

***That Dragon, Cancer: What Can a Video Game
Teach About Family Illness, Death, and Bereavement?***

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ABSTRACT. Illness, death, and bereavement are present in every family's story, yet not every undergraduate student has experienced them directly. Family Science instructors should seek creative ways to help students understand complex dynamics of families during these crises. *That Dragon, Cancer* is a narrative video game immerses users in the story of Joel Green and his family during their four-year battle with juvenile cancer. We present findings of a qualitative study of undergraduate students who played *That Dragon, Cancer* during a course module on death and bereavement. Participants reported that the game was a unique learning experience that illustrated course concepts effectively. We discuss possible barriers to the use of video games in the classroom and give recommendations for overcoming them.

Keywords: pedagogy; technology; family crisis; death and dying; bereavement

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A comprehensive curriculum of families and their dynamics must include the study of death and grief. Death is listed explicitly as a crisis that ought to be discussed in a curriculum modeled after the National Council on Family Relations' Family Life Education Content Areas (National Council on Family Relations, 2014). Yet although all families experience death, not every college-aged student has direct experience with the death of a close loved one. For many students, personally relating to the theories and family dynamics surrounding an uncomfortable topic such as death might be difficult. While teaching an undergraduate course on Family Crisis and Resiliency that included a module on illness, dying, and bereavement, the first author searched for an activity that would illustrate course content and help students gain personal understanding of the experience of a family undergoing bereavement. He chose to assign students in the course to play the video game *That Dragon, Cancer* (Numinous Games, 2016, *That Dragon, Cancer* hereafter).

That Dragon, Cancer is a narrative video game in which the user is immersed in the story of Joel Green and his family during Joel's four-year battle with juvenile cancer. The game was written and developed by Joel's parents, Ryan and Amy Green, during the late stages of Joel's illness in 2012-2013, and was finished and published after Joel's death in 2013. The player explores the in-game world in a series of vignettes that reconstruct moments in the family's life. In the words of one reviewer (writing about Ryan, the game's primary designer), "[H]e has encoded the experience, his actual experience, of being a father to a son doctors tell you will not and cannot live." (Holkins, 2013, para. 6)

Several authors have reflected on the use of films and film clips to illustrate and apply concepts in Family Science courses (Adams & Hall, 2015; Chandler, 2016; Lee, Raza, Mulcahy, & Swann-Jackson, 2015), and a large body of research supports such a practice (Ljubojevic, Vaskovic, Stankovic, & Vaskovic, 2014). There are also many movies and television shows that depict dying and bereavement in families, such as *Ordinary People*, *Rabbit Hole*, and *Manchester by the Sea*. The first author chose to assign *That Dragon, Cancer* in the hope that the interactive nature of gaming, and specifically the nature of *That Dragon, Cancer's* gameplay, would immerse the student in the Green family's story in ways that watching a film might not.

That Dragon, Cancer uses various gameplay modes. For example, in portions of the game the player uses her mouse or touch-screen controls to direct an avatar that represents Joel, Ryan, or Amy as they navigate actual scenes from their lives during Joel's illness. The scenes are depicted in ways that immerse the player in the emotion of the moment. One scene provides an illustrative example. The player takes on the role of Ryan as he spends a night with Joel in a hospital intensive care unit (ICU). Joel, who is depicted as 3-4 years old at the time, is crying in discomfort. As Ryan, the player may attempt several strategies to console Joel, such as offering him juice, holding him, and speaking to him. The cognitive delays Joel experienced make communicating with him even more difficult than it might be with a typical preschooler who is experiencing pain. Tech industry journalist Jenn Frank experienced an early demonstration of this scene before *That Dragon, Cancer* was published. In her words:

In the game, you click through the ICU, feeling around with your cursor for any sort of narrative relief. Sometimes relief does arrive, in the form of a white scrawl, an almost-handwritten prose-poem scribbling itself against the ICU. Sometimes, though, it seems you've finally run out of options.

Your son is crying out in pain. There is nothing you can do.

That Dragon, Cancer positions itself as an adventure game.... You fall into these cyclic, helpless loops of action, clicking on this hotspot and that one, fumbling for anything to alleviate your—Ryan's—son's cries; cries that start out gut-wrenching, then quickly turn into something more persistently awful, something you've got to quell as quickly as possible. It hurts on every level.

To get to all the hotspots on one side of the room, you have to repeatedly seat yourself in the too-small armchair near your—Ryan's—son's bed. And...that's how it actually goes. You keep sitting down and surveying the room, looking for just one new thing to try to do. That's how it really, really went.

And at some point the game stops cold. Now there is only one command on the screen.

Pray.

