

Gamified Social-Emotional Learning

by

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May 2021

Presented to the

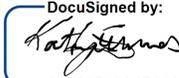
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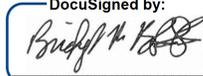
In Partial Fulfillment

of the Requirements for the Degree of

Master of Science

Approved by:  6/26/2022
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 6/26/2022
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Abstract

This study investigates the viability of utilizing game elements in Social-Emotional Learning (SEL) for adolescents aged 12 to 14 and finding the right game element to help students learn to recognize their emotions and increase their coping skills in social situations. A game was developed with ten storytelling scenarios to recognize their feelings and make choices in a challenging situation. The ten scenarios were divided into two sets of five comparable scenarios each. Performance on the first set of scenarios was compared to performance on the second set. A qualitative method was used to observe the participant's choices, and a final interview was conducted to understand their choices. The results showed that utilizing the game element has the potential to be a viable approach for supporting Social Emotional Learning. Participants stayed engaged, and they found that the game made them think about the problem and think about their choices throughout the game. However, the testing also found several improvements that need to be made in a user interface, including some design ideas that merit further investigation.

Acknowledgments

I would like to thank my advisor, Dr. Kathryn Summers, for all her help and advice at every stage of the research project. Your insightful feedback and your guidance brought my work to a higher level. I would also like to acknowledge my colleagues at Pearson Virtual School for their support. I want to thank Barrett Benica, Manager of Multi-Media, Matthew Cummings, Director of User Experience, Mathew Poovan, Product Manager, for their support. In addition, my appreciation also goes out to my family and friends for their encouragement and support all through my studies.

Table of Contents

List of Tables	iii
Chapter 1: Introduction	1
Chapter 2: Review of Literature	4
Adolescent development	4
Cognitive development	5
Piaget’s theory	6
Vygotsky’s theory	7
Information Processing theory	8
Characteristic development	9
Social and emotional development	9
Moral development	10
Kohlberg’s stages of moral development	11
Gilligan’s stages of moral development	12
Chapter 3: SEL.....	15
Social-Emotional Learning	15
Motivation for Learning.....	16
Storytelling to Enhance Learning	17
Gamification as a Learning Tool	18
Gamification Design Principles	19
Multimedia game	20
Chapter 4: Methodology	22

Participants.....	24
Script before the test	25
Interview questions after the test	26
Chapter 5: Results	27
Chapter 6: Discussion	34
Chapter 7: Conclusion.....	37
Limitations of this Study.....	37
Further Work.....	38
References.....	40
Appendix A: Game Scenario	43

List of Tables

Table 1. <i>Self-management</i>	28
Table 2. <i>Relationships</i>	29
Table 3. <i>Social awareness</i>	30
Table 4. <i>Overall improvement per participant</i>	31
Table 5. <i>Total stars earned in each category</i>	31

Chapter 1: Introduction

Social and emotional learning (SEL) is to help students develop the ability to manage their emotions and build positive behavior during their developmental process. SEL is important because students can learn to make responsible decisions to aid in their academic success, learn to resolve conflicts to build healthy relationships, manage their emotions to avoid negative behaviors, and make ethical decisions towards others. Thus, both educators and parents recognize the importance of social-emotional learning (SEL). However, there is a lack of resources in ways of learning social-emotional skills. Most of the existing methods are group discussions in a classroom setting and watching videos. This study was designed to explore the hypothesis that gamification combined with a story-based web experience has the potential to keep students engaged and make it a fun experience for students to learn these skills. Adolescents aged 12 to 14 lack life experience, and SEL can help them prepare for some of the challenging situations they are bound to face as they transition from childhood to adulthood. Students who lack social-emotional skills tend to struggle academically and have difficulty establishing relationships with others: "Students with limited social consciousness and insufficient coping skills often struggle scholastically and demonstrate poor socioemotional skills" (Hill et al., 2015). SEL education can give students a learning opportunity to see how they react and solve a situation when they are faced with new experiences.

Due to a lack of life experience, students need to learn how to manage their emotions and make good decisions. For example, they need to learn to set goals and solve given problems to achieve academic and personal success and be socially aware of their world to prepare to make more successful choices as they develop into adults. One program that was established to help underprivileged students achieve academic success and provide positive youth development for middle school students is called CARE (Character and Resiliency Education). This program promoted "planning and problem solving within a group, requiring students to listen to one another and follow through

with handling conflicts" (Hill et al., 2015). This program was able to increase academic success and gave students a coping skill that benefited them in their overall well-being.

This age group is at an early stage of transitioning from childhood to adulthood, going through physical, psychological, and social changes. They are dealing with how their bodies and their thoughts are changing, and they start to see the world in more complex ways "many adolescents struggle to meet society's—and their own—demand as they traverse the challenges of the teenage years" (Feldman, 2016). During this stage, SEL education can help children to deal with everyday life challenges. SEL is for children to learn about what they are feeling and how to deal with their emotions in a positive way. It is to help children learn how to interact with others socially and communicate their thoughts and feelings effectively to create a healthy relationship as they grow into adulthood. SEL is not meant to replace psychotherapy or parenting. It is to help students realize their moral values, express and communicate their emotions more effectively, and help them make better decisions that will lead to responsible behavior.

