Rivers et al., 2015; Lorimer, 2019; Albright et al., 2022), which is important as skills development is a key predictor of young people's well-being in the context of SEL interventions (Taylor et al., 2017). CASEL (2023) has determined that optimal skill development stems from SEL experiences that are sequenced, active, focused, and explicit (SAFE; Durlak et al., 2011). By providing consistent and SAFE practice opportunities within the context of real-time interactions, iThrive Sim could help to standarize and scale social and emotional skills development while simultaneously enhancing engagement with academic content and civic mindsets.

Despite the promise of playful, tech-supported learning approaches like iThrive Sim, there have long stood significant barriers to their adoption. Teachers report that they value SEL but need more time and training to implement it, and that they do so mostly

informally in secondary settings compared to elementary ones (Hamilton et al., 2019). iThrive Sim aims to "bake SEL into" academic instruction to support seamless integration. While this is a critical step, this confluence of learning objectives needs to find the right home within a school, and varying standards for civic and social studies instruction can make this fit harder to establish. Further, learning through play as a methodology is often misunderstood and trivialized; generally, its full acceptance is confined to preschool (see Parker et al., 2022) even though play benefits learners across the lifespan (Gray, 2013). Recent work (Parker et al., 2022) seeks to bring greater coherence to the concept of learning through play beyond early childhood to bridge evidence for its benefits with educational policy and practice.

As compared to traditional teacher-led, lecture-style instruction, many educators perceive that facilitating a simulation requires much effort to onboard to a new tool and manage tech complexities while contextualizing the learning experience and supporting students' engagement in it. Even a user-friendly technical interface can be daunting to educators when it is new. And despite the fact that pandemic-era learning shifts saw schools' provision of 1:1 devices to support digital learning "explode" (Bushweiller, 2022), disparities in access to technology and high-speed internet remain likely obstacles to wide-scale adoption. To enhance adoptability of iThrive Sim, work needs to be done to support shifting mindsets around SEL and play in secondary settings, and to scale up the training and support required to implement a tech-facilitated teaching methodology.

Robust efficacy data on iThrive Sim are not yet available. To support research on the effectiveness of this methodology and to improve the utility of the iThrive Sim platform for facilitating self-reflection and evaluation of learning, iThrive Sim is currently being enhanced with more sophisticated data collection features. Funded by an award from Tools Competition, the next instance of iThrive Sim will collect information on key performance indicators during play, including how long players deliberate about decisions, whether players decide or allow the system to choose options on their behalf, how many times players consult in-game assets (e.g., primary source documents, graphs), and open-ended reflections from players about their own and their fellow players' in-game actions. These and other key performance indicators will be exported in .csv format for ease of access and evaluation by students and educators. The platform with its data collection features is available for researchers to use in conducting their own studies to evaluate indicators of social, emotional, and academic learning in a real-time performance context.

Acknowledging the limitations of this early research for drawing clear conclusions about efficacy, preliminary user feedback suggests that iThrive Sim is worth pursuing and testing further as an engaging, co-designed approach to experiential civic learning. Civic learning that is fully integrated with real social connection and embodied opportunities to develop the social and emotional competencies of engaged community members stands to address current educational gaps.

6 Summary

Preliminary data indicate that the iThrive Sim approach provides a relevant and immersive humanities learning experience replete with rich humanities primary source materials. While robust efficacy data

on iThrive Sim are forthcoming, its evidence-based approach—drawing on scholarly research, data from SEL, game-based learning, and the teen brain, in addition to the C3 Framework standards—suggests iThrive Sim's potential to aid in transforming learning in civics and history in secondary education.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

SR: Conceptualization, Project administration, Writing - original draft. MB: Conceptualization; Writing - review and editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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