This is how it really, really went. (Frank, 2013, para. 19-25)

In contrast, one might consider one of the pivotal scenes in the classic film *Ordinary People* (Schwary & Redford, 1980, *Ordinary People* hereafter). Donald Sutherland and Mary Tyler Moore portray Calvin and Beth Jarrett, a married couple who lost a teenaged son to accidental death. Near the film's climax, Calvin confronts Beth with the emotional distance that has grown between them since their son's death. He accuses Beth of having buried her love with their son. Beth ultimately chooses to leave the family.

Ordinary People is an award-winning film featuring widely acclaimed performances; it beautifully depicts a family in turmoil as its members cope, in different ways, with their grief. The scene described above is powerful and moving, the denouement of a deeply emotional story being told by great filmmakers. Yet the viewer remains just that—a viewer, on the outside looking into the Jarrett family's experience. We hoped that the interactive nature of *That Dragon, Cancer* might give students a qualitatively different experience of a family's grief compared to that offered by viewing a film. Our hope is that being forced to make decisions for family members and being immersed in the uncertainty and ambiguity of scenes depicting the Green family will help students identify with the family and understand their experiences in ways that might not be possible when viewing a film or teleplay.

For more examples and to gain a sense of the nature of *That Dragon, Cancer's* gameplay, the reader is encouraged to view the game trailer by visiting www.thatdragoncancer.com.

Assignment Objectives

The course described here is organized around application of family stress theory to several sources of family stress such as parenting, divorce, and (in the case of the assignment described here) family illness, death, and bereavement. Although the course is informed by feminist theory, family systems theory, and developmental models, the ABC-X model (Hill, 1949) is used as a foundation to discuss the dynamics of family stress (Bush, Price, Price, & McKenry, 2017; Peterson, 2017). According to the model, three constructs (A—stressor events, B—family resources, and C—family members’ perceptions and attitudes regarding the stressor and the family’s situation) interact to produce X—the level of stress or crisis experienced by the family (Boss, 2002; Hill). For purposes of this assignment, the first author intended students to deepen their understanding of these theoretical concepts by identifying examples of each construct in the ABC-X model in the life of the Green family as depicted in *That Dragon, Cancer*. Along with illustrating theoretical concepts, the first author intended students to experience emotional connection to a family undergoing stressors of illness, death, and bereavement.

Students were instructed to first, play through *That Dragon, Cancer* or view a walkthrough video of the game (a walkthrough video consists of the recording of the computer screen and audio as an individual plays through the entirety of a video game); second, complete a reflection paper applying course concepts to the Green family’s experience. Assignment objectives were:

1. Students would demonstrate their understanding of the ABC-X model of family stress by applying concepts from that model to the Green family and their experiences.
2. Students would demonstrate their personal and emotional connections to the experiences of one family who underwent the illness and death of a child, by means of reflective writing about playing *That Dragon, Cancer*.

We gathered qualitative data from 29 participants about their experiences with this assignment. We believe the data demonstrate that our assignment objectives were met, as may be seen in the Results and Discussion sections below. In addition, we believe that assigning a video game is in keeping with best practices for teaching students who are “Digital Natives” (Premsky, 2001). Finally, the assignment aligned with the first author’s approach to college teaching, which is derived from Merrill’s Component Display Theory (Merrill, 2013).

Teaching Digital Natives

In 2001 Premsky introduced the concept of “digital natives.” Described generally as individuals born after 1980, digital natives are said to share a wide experience with technology, an affinity for graphical representations of information, and a preference for interactive teaching methods (Premsky, 2001, 2010; Teo, 2013). Since this description emerged, many experts have called upon teachers to use methods that appeal to the digital native generation (Bates, 2015; Buzzetto-More, 2014; Premsky, 2002, 2003). Three examples of such methods are the use of

technology in the classroom (e.g., online learning management systems), using video to illustrate course concepts, and the introduction of video games as teaching tools.

Bringing Technology into the Classroom

Since proficiency and experience with technology is one defining feature of digital natives, authors have promoted the increased use of technology in the classroom as a way to reach those students (Muraco, Totenhagen, Corkery, & Curran, 2014; Prensky, 2010, 2015; Wardlow & Harm, 2015). Today's college instructors can choose from various digital tools such as streaming video, online learning management systems such as Canvas and Blackboard, digital presentation software such as PowerPoint and Keynote, and class participation tools such as Kahoot! (www.kahoot.com) and Quizziz (www.quizziz.com). College classrooms often include an installed computer or the necessary networking for the instructor to use her own laptop, and students almost universally carry laptops or smartphones with them to class or have access to them outside class (Patterson & Patterson, 2017). Although digital tools may be misused and are not substitutes for effective teaching, their careful use promotes learning and retention, particularly among digital natives (Merrill, 2013).