Based on this adolescent's developmental stage, gamification can be used to motivate and increase engagement in learning SEL. Using gamification as an educational tool can help students to solve new problems that they face every day: "The use of educational games as learning tools is a promising approach due to the games' abilities to teach and the fact that they reinforce not only knowledge but also important skills such as problem-solving, collaboration, and communication." (Dicheva, Dichev, Agre & Angelova, 2015). Since SEL deals with personal choices, using a story-based scenarios where students have to make choices would be an effective gamification design. Dicheva et al. (2015) described "freedom of choice" as one of the most frequently used gamification designs in education. Creating a story-based game where students can make choices in SEL education can increase enjoyment in learning, thereby increasing motivation to learn.

The research questions for this project are as follows:

1. Is the combination of gamification and story-based scenarios an effective method for Social Emotional Learning?

Gamified Social-Emotional Learning

3

2. Do adolescents find the combination of gamification and story-based scenarios enjoyable and engaging?
3. Does the combination of gamification and story-based scenarios provoke thoughtful reflection in adolescents?

Chapter 2: Review of Literature

In order to understand how adolescents engage in social emotional learning, I will briefly review what is known about cognitive and moral development during this life stage. The final part of this chapter will explore the potential value of gamification in learning, as demonstrated in other studies.

Adolescent development

Early adolescence developmental stages go through many changes, physically, intellectually, emotionally, and socially. According to Feldman (2016), they start to develop their individuality and become more aware of their environment. They initiate more social relationships outside of their family, and they start to care more about their peers' opinions than their parents: "in adolescence, conformity shifts to the peer group, in part because pressures to conform to peers increase as adolescents seek to establish their identity apart from their parents." (Feldman, 2016). They open themselves up to their peers to connect with like-minded peers, and they start to influence each other. They start to engage in more risky behaviors without putting too much thought into the consequences by influencing each other: "adolescence is a time of experimentation of trying out new identities, roles and conduct. Peers provide information about what roles and behavior are most acceptable by serving as a reference group." (Feldman, 2016). Middle school students ages are between 12 to 14 years old when they start to go through puberty. During this time, they start to have a flux of mood swings: "The surge in production of hormones that triggers the start of adolescence also may lead to rapid swings in mood." (Feldman, 2016). Feldman (2016) explained that it is feelings of anger and annoyance for boys, and for girls, it is feelings of anger and depression. Some develop physically earlier than others, and they have to deal with both negative and positive experiences. For example, girls who develop earlier may get positive attention from older boys: "Girls who mature earlier tend to be sought after more as potential dates, and their popularity may enhance their self-concepts" (Feldman, 2016), but may get negative

attention from other girls her age “Early maturing girls may have to endure ridicule from their less mature classmates.” (Feldman, 2016).

With physical changes, their brain starts to go through changes as well. Their *prefrontal* part of the brain starts to develop: "The *prefrontal cortex* is part of the brain that allows people to think, evaluate, and make complex judgments" (Feldman, 2016). Since middle school students are at the prefrontal cortex's early developmental stages, they react to their emotions rather than logical reasoning. They tend to take part in more risky behaviors out of impulse, and they underestimate the consequence of these behaviors. "This brain immaturity may lead to some of the risky and impulsive behaviors that are characteristic of adolescence" (Feldman, 2016). They start to experiment with drugs, alcohol, and dangerous behavior to deal with stress and out of peer pressure. They may think that they will be accepted into a group of peers by behaving similarly with little regard to the consequences.

Cognitive development

There are three significant theories, from Piaget, Vygotsky, and Information Processing theory, that help us to understand how children's cognition develops. Piaget believed that all children go through cognitive developmental stages without skipping a stage “all children pass through a series of four universal stages in a fixed order from birth through adolescence” (Feldman, 2016). Piaget believed that children gain knowledge by connecting their previous knowledge with new information and using deductive reasoning to form new knowledge. Vygotsky believed that not all children go through the same stage at the same time. Instead, their cognitive developmental stages vary depending on their social interaction and language development: “Social-cultural experience of the child occurs through language and this leads to the development of thought” (Dastpak, Behjat & Taghinezhad, 2017). He believed that children gain knowledge from more knowledgeable peers or adults and through their guidance: “Adults play an important role in children’s learning and help them achieve their potential” (Dastpak, Behjat & Taghinezhad, 2017). Vygotsky believed their developmental progress depends on language development. By acquiring more language skills, they can interact

with others around them and learn how to behave, which leads to improved behavior. Later cognitive psychologists who believe in information processing agree with Vygotsky that not all children go through the same stages at the same pace as they age; they believe that some children may advance faster than others. The reason some children advance faster is that they gain knowledge by gaining experience. As they get older, they can store and process information more efficiently, and “their store of knowledge increases as the amount of material to which they are exposed grows and their memory capacity enlarges” (Feldman, 2016). Thus, Piaget believed that all children go through the same stages at roughly the same pace, while Vygotsky and Information Processing theorists recognized more variability. Vygotsky focused on the role of language and social interaction to explain that variation, while information processing theorists broadened their view to acknowledge the influence of other kinds of life experience as well. All three theorists recognize that children can learn by facing a contradiction between their current experience and their previous knowledge, although Piaget believed that this learning could only proceed in predictable stages.

Piaget’s theory

Piaget believed that children go through four cognitive developmental stages as they gain different abilities. They gain knowledge by adapting two ways to process new information; *assimilating* and *accommodating*. According to Huitt & Hummel (2003), *assimilating* is when children process information in order to combine it with what they already know. *Accommodating* is when children change their previous knowledge because they have encountered new information. By age 12 and into adulthood, adolescents go through a *formal operational stage*, a stage where “intelligence is demonstrated through the logical use of symbols related to abstract concepts. Early in this period, there is a return to egocentric thought” (Huitt & Hummel, 2003). During this stage, children can think in abstract ways and start developing common sense; hence, they can solve problems that are not related to what they experienced but solve problems by deductive reasoning. Using deductive reasoning, they can form a hypothesis and predict a particular outcome based on that hypothesis: “Adolescents in the formal

operational stage use *hypotheticodeductive* reasoning, in which they start with a general theory about what produces a particular outcome and then deduce explanations for specific situations in which they see that particular outcome” (Feldman, 2016). However, with the return of egocentric thought during the *formal operational stage*, adolescents become more self-absorbed “Adolescent egocentrism, a state of self-absorption in which the world is viewed as focused on oneself, may also dominate adolescents’ thinking” (Feldman, 2016). It would seem that they start to be more self-conscious because they think that they are the center of everyone's attention. For example, when they get a pimple on their face, they may assume that everyone is looking at it and they become more self-conscious. Therefore, with egocentric thoughts, their problem-solving ability, such as deductive reasoning, may be clouded, and they may come up with a hypothesis based on their self-absorbed views. However, Piaget’s theories failed to recognize that not all children go through the same stages at the same time; depending on the child's upbringing and environment, the stages that they go through may differ.

Vygotsky’s theory

Vygotsky believed that children's cognitive development is related to social interaction. Vygotsky believes children’s developmental progress depends on language development. By acquiring more language skills, they can interact with others around them and learn others behave, which leads to their own behavior. Language is used to participate in social interaction and to develop social relationships. During these interactions, children learn a language, which leads to cognitive development - "Based on the concept of ZPD (Zone of Proximal Development), adults interact with the child through speech, and this will play a crucial role in his cognitive development" (Dastpak, Behjat & Taghinezhad, 2017). According to Dastpak et al., Vygotsky described ZPD as a zone where children's learning occurs by solving a problem: "The child possesses the potential to solve problems partially independently and partially under the guidance of adults or peers" (Dastpak et al., 2017) For example, a child is given a problem to solve independently. However, if the child cannot solve the problem, a child gets assistance from an adult to solve the problem, and learning occurs. This suggests that the more

problems they solve, the more experience they will gain; thereby, they can process information more efficiently with fewer assistance from the more knowledgeable adults or peers. Social behavior can be learned through explicit language or through observation, although Vygotsky focuses on the social aspects of behavior.

Information Processing theory

Information processing theory compares children's cognitive development to a computer system. Children's cognitive growth depends on their ability to learn, store, recall, and apply information, "Information processing has three basic aspects: encoding, storage, and retrieval." (Feldman, 2016). Encoding is when information is presented to a child; storage is when a child stores the information in their memory; retrieval is when a child recalls that information to use it. Feldman (2016) explained that during middle school age, their memory capacity increases, and their ability to retrieve information becomes more advanced. With larger memory capacity, they start to organize information in a pattern that they can recall more efficiently. To recall the memory more efficiently, a memory strategy called *rehearsal* can be incorporated. *Rehearsal* memory strategy repeats the information to form a mental image linked to the information to help them remember what they have learned: "memory strategies include *rehearsal*, consistent repetition of information that children wish to remember; *organization*, which is placing material into categories; and *cognitive elaboration*, in which mental images are linked with information that someone wants to recall" (Feldman, 2016). This also suggests that the more experience they gain, for example, by playing a relevant computer game, the faster they will be able to recall that experience. Unlike Piaget's theory, information processing suggests that the manner in which children process information depends on individual capabilities and individual life experiences rather than going through predictable stages. In information processing theory, if a child saw a certain act that they know is wrong from a previous observation of others' experience, or from their personal lived experience, they gradually develop the ability to predict the negative consequences of that act.