Using Video to Illustrate Concepts

One method of bringing technology into the classroom is the use of video. Digital natives are said to share an affinity for graphical methods of presenting new concepts, such as video (Buzzetto-More, 2014; Ljubojevic et al., 2014). There is a long history of the use of video and film to augment other teaching strategies. The first author has fond memories of his school's 16mm film projector being wheeled into the classroom; today's teachers widely use YouTube, TED Talks, and other sources of streaming video in their classrooms (Hyndman, VanLeeuwen, & Weeks, 2016; Langlais, 2016). Using video as a supplement to more traditional teaching strategies (e.g., as a means of demonstrating skills or presenting additional content outside the classroom) has been shown to increase knowledge retention, student participation, and skill acquisition (Buzzetto-More, 2014; Green et al., 2018; Ljubojevic et al., 2014).

Previous iterations of the first author's course on Family Crisis and Resiliency had included video (such as a movie) to demonstrate family dynamics related to illness, death, and bereavement. The first author believed, however, that a more interactive experience might help students better understand experiences of family members who have undergone those stressors. Having become aware of *That Dragon, Cancer* and played through the game, we decided to incorporate it in the class.

Video Games in the Classroom

Although video games have existed for decades, the use of such games in teaching is an emerging field. Researchers have investigated the utility of video games in some teaching contexts such as high school social studies classrooms (Maguth, List, & Wunderle, 2015; Squire, 2005) and in the humanities at the college level (Colby & Colby, 2008). Simulated environments with features similar to many video games have been used for delivering content in medical and science education training (Annetta, Murray, Laird, Bohr, & Park, 2006; Erhel & Jamet, 2013).

There have been calls for more use of video games in science, technology, engineering, and mathematics education (e.g., Mayo, 2007). Yet in spite of their increasing use and widespread calls to incorporate more technology such as games and interactive simulations, there are no conclusive results on whether these methods influence learning positively (Erhel & Jamet, 2013; Vogel et al., 2006). We also found no research on the use of video games in the social sciences. More research is needed to confirm whether and in what circumstances video games enhance learning, particularly whether using video games demonstrated any benefits compared to pedagogical uses of videos or films.

Researchers are hopeful, however. Kapp, Blair, & Masch (2014) described several reasons to introduce video games into the classroom at this early stage in our understanding of their pedagogical effectiveness. First, games introduce a layer of interactivity in the learning process. Students must make the choices necessary to continue a game; concepts from course material may inform those choices (Maguth et al., 2015). Second, because of their interactive nature, games can engage learners' attention in ways that other experiences (e.g., lecture, reading, or watching videos about course material) might not (Kapp et al.). Third, games can put students in the position of thinking deeply and reflecting on course material. Each gameplay experience is different and relies on the learner; new experiences then emerge from the interaction among the learner, course material, and choices the game offers (Colby & Colby, 2008). A fourth reason to incorporate games in the classroom is the opportunity they provide for authentic practice. This is particularly salient in the case of *That Dragon, Cancer* in the context of the first author's course. In that course, students learn about concepts such as interrelatedness of family subsystems, internal and external stressors, perceptions of family members, and family resources. In the game, the player must make choices and interact with a narrative in which each of those constructs is demonstrated vividly. Although recent research indicates that many Family Science instructors use digital tools such as online learning management systems, streaming video, and social media (Hyndman et al., 2016), we found no publications that addressed use of video games or other such interactive learning tools in Family Science or related fields. This may be due in part to a lack of games dealing directly with experiences of families in realistic ways. *That Dragon, Cancer* may be unique in this regard and it affords us an opportunity to immerse students in an interactive digital narrative that directly engages them with important concepts from the scientific study of families.

First Principles of Instructional Design

The introduction of a video game such as *That Dragon, Cancer* into this course also aligned with the first author's approach to teaching, which is informed by David Merrill's Component Display Theory (Merrill, 1994, 2013). In his pioneering work on instructional design, Merrill asserted that five first principles emerged from the literature on effective instruction (Merrill, 2002, p. 44-45; Merrill, 2013):

1. Learning is promoted when learners are engaged in solving real-world problems
2. Learning is promoted when existing knowledge is activated as a foundation for new knowledge
3. Learning is promoted when new knowledge is demonstrated to the learner

4. Learning is promoted when new knowledge is applied by the learner
5. Learning is promoted when new knowledge is integrated into the learner's world

The assignment described here most strongly applies the first, third, fourth, and fifth principles. Via *That Dragon, Cancer*, students are confronted with the real-world problem of a family experiencing the chronic and terminal illness of one of their children. Although the player has no opportunity to “solve” the problem while playing *That Dragon, Cancer*—that is to say, one cannot cure Joel’s cancer or prevent his real story from playing out—students interact with the narrative and make choices as proxies for Joel and his family members.