Characteristic development

One of the important characteristics of adolescent cognitive development is the growing importance of peer interaction. During the early adolescent stage, children spend more time with their peers than with their parents; they open up and share their thoughts and feelings with their friends to establish a closer relationship. According to Steinberg & Morris (2001), they are influenced by the crowd they associate themselves with, such as jocks, nerds, popular, etc. Steinberg & Morris (2001) also stated that by establishing themselves as members of the crowd, they start to develop their identity, which influences their behavior. Since their prefrontal cortex is still at an early stage of development, they more commonly react to their emotion rather than stopping to think logically about what they are feeling and assessing how to behave according to the situation. For example, to belong to a particular group, adolescents may exhibit behaviors that those group of peers will approve of without thinking about the consequences. According to Dishon, Andrews & Crosby (1995), children choose friends based on similarity “as early as middle childhood, antisocial children tend to associate with other antisocial and/or rejected peers.” (Dishon et al., 1995). Dishon et al. also stated that “There is support for the idea that children are attracted to those most like themselves (i.e., social choice), particularly concerning aggressive behavior in middle childhood” (Dishon et al., 1995). Once adolescents choose who their friends are, they start to positively and negatively influence each other and show similar behavior.

Social and emotional development

The middle school student’s school environment changes significantly when they move from elementary school to middle school. During elementary school years, they are used to being in one small classroom with the same teacher and classmates. However, when they move up to middle school, they have to move from one classroom to another and meet different teachers and students in each class. This transition can be emotionally and socially difficult because they have to make new social connections and establish broader social connections. Some are more prepared than others because some children grew up in a supportive home environment, but not all children have that type of home

environment. Those who grew up in a non-supportive home environment are not prepared for this type of interaction or do not have enough experience to navigate through this occurrence. According to Steinberg & Morris (2001), adolescents who had parents who are reliable, dependable, trustworthy, warm but firm throughout their early childhood, adjusted better psychologically and socially, and performed better in school: “authoritative parenting is associated with a wide range of psychological and social advantages in adolescence, just as it is in early and middle childhood” (Steinberg & Morris, 2001).

On the other hand, adolescents who had parents who are controlling, overly accommodating, or indifferent throughout their early childhood had low self-esteem and developed psychological problems such as depression and anxiety and showed antisocial behavior. Children who grew up in an unfavorable environment may show the same attitude and treatment to their peers, thereby getting rejected by their peers. By being rejected by other peers, they have less interaction with peers; therefore, their social interaction skill is stunted: “antisocial behavior disrupts prosocial skill development and leaves antisocial children less socially competent” (Dishion et al., 1995). This will lead to deeper emotional problems, and they will start to disengage from school and their peers.

Moral development

We will begin by discussing two influential moral development theories. Kohlberg’s theory describes three levels of moral development, and Gilligan’s theory describes three stages of moral development. Kohlberg believed that his moral development was universal, but Gilligan argued that his theory is centered on males, and she believed that females’ moral development is different from males. Subsequent theorists have found less male/female dichotomy than Gilligan suggests, but both of these theories of moral development have been important for subsequent study.

According to Woods (1996), boys scored better with Kohlberg’s model, and boys showed higher morality than girls. However, girls scored better with Gilligan’s model, and girls showed higher morality than boys. Woods (1996) further described that Kohlberg’s model is where moral reasoning is conducted on hypothetical dilemmas based

on justice, and moral decisions are made rationally. In contrast, in Gilligan's model moral reasoning is conducted on real-life dilemmas based on care.

Kohlberg's stages of moral development

Kohlberg's studies show three levels of moral development, and each level is further divided into two stages.

Level 1 – pre-conventional morality

Stage 1 – obeying the rule in fear of punishment

Stage 2 – obeying the rule with an expectation of reward.

Level 2 – conventional morality

Stage 3 – obeying the rule to get respected by others

Stage 4 – obeying society's rules in order to maintain social order.

Level 3 – post-conventional morality

Stage 5 – obeying the rule as a whole society, but with the recognition that rules can be changed if society feels they need to be updated to meet current needs

Stage 6 – obey society's rules to a certain extent as long as those rules are consistent with the person's personal principals.

Kohlberg believed that most females were in stage 3 of the conventional morality level, while most males were in the same level but at stage 4 (Redzic, 2015). In other words, girls made decisions based on what others approved of, and boys made decisions out of a perceived duty to society's rules. Using Gilligan's "ethics of care" rubric, Skoe & Gooden (1993) found that boys made choices based on their desire not to get in trouble, which would presumably correspond with Kohlberg's stage 1, while girls made choices to get approval from others, which coincides with stage 3 of Kohlberg's model.

Subsequent research has suggested that both boys and girls will make moral decisions that are heavily influenced by the group of peers they associate themselves with, which is consistent with Kohlberg's Level 2: "At stages 3-4 moral conduct is determined by valid accepted social norms" (Redzic, 2015). Redzic's study found that

boys and girls were generally at the same level of moral reasoning and would often make the same decisions, but that the reasoning behind those decisions sometimes differed. It seems that for boys, it is to avoid getting into trouble with the group, and for girls, it is to get accepted by the group.