New information is also demonstrated for students. Having been exposed to research-based information about family stress and resilience in the context of illness via lecture and course readings, students experience a vivid demonstration of one family’s experience of those constructs while playing through *That Dragon, Cancer*. Finally, students are required to apply and integrate their knowledge by playing the game and by reflecting on the experience via a writing assignment.

Study Aims

This project extends previous research on video games in the classroom into the social sciences, specifically Family Science. We used a qualitative approach to investigate experiences of students who played or viewed *That Dragon, Cancer* as part of a course module on death and grief in families. Our aims were to investigate students’ opinions on the value of using interactive games in a college course and their perspectives on the game’s contribution to their understanding of family illness, death, and bereavement.

Methods

Procedures

***That Dragon, Cancer* assignment.** All students in an undergraduate Family Crisis and Resiliency course were instructed to purchase and download *That Dragon, Cancer* for PC, Mac, or iPad. Students were instructed to play the game for at least two hours because published reports indicated the game required at least two hours to play through completely (LudaAa, 2016). The instructor explicitly encouraged students to play through the full game even if doing so took longer than the required two hours. The process of purchasing, downloading, and installing the game for all three platforms was discussed in class. When the study was conducted, the cost of the game was \$10.99 for PC and Mac users and \$7.99 for iPad users. (Readers are encouraged to visit www.thatdragoncancer.com to view the most current procedures of download and installation along with current price information.) Anticipating that some students might have technical difficulties or might not own a compatible device, they were offered an alternative assignment in which they were allowed to view a two-hour walkthrough video on YouTube depicting another individual playing the game (LudaAa).

After playing the game or viewing the walkthrough video, all students were instructed to write reflection papers in response to the following questions:

1. How many minutes did you spend interacting with *That Dragon, Cancer*? Did you complete the game?
2. Consider the Green family, the subjects of *That Dragon, Cancer*. Apply the ABC-X model to the family. Describe several elements of their lives that apply to each component of the model.
3. What did you learn about family illness, dying, and bereavement from interacting with *That Dragon, Cancer*?

Voluntary research project. After Institutional Review Board approval from the authors' university, students were invited to participate in a research project about their experience of playing *That Dragon, Cancer*. An announcement was made in class and by email, informing students they could earn extra credit in the course either by participating in the research project or by completing an alternate extra credit activity (viewing a film depicting death and grieving in a family context and writing a two-page reflection paper on the film). A graduate assistant who was unaffiliated with the research project was responsible for tracking which students earned extra credit in the class and communicating this information to the first author, without specifying whether each student participated in the research or completed the alternative extra credit activity. The first author remained blind as to which students participated in the research until after the semester had ended and final course grades were submitted to the university.

Students who chose to participate in the research were directed to an online survey via Survey Monkey. There, participants were presented with an informed consent statement and indicated their consent via electronic signature. Participants were then asked to indicate whether they purchased the game or viewed the optional walkthrough video. Participants were also asked to indicate how many minutes they spent playing the game. Finally, participants were asked to respond to these open-ended questions about their experience with *That Dragon, Cancer*:

1. Reflect on your experience of *That Dragon, Cancer*. What did you like about this activity?
2. What did you not like about this activity?
3. What about *That Dragon, Cancer* was unexpected to you?
4. How did interacting with *That Dragon, Cancer* help you understand concepts from our class?
5. Would you recommend that this activity be assigned in future semesters of Family Crisis and Resiliency?
6. What would you change about this assignment in future semesters?
7. What would you keep the same about this assignment in future semesters?

Participant data were downloaded in a spreadsheet format stored in the Marriage and Family Institute at Abilene Christian University, a HIPAA-compliant outpatient mental health clinic, to guard participant confidentiality.

Participants

Study participants were 29 undergraduates out of a total of 43 students enrolled in the Family Crisis and Resiliency course at a small (< 5000 undergraduates) private university in the Southwestern U.S. Nineteen participants were seniors and 10 were juniors; 26 participants were female. The mean age of participants was 22 years old (SD = 2.02, range 20-30 years), indicating that all participants fit the age profile of digital natives. Participants' mean cumulative GPA was 3.31 (SD = 0.43) at the time of the study. Participants' mean grade in the course was 88.86% (SD = 6.50). The *That Dragon, Cancer* assignment was graded as Complete/Incomplete, and all participants received a Complete grade. Chi-square tests revealed no significant differences between study participants and students who did not participate on sex, age, classification, GPA, or course grade. No students elected to complete the alternate extra credit activity rather than participate in the research.