Gilligan's stages of moral development

Gilligan's work suggested an alternative model of moral development based on the individual's level of concern for others. Gilligan was explicitly motivated to provide a model for moral development that avoided what she saw as Kohlberg's gender bias. Gilligan's research suggested three moral development stages: Stage 1 is an orientation toward individual survival where girls decide based on self but gradually change to what is best for others. Stage 2 is goodness as self-sacrifice, where they make decisions based on others' needs by sacrificing themselves but gradually change to what is best for both others and themselves. Stage 3 is a morality of nonviolence where they make decisions based on not hurting anyone, including others and themselves. Gilligan believed that males and females base their moral reasoning on different criteria: she believed that boys make moral decisions based on rules and responsibility, while girls made moral decisions based on obligations and responsibility (Redzic, 2015). Unlike Kohlberg, who believes that children go through standard, successive stages of moral development, Gilligan believed that moral development relies on children's level of maturity and empathy (Redzic, 2015). Gilligan believed that because females are considered caretakers in society, they make moral decisions based on care ethics rather than abstract justice.

Ultimately, both Kohlberg and Gilligan failed to pay enough attention to the variation in life experience, cultural experience, etc., that would inevitably affect an individual's maturity level as well as the moral norms they would encounter. In other words, drawing from Vygotsky and information processing theories helps us understand that children's moral development is heavily influenced by the environment that they grew up in. Based on this assumption, it makes sense that if a child's life experience is highly gendered then this gendered experience is likely have some impact on moral

development, but both Kohlberg and Gilligan seem to have over-emphasized the role of gender and under-emphasized the influence of culture and social norms.

Subsequent work has suggested that, as with Kohlberg's model, when moral reasoning is conducted on hypothetical dilemmas based on justice, children of both genders were able to separate their emotions and use their reasoning to make moral judgment (Haidt, 2001). Because children were dealing with hypothetical dilemmas, they were able to separate their personal feelings and were able to think logically before making moral judgments. Similarly, with Gilligan's model, where moral reasoning is conducted on real-life dilemmas, children of both genders were more likely to feel emotions first, which affected their moral judgment because their judgment derived from those emotions. (Haidt, 2001) Because children had to make moral judgments based on their real-life dilemmas, the dilemmas may have felt more personal and hence involved more emotion. According to David Hume, "a person should not behave only with reason, one has to have some sentiment towards human life". (Haidt, 2001)

Two of Gilligan's supporters, Skoe & Gooden (1993), found that male and female adolescents aged 11-12 do indeed make different moral decisions when dealing with real-life dilemmas as opposed to hypothetical dilemmas. Their results showed that girls are more care-oriented than boys, but this may reflect the fact that the girls in their study were more oriented toward real-life dilemmas than hypothetical dilemmas. Differences in motivation remained, but differences in actual moral decisions were smaller. That is, girls made choices to get approval from others, whereas boys were more concerned about not getting in trouble and showed higher egocentrism when they made choices, but both boys and girls made decisions that were strongly influenced by their relationships with their peers.

Kohlberg's and Gilligan's models for moral judgment are very different in their treatment of emotion. Kohlberg developed a rationalist model where moral judgment is based on moral reasoning: "reasoning ultimately makes the decision" (Haidt, 2001). Gilligan was focused on gender differences in developing her "ethics of care." Subsequent theorists have moved toward what they call a social intuition model, where

moral judgment occurs quickly and automatically based on social, cultural, and psychological background, and moral reasoning comes after these emotions. In this model, “moral judgment is caused by moral intuition first and moral reason second” (Haidt, 2001).

Thus, this study will rely on the social intuition model, using the assumption that moral judgment occurs quickly and automatically based on social, cultural, and psychological background, and moral reasoning comes after these emotions. This study will also assume that early adolescents primarily react to their emotions rather than think logically before they act, and that their moral behavior will be strongly affected by their peers because they want to be accepted by the group that they associate themselves with. Due to the small sample size, this study will not study the potential gender-based differences in the motivations behind their moral reasoning, focusing instead on the ways that both groups are strongly influenced by the social norms of their peer group.

The most significant change in moral reasoning that comes with increasing maturity is when children begin to navigate contradictions between social groups—that is, they begin to consciously explore gaps between family-based moral beliefs, peer beliefs, and their own life experience (Feldman, 2016). The social intuitionist model is more appropriate for Social Emotional Learning since SEL requires children to make moral judgement based on their emotions and intuition first and their moral reasoning second.

Chapter 3: SEL

The combination of cognitive and moral development underlies the development of social emotional learning, which is defined as “the process of developing the self-awareness and self-control and interpersonal skills that are vital for school, work, and life success” (Committee for Children, 2021). This project explores the viability of using gamification along with story-based scenarios in order to support social emotional learning. This chapter reviews some of the prior research about the relationship between gamification and learning.

Social-Emotional Learning

As interest in adolescents’ psychological well-being has increased during recent years, it has become increasingly evident that early childhood psychological well-being directly influences adult psychological well-being. As stated earlier, early adolescents often react based on their emotions without immediately thinking about the consequences of their actions, due to the early developmental stages of their prefrontal cortexes. Because adolescents mostly lack life experience, they often do not know how to deal with new emotions or with the new social situations that they start to experience. Repeated failure to deal with these situations can eventually lead to emotional disorders. SEL is intended to prevent children from developing emotional disorders. By helping adolescents understand their new experiences and by guiding them to make responsible decisions, including learning to seek help from someone in their social circle, whether peers, older siblings, teachers, counselors, or parents, adolescents are enabled to make better life decisions as they face new challenges. Neth, Caldarella, Richardson & Heath (2020) stated, “One of the most critical challenges for schools is teaching adolescent students positive social and emotional skills, which are crucial for them to succeed academically and emotionally.”