Twenty-seven participants indicated that they purchased and played the game; seven participants reported they both played the game and viewed a walkthrough video. Only two reported that they only viewed a walkthrough video. Twenty-one participants reported that they interacted with the game for two or more hours, seven reported that they did so for more than 1.5 hours but less than two hours, and one reported more than 1 hour, but fewer than 1.5 hours of activity. Both participants who indicated that they only viewed a walkthrough video also reported that they interacted with the game for more than 1.5 hours, which suggests they likely viewed the entire walkthrough video and experienced every scene in the game. We detected no systematic differences between participants who played the game versus those who viewed the video, or between participants based on time spent interacting with the game.

Data Analysis

To avoid the possibility of confounding the first author's dual roles as researcher and instructor, analysis did not start until after the semester ended and final course grades were submitted. Analysis was performed by means of an iterative process of reading participants' responses, making memos, and engaging in discussions among the authors to discover units of meaning (i.e., themes) present in the data, coding, and re-reading and re-discussing to refine themes and codes (Saldaña, 2009).

Results

Student Likes and Dislikes

Our first aim was to understand students' preferences about the use of a video game such as *That Dragon, Cancer* in a college family studies course. Participants were first asked, "What did you like about this activity?" In the words of Participant 8 (see Table 1 for a summary of participant characteristics):

"I fell in love with the creative dialogue that drew me in to the point where I had to write down every single word. It took way too much time, but I was so involved in the narrative that I was hypnotized by the spoken word poetry."

Other participants were less effusive; nevertheless, every participant identified at least one positive aspect of assigning *That Dragon, Cancer* as a course activity. Representative comments included:

“I liked how interactive and real this game was and how it related to the course.”
(Participant 22)

“I loved playing this game. I thought it was such a unique experience to have a small glance into the minds of people experiencing family illness, and more specifically cancer.” (Participant 6)

“I liked that it made our section on family illness come to life.” (Participant 19)

“I really liked how it put you in the shoes of Joel's family and allowed you to view their experiences through a firsthand account.” (Participant 29)

“I liked how well planned out and personal the game was. In the beginning stages of the game I wanted to know more of the history and backstory, but the longer I played the more I realized I didn't need to know that information. I was living in the moment and going through the stages of cancer just like the family did.” (Participant 25)

Participants were also asked, “*What did you not like about this activity?*” Two participants described a primarily negative reaction to *That Dragon, Cancer*, but their reactions were very different. In the words of Participant 5,

“I felt like this game got too close to a very intimate part of a person’s psyche. It made me feel slightly violated. The content was too heavy to explore in a video game and too raw to be experienced in a game setting. For people who have had real trauma similar to what was being played, it was too much.”

Participant 4, who went so far as to suggest that the activity not be used in future semesters, expressed her negative opinion thus: “I really wish it was more interactive. I wanted to be able to actually do things and not just make them walk and stuff. It was kind of boring.”

Table 1

Participant Characteristics

Participant	Sex	Age	Race	Classification	Played Game, Viewed Walkthrough Video, or Both played and viewed video
1	Female	20	White	Senior	Played and viewed walkthrough
2	Female	21	White	Senior	Viewed walkthrough only
3	Female	23	White	Senior	Played game only
4	Female	22	White	Senior	Played game only

5	Female	21	White	Senior	Played game only
6	Female	20	White	Junior	Played game only
7	Female	22	White	Junior	Played and viewed walkthrough
8	Female	30	African American	Junior	Played and viewed walkthrough
9	Female	22	African American	Senior	Played game only
10	Female	21	White	Senior	Played game only
11	Female	22	White	Senior	Played game only
12	Female	21	White	Senior	Played game only
13	Female	21	African American	Senior	Played and viewed walkthrough
14	Male	22	White	Junior	Played game only
15	Female	21	White	Senior	Played and viewed walkthrough
16	Female	20	White	Junior	Played game only
17	Male	23	White	Senior	Played game only
18	Female	21	White	Senior	Played game only
19	Female	20	White	Junior	Played game only
20	Female	22	White	Senior	Played game only
21	Female	22	African American	Senior	Played game only
22	Female	22	White	Senior	Played and viewed walkthrough
23	Female	25	White (Hispanic)	Senior	Played game only
24	Female	20	White	Junior	Played game only
25	Female	20	White	Junior	Played game only
26	Female	24	African American	Senior	Played game only
27	Male	20	White	Junior	Viewed walkthrough only
28	Female	23	White	Senior	Played and viewed walkthrough
29	Female	21	White	Junior	Played and viewed walkthrough

Although Participants 4 and 5 primarily expressed negative opinions, they also described some positive aspects of the activity. Participant 4 praised the game for demonstrating family resilience and family systems. Participant 5 expressed appreciation for the game's realism game for inclusion of a "faith component."

No other participant expressed a primarily negative opinion; two participants stated there was nothing about the activity they did not like. If our goal had been simply to present a pedagogical activity that students generally enjoyed or appreciated, then *That Dragon, Cancer* would have been successful. We had other aims, however, and themes related to those aims emerged from participant responses to the question, "What didn't you like about this activity?" as well as to other survey questions. The following section discusses these themes.