These researchers estimated that as many as “one-fourth of youth between the ages of eight and 15 have a mental health disorder” (Neth et al. 2020). According to Neth et al. (2020), students who exhibit Emotional Behavioral Disorder (EBD) tend to perform poorly academically and have difficulty establishing relationships. There are two types of

EBD behaviors that can have negative impacts on adolescent well-being: externalizing and internalizing. Students with externalizing behaviors show signs of physical hostility and have destructive behaviors. They show their frustration outwardly; for example, they may get into fistfights or destroy objects. Students with internalizing behaviors are withdrawn and tend to be loners. They internalize their feelings and direct their frustration at themselves. These students often develop low self-esteem, depression, or anxiety, and may resort to substance abuse. Neth et al. stated that including SEL lessons into the curriculum is beneficial in helping children to deal with challenging situations socially and emotionally: “Consistent, safe, and positive school environments are critical for helping students learn tools to deal with externalizing and internalizing symptoms” (Neth et al., 2020).

Additionally, Neth et al. evaluated the Strong Kids knowledge test after students have completed the SEL curriculum: “Strong Kids is an evidence-based SEL program designed to prevent internalizing symptomatology by promoting social and emotional wellness and coping” (Neth et al., 2020). They found that this program improved students’ social-emotional skills, although not as much as they had hoped. However, Strong Kids is designed to help to internalized behaviors and does little to address externalized behaviors.

Motivation for Learning

It is important to understand the developmental stages for early adolescents and understand their cognitive processing abilities in order to develop an SEL curriculum that fits the students’ level of understanding: “It is recommended that parents and teachers challenge the child’s abilities, but do NOT present material or information that is too far beyond the child’s level” (Huitt & Hummel, 2003). Children who have high self-confidence perform better academically than those who have low self-confidence. According to Bandura (1993), “a person with the same knowledge and skills may perform poorly, adequately, or extraordinarily depending on fluctuations in self-efficacy thinking.” Their thinking about self-efficacy is affected by how they perceive their own abilities. Bandura separates children into two primary groups. One group believes that

they acquire knowledge by learning. This group is not afraid of challenges and is not afraid to make mistakes. When they do make mistakes, they think of this as a learning process. This group has a “highly resilient sense of personal efficacy” (Bandura, 1993). The second group believes that you are born with intelligence. This group is afraid of challenges and prefers easy tasks that they know they will succeed at because if they fail, that will prove that they were not born with intelligence. When faced with challenges, this group performed relatively poorly: “their perceived efficacy plummeted as they encountered problems” (Bandura, 1993). Children who perform well under challenging situations have high self-esteem, “high self-esteem is related to parental approval, peer support, adjustment, and success in school” (Steinberg & Morris, 2001). Although children’s self-esteem varies every day during early adolescence, it becomes more stable as they become adults; therefore, they need consistent support and encouragement from their environment during their early years.

In order for adolescents to learn how to deal with their emotions and how to deal with difficult social situations, an SEL program that deals with choices and consequences can teach young adolescents to make better decisions by using *operant conditioning* where they can learn to respond more positively in the future depending on the positive or negative outcomes during their learning.

Storytelling to Enhance Learning

Storytelling is an effective teaching tool because it’s entertaining and can enhance student’s motivation to learn. Also, when storytelling is accompanied by lessons, it’s easier for students to connect, relate their own experiences, and learn from the characters inside the story “we learn to make sense of our world through stories” (Aleterio, 2002). According to Aleterio (2002), storytelling can be used to convey information, express view, share experience, entertain, and connect with others. Storytelling can increase collaborative and reflective learning by reading a story about a character and reflecting on the choices that the character makes; one can relate themselves to the character and their choices. For example, when someone tells a story about their experience and the choices that they made, one can think about the story and relate to that person’s problem

and their choice to solve the problem, thereby, learning about themselves at the same time. “Storytelling also has the capacity to support and enhance the relationship between students creating new knowledge and learning from other.” (Aleterio, 2002). According to Di Blas (2022), storytelling coupled with multimedia can help students to express their own views and their identities. “Digital storytelling has been connected to benefits of various kinds: self-expression, communication skills, media literacy and – quite expectedly – creativity.” (Di Blas, 2022). For example, when students were tasked to use digital photography to tell stories, it enhanced the students’ motivation to complete the task. Di Blas (2022) also suggested that, when designing an educational technology, designer should design a tool that offers clear path and a wide degree of freedom, leave the pedagogy experience to the teachers, and keep the technology simple.