Themes from the Data

Apart from the question of what participants found to be positive and negative about *That Dragon, Cancer*, several themes emerged from our analysis of participants' reflections on the activity. Two themes illustrate the success of assigning *That Dragon, Cancer* to achieve our assignment objectives. One speaks to the value of *That Dragon, Cancer* as a unique way to engage with course material. The final theme is complex, encompassing the frustration some students felt toward the practical task of downloading and playing a video game along with frustration and confusion some students expressed regarding the game's intentionally ambiguous and abstract nature. We have chosen to use participants' own words to label both themes.

"I didn't expect to care as much as I did." Many participant comments indicated that *That Dragon, Cancer* personalized family dynamics surrounding illness, death, and bereavement. Some expressed surprise at the strength of their emotional reactions to the game, such as Participant 9, who stated, "It was unexpected to me how personal the game was." According to Participant 6, "I did not expect it to be as emotional as it was. I felt attached to it at the end and I wanted to continue playing more of the game."

This quality of eliciting an emotional reaction was not a positive experience for every participant. In answer to the question, "What about *That Dragon, Cancer* was unexpected to you?" Participant 8 responded, "Going into a depressive episode of weeping." Participant 25 stated, "I thought this game was too personal and at times I felt like I was invading this family's privacy. I was witness [sic] and walking through the worst moments of their life and I don't even know them." Participant 1 commented, "I didn't enjoy how sad I felt after playing this game."

Although every family has its own story, many college students have not experienced the chronic illness or death of a close loved one. One of our goals for this assignment was that students would experience personal and emotional connections to experiences of a bereaved family. Participant responses suggest that we achieved this goal. The issue of students' sadness needs to be addressed, however. We elaborate on this point and the need for more research in our discussion below.

“It brought the concepts of death and crisis alive.” We also launched this assignment with the goal that students would deepen their understanding of course content, especially the ABC-X model of family stress. The assignment required students to apply that model to specific aspects of the Green family’s experience after playing *That Dragon, Cancer*. Participants made several comments indicating that playing *That Dragon, Cancer* was an effective way to illustrate the ABC-X model. According to Participant 9,

“I think by playing the game you get to see a more hands on experience of the terms we use in class like ambitious [*sic*] loss and a family illness and even a crisis like hearing your child's illness is terminal. Really getting to see how the ABC-X model is applied in each stage helped give a better perspective on why this was created in the first place.”

Participant 26 stated, “I really saw the family stress theory play out in the game. There were moments where the family had to deal with messes the child made. I also noticed the family pulling together to make sure things stayed afloat.”

Finally, Participant 20 commented,

“The game connected elements of faith and demonstrated how it fits with concepts like the ABC-X model as the Green's faith determined their kinds of resources and perceptions, consequentially determining their resiliency and ability to process and attribute meaning to Joel's journey and passing.”

“It was a different way of learning.” According to several participants, playing *That Dragon, Cancer* was a unique learning experience. One intention behind this assignment was that students would be exposed to dynamics of a family experiencing illness, death, and bereavement in a way that was not possible through other teaching methods. This appears to have been successful. Several participants commented on the strength of this activity as a teaching tool. For example:

“It brought the concepts of death and crisis alive. It was more than just words on a page; it was an interactive role-play of the activities in the game. The conversations that the parents had via phone and in person and with doctors were some of the things we talked about in class and how families could deal with them.” (Participant 14)

“I liked this activity because it was a different way of learning that I had never experienced before. I thought that it was a really interesting way to see somewhat of first hand the results of a stressor like child illness and in a way experience the rollercoaster of emotions along with the family.” (Participant 15)

“I just kept touching the screen hoping something would happen.” Three students expressed frustration with technology issues that hampered gameplay. Before the assignment or data collection began, one student (Participant 5) required the instructor’s intervention to install the game to her personal laptop. No other students expressed inability to download or install the software but some did make comments related to “glitches” or flaws in the app itself. For example, according to Participant 12, “The only thing that I did not like about this activity was

the issue that I had with the app. I had a lot of trouble getting the sound to come out.” Participant 2 stated, “It wouldn’t download on my phone.” Student comments about technological problems tended to follow this pattern—either the problem was “not a big deal,” (Participant 22) or it represented the only negative comment made by a student who found the activity to be a generally positive, informative experience. Technological problems or “glitches” did not appear to be troublesome enough to cause any students to have an entirely negative view of the activity. For example, Participant 12, who complained about the game’s sound, also stated, “I enjoyed the activity because it gave us a unique way to view the material. It tied everything together and gave us a chance to see how what we have been learning plays out in real life. I think everything about this assignment was beneficial.”