Gamification as a Learning Tool

Gamification in education means incorporating a game element to teach a learning objective, in the hope of making the learning experience more fun and more engaging—in other words, more like a game. It does not need to be a typical game that children typically play for fun: “The concept of gamification is different from that of an educational or serious game.” (Dicheva, Dichev, Agre & Angelova, 2015). Gamified educational tools are used to motivate students and to increase engagement during the learning process: “The purpose of using gamification in education is to motivate and engage students, to improve their performance and training, and change undesired behaviors” (Toda et al., 2019). However, choosing the right gamification elements to help students learn what is intended for them to learn (i.e., learning objective) is still challenging. It is vital to choose the right game element that would support the learning objective, “while the concept of gamification may look simple, the analyzed work demonstrates that gamifying learning effectively is not” (Dicheva et al., 2015). Mohammed and Ozdamli (2021) found that using gamification increases students’ engagement in learning activities. Students attitude towards learning activities changed in a positive ways when they were using gamified educational tools “the study found that the pleasantness components of gamification apps such as entertainment, amusing and

emotive fulfilment also inspired students to participate more in learning activities” (Mohammed & Ozdamli, 2021). They also found that using badges, levels, feedbacks, points, and leaderboard to be the most effective element to motivate students to participate in learning process “the study also discovered that marks and responses or in other words “points and feedbacks” were the two most essential components of gamification that motivates students” (Mohammed and Ozdamli, 2021)

Gamification Design Principles

For this project, the use of gamification is driven by the insight that, according to Information Processing theory, children can process information more efficiently as they gain more experience. Multimedia SEL education, where students make choices and see the consequences, may allow them to gain more experience dealing with the emotional and social challenges they face every day. Dicheva et al. (2015) describe five design principles that can be used in gamification in educational contexts: “the most used gamification design principles in an educational context are visual status, social engagement, freedom of choice, freedom to fail, and rapid feedback.” They further described gamified elements such as

- goals – challenges and quest with a clear goal
- customization – personalized experiences
- feedback – immediate feedback, competition, accrual grading – visible status/points/leaderboards, access/unlocking content
- freedom of choice – multiple routes to success
- freedom to fail – multiple attempts
- Storytelling
- new identities/role – avatars
- time restriction – countdown clock.

For SEL education, where students have to assess the situation and think about making the best choice, gamification elements such as competition, new identities/roles, and time restrictions will not work. Most moral behavior requires a focus on social responsibilities, making competition inappropriate. New identities/roles will not work because we want

students to think about the moral decisions that they actually face in real life. Time restriction will not work because we want them to think through their decisions rather than rush to make a choice.

However, utilizing goals, customization, feedback, accrual grading, freedom to choose and fail, and storytelling will be suitable for SEL education. Providing a clear goal and giving a student a choice to complete a task is a way to customize the lesson. The context of the lesson will be personalized with the outcomes of their personal choices that connect to the storytelling element. Dicheva et al. (2015) also recommend giving a fast response, rather than a delayed response, to let students know the results of their actions. The feedback element will work since students need to see the consequences of their choice. Accrual grading will give them points to let them know how well they did. This provides feedback and will motivate them to look for the best choices next time around.

Multimedia game

The goal of this project will be to develop a multimedia game where students go through a journey. During this journey, they are put in a situation where they have to make choices and see the consequences of their choices. The situations will include times when they have to identify what they are feeling and then choose to behave in the best way they can think of. Their choices will take them to the next step, where they get immediate feedback by seeing the consequences of their choice. Students receive a cumulative number of stars based on the quality of their choices. Feedback will also be provided by “Owl the Wise,” an owl icon that will appear at the end of each journey. It would give praise if they made the best choice. If they did not make the best choice, it would offer advice on the best choices they could have made. Incorporating Vygotsky’s theory, children will be in the zone of proximal development while they are making choices. However, one of the available choices will be to ask an adult for help if they need help making decisions. There will be two sets of comparable journeys to see if students have learned from the first set of journeys, thus incorporating Piaget’s assimilating and accommodating theory. And as in information processing theory,

Gamified Social-Emotional Learning

21

repeating these journeys over time will give students more experience, enabling them to recall these experiences more efficiently in the future.

Chapter 4: Methodology

The goal of this study is to develop a gamified SEL educational product that can help middle school students recognize their emotions and make better choices when faced with challenging situations. Gamification is used to enhance their participation and stimulate their learning process. A qualitative method was used to observe the participant's behavior, and an interview was conducted to understand their choices. Their experiences were collected and analyzed to see if the participants learned to make better choices the second time around after experiencing the first hypothetical scenarios.

Scenarios were presented in the form of three questions and outcomes in order to constitute a "journey." The participants played a game that consisted of 10 journeys. The second set of five journeys explored the same sorts of situations that were covered in the first set of five journeys. The scores, or number of "stars" collected by participants in the first five journeys was compared to the scores for the second set of journeys, to see if they learned from their previous experience and see if they would make better choices the second time around. In each journey, they had to recognize their emotions, identify the problems, and set goals to solve the problem. Every time they made a choice, they could see the consequences of their choices, and they received advice from Owl the Wise. Owl the Wise's purpose is to advise the users so that they can make better choices for the second set of scenarios. The participants earned stars in three skills categories: self-management, relationship, and social awareness.