Several other students expressed frustration and confusion that were unrelated to technical problems but which reflected the intentionally ambiguous nature of gameplay in *That Dragon, Cancer*. Some representative comments were:

“I did not like how the game left me without cues on what to do next. I often found myself confused as to what to do next.” (Participant 26)

“I did not like how on some parts of the game it was not clear what to do next. I spent most of the time clicking random spots. I wish there would have been more direction.” (Participant 21)

“Honestly, the only thing I didn't like about the activity is sometimes I couldn't figure out where it wanted me to go and what it wanted me to click on. There were times when I moved onto the next scene thinking I had missed seeing or listening to something in the previous scene.” (Participant 16)

“I guess one thing I really didn't like about the activity would have to be that there were some places where I honestly did not know what to do. I kept clicking around and trying to figure out what the game wanted me to do. I would sometimes spend 15-20 minutes stuck at one story plot because I did not know how to move on the next story.” (Participant 11)

“I think the navigation of the game was difficult, but I didn’t take the time to read the instructions or anything. But it was hard to move around and understand what some symbols meant in regards to motion and moving forward in the game.” (Participant 9)

These comments and others like them lead us to two conclusions about using *That Dragon, Cancer* in this module. On one hand, technical issues such as difficulty downloading the game are problems that should be addressed by preparing students adequately and giving clear instructions so that technical problems do not interfere with assignment objectives. We elaborate on this in our discussion below.

On the other hand, we believe the high level of student confusion and frustration point to one of the assignment’s greatest strengths. The creators of *That Dragon, Cancer* had a goal of immersing the user in the experience of their family during Joel’s illness and death (Tanz, 2016).

Key elements of that experience include feelings of hopelessness and confusion—the sensation of being powerless in the face of cancer (Lussenhop, 2016; Tanz, 2016). According to one profile of Ryan and Amy Green, the game’s designers were “trying to create a game in which meaning is ambiguous and accomplishments are fleeting. [They are] making a game that is as broken—as confounding, unresolved, and tragically beautiful—as the world itself” (Tanz, 2016, para. 15). A thoughtful person playing the game attentively will naturally experience sensations of powerlessness, confusion, and frustration during gameplay. Such sensations are an intentional feature of *That Dragon, Cancer* and are not mitigated by being an experienced video gamer.

Consider as an example the comment made by Participant 26, quoted above. She complained about confusion about “what to do next.” Confusion about one’s role, feelings of meaninglessness, shock, and other disabling cognitive symptoms are common features of the grief experienced by parents after losing a child (Goldstein et al., 2018). We believe that student comments expressing confusion and powerlessness about the game (i.e., those that are unrelated to technical problems such as downloading errors) indicate that the assignment was successful in confronting students with the reality of illness, dying, and bereavement in families.

Discussion

Our aims for this assignment were that students would gain deeper understanding of course concepts such as the ABC-X model of family stress and that students would experience emotional connection to the experience of a bereaved family. We chose to assign students to play *That Dragon, Cancer* and write reflection papers about it for three reasons. First, experts recommend the use of technology in teaching digital natives; second, the activity fit the first author’s philosophy of teaching; third, we believed the activity would achieve our pedagogical aims. Having reviewed participants’ comments, we believe the assignment was successful. The first author continues to use it in Family Crises and Resiliency. Two lessons stand out for how they have influenced the way the assignment is presented now.

Overcoming Barriers

Our finding that students universally praised at least some aspects of the activity aligns with previous research, which showed that students preferred interactive games over traditional classroom methods when they are allowed to control the game themselves (Vogel et al., 2006). At the same time, however, participant complaints about *That Dragon, Cancer*’s being difficult or confusing match some research that identifies barriers to using video games in the classroom. The potential for technical problems is a barrier because students might have problems installing or opening the game file or figuring out how to play the game (Colby & Colby, 2008; Sandford, Ulicsak, Facer, & Rudd, 2006). In one large study, teenage students, most of whom were avid gamers, were not as adept with unfamiliar video games as their teachers expected them to be (Sandford et al., 2006). Another possible barrier is negative perception of video games among teachers. Sandford et al. reported that some teachers believed video games would be too distracting in the classroom, and hence not appropriate as pedagogical tools. Teachers and students may also have very different levels of experience with video games. According to a survey of more than 900 teachers and more than 2,000 students in the UK, 72% of teachers stated they never play video games for leisure while 85% of students reported they play video

games at least every couple of weeks (Sandford et al., 2006). Teachers who rarely or never play video games might feel uncomfortable instructing students about a video game exercise in the classroom.

Some participants in our study faced technical problems. Inexperience with video games might account for some participants' confusion about the mechanics of gameplay in *That Dragon, Cancer*. Before implementing this assignment the instructor should thoroughly familiarize herself with the process of downloading and installing the game and with the mechanics of gameplay. *That Dragon, Cancer* is available for PC, Mac, and iPad platforms; the instructor should be familiar with downloading, installing, and playing the game on all three. Instructions are available at www.thatdragoncancer.com. The instructor should direct her students to that site and perhaps demonstrate how to download and install the game in class.

Instructors should also prepare students for the ambiguous and frustrating nature of the game play. Although *That Dragon, Cancer* is an interactive narrative of several months in the Green family's life, it is dissimilar to a film or television episode. In this game, time does not always progress linearly and the player must confront ambiguous situations with very few instructions about what to do to proceed. It is important to reassure students that these features are intentional and that their sensations of frustration or confusion represent immersion in the same sensations that Ryan and Amy Green experienced as they navigated the period of their son's illness and death.

We also included an optional alternative assignment that allowed students to view a two-hour walkthrough video on YouTube instead of playing the game. This option was available for any student unable to afford the game's cost or who lacked access to a compatible device. Although we do not believe that experience with or affinity for video games is necessary for *That Dragon, Cancer* to succeed as a teaching activity, this option was available to students if they wanted it for any reason. We recommend that any instructor including this game in her course requirements include a similar option.

Sensitivity to Students' Emotional Reactions

Although one of our aims was that students would have a personal and emotional connections to the Green family's story, some students found their emotional reactions to be negative experiences. Very little has been written about students' emotions in the presence of difficult topics such as family illness or death. Students in medical professions receive training in end-of-life care; recently, authors have called for more attention to emotional needs of students who are encountering death for the first time (Gillan, van der Riet, & Jeong, 2014; Heise & Gilpin, 2016; Liu et al., 2011). Activities such as journaling, debriefing groups, and art therapy have been shown to improve medical and nursing students' comfort and efficacy with providing end-of-life care. There needs to be more research on identifying best practices for Family Science educators, who regularly teach on topics (such as death) that may elicit students' strong emotions, memories, and opinions.

Until more is known, we make three recommendations for instructors using *That Dragon, Cancer* in their courses. First, instructors should prepare students by showing the trailer for the game in class (available at www.thatdragoncancer.com) and informing students that the game depicts experiences of family members dealing with childhood cancer. Students should be informed that they might react emotionally to the game and should plan accordingly. Second, instructors should schedule time during class, after students have completed the assignment, for students to discuss their reactions to the game. One strategy is to read anonymous quotes from student reflection papers and then ask students if they would like to volunteer to elaborate on what was written; or, if not, whether students have similar comments about the game. This debriefing activity aligns with emerging best practices in the medical training field (Heise & Gilpin). Third, instructors should inform students of supportive services that are available either on campus or in the community, such as counseling services or support groups. We recommend this information be included in the course syllabus and in class discussion before and after the assignment.

Limitations

Our study has several limitations. The sample was composed of almost 90% female participants. Had there been more male participants, their data may have led to different conclusions or provided richer understanding of the impact of *That Dragon, Cancer* on learning in the course. Similarly, our sample was drawn from a population of students at a small faith-based private university. A more geographically diverse sample or a sample drawn from a larger or secular institution might have provided insights different from what we present here.

Two participants indicated that they viewed a walkthrough video but did not download and play *That Dragon, Cancer*. We do not know why. Some possible explanations are (a) these participants might not have had access to devices that were compatible with available versions of *That Dragon, Cancer*, (b) the cost of downloading the game might have been prohibitive for them, (c) they might dislike playing video games. There may be other explanations. We recommend that instructors who wish to use the game in their classes consider making at least one copy of the game available on a university computer, such as in an on-campus computer lab or on an iPad that students may check out for a time.

An experimental design is necessary to test whether playing *That Dragon, Cancer* leads to better understanding of course concepts. Using our data, we have shown that many participants believed the assignment contributed to their learning, but our design does not allow us to test this directly. Additionally, our use of an open-ended survey instrument did not allow us to ask follow-up questions. An interview method would have afforded participants opportunities to elaborate on their comments and might have produced richer data.

Recommendations for Further Research

More research is needed to investigate the utility of technology, and specifically of video games, in the Family Science classroom. There are other games that could be used for illustrating Family Science concepts. For example, *The Sims 4* (Electronic Arts, 2014) allows the user to create an avatar, choosing characteristics such as personality and appearance, and then guide the

avatar through life choices such as employment, education, and relationships. Students could be assigned to compare their Sim's experiences with their own relationship experiences.

Many films and television shows depict family relationships and are commonly used in Family Science (Erwin, 2009). We believe *That Dragon, Cancer* makes an excellent addition to the list of media used in our classrooms and that instructors should continue searching for creative ways to present the important concepts we teach.

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