Collaborative for Academic, Social, and Emotional Learning (CASEL) is a network of academics, teachers, and policy makers dedicated to Social/Emotional Learning for K-12 students. This organization describes social-emotional competencies in five categories: Self-Awareness, Self-Management, Social Awareness, Relationship Skills, and Responsible Decision Making (Haggerty, Elgin & Woolley, 2011). Given the time constraint, this game will deal with three of these skills categories: self-management, relationship, and social awareness. Participants earn stars based on these three categories; however, they will be making choices in the game that will hopefully

lead to more responsible decision-making based on their exploration of the consequences of their choices. The journeys, the proffered choices, and the projected outcomes for each choice were based on CASEL's Social Skills Improvement System Rating Scales (SSIS-Rating Scale) (Haggerty et al., 2011). This allows the journeys to measure the participants' choices in the areas of communication and cooperation assertion, responsibility, empathy, engagement, and self-control skills. The journeys will also explore the choice to externalize or internalize particular problem behaviors.

In self-management, participants must make responsible decisions and exhibit self-control to manage their emotions effectively. In the relationship, they must decide the most positive way to deal with relationships, which involve communication, cooperation, and engagement. In social awareness, they must make choices based on empathy and assertion.

In the game, the first thing that users had to do when encountering a challenge was to express their feelings. Users received 1 star for expressing their feelings because all feelings are valid, and there are no right or wrong answers. Second, they must assess the problem, and the highest number of stars were given for positive thinking and for accurately assessing problems. Third, they must act to resolve the issue, and they earned the highest number of stars for choosing the outcomes that were safest, that helped to preserve emotional health, and that would enable them to achieve their goals. Each scenario was presented as a journey, and participants collected stars in each step to see how many stars they collected in each journey and throughout the game. After they completed all ten journeys, participants got a final score of all the stars they earned in each journey.

The original intention was to allow participants to see their strengths and weaknesses in each topic area, or skill. Participants earned stars as they completed each journey. They earned two stars for the best choices, 1 star for the second-best choices, and the worst choice is 0 stars. The best scores they can get for each journey were 5 out of 5, and the worst scores they can get for each journey were 1 out of 5. The final scores total all the stars earned by participants throughout ten journeys. The best scores they can

get for self-management and social awareness were 20 stars each. The maximum number of stars available in the category of relationships was 10.

Participants

Early adolescents between 12-14 years old were recruited. There were 10 participants, six girls and four boys. However, two boys ended up being outside the desired age range; one boy was 15 years old, and one boy was 11 years old. Their scores were not added to the results. Therefore, the scores of only six girls and two boys were added to the results. The convenience sampling was used to recruit users by networking from friends, family, and co-workers. The recruited users are representative of the middle school population within the age range, and few selected students were chosen to represent this population. Etikan, Musa & Alkassim (2016) stated that convenience sampling is often used by researchers because the test subject is easy to recruit, and they represent the needed population. Since it is not possible to include all population, these users were chosen because they meet the age range, and they currently attend middle school. Their opinions were collected to see if this game was enjoyable, and if this game have help them to make better choices during the second set of the game. However, this convenience sampling does pose few limitations in this study, which I will discuss later in a separate section in this paper. These few selected users were easily accessible regardless of their location because the test was conducted through using Zoom.

Testing was done remotely and was recorded using Zoom while the users were in their home environment. Parents were present and were sitting next to the participants from start to end of the session. The sessions took about 30 to 45 minutes, depending on the participants' speed. Testing was conducted during their free time and they were in a relaxed mood. Parents were asked to refrain from giving their opinions or advice during the session. However, with the parents in the room, their body language may have influenced the children, but the emotional nature of the content made it important for the parents to be present. Participants were asked to play the game. They were asked to speak aloud while playing the game, and to talk about their thoughts and why they were making those choices. Think-aloud method was used because this was the best way to find out

their thought process while they are making decision, “the method has high face validity, since the data obtained reflect the actual use of an artefact, and not the participants’ judgements about its usability.” (Van Den Haak, De Jong & Jan Schellens, 2003) By having them speak about their thoughts, we can find out if they are making different choices during the second set of the game.

Some questions were asked after the participants finished playing the game. Post-questionnaire was used to gather more information, and to have more in-depth discussion about their opinions. According to Powe, Garrod & McMahon (2005), post-questionnaire in qualitative method is essential in understanding the participants thought process and their motivation. Powe et al (2005) stated that by learning this information, we can identify any design flaws, and gain better understanding in the products value. The first question was did they feel like Owl had anything helpful to say. The purpose of this question was to see if participants felt like they had learned anything based on the consequences of their choices. They were asked if any of the game’s journeys felt similar to issues they might face in real life. The purpose of this question was to see if the journeys in this game were appropriately selected. These answers helped to measure if participants found this game to be helpful. They were also asked if the star scoring helped them to understand their strengths and weaknesses. Finally, participants were asked to rate their enjoyment of the game on a scale of 1 to 5, one being boring and five being enjoyable. The purpose of this question was to find out if this game was enjoyable enough that students would be motivated to complete more journeys. They were also asked if they would change anything about the game to make it better, to see if any improvements can be added to the game.

Script before the test

You have enrolled in an online school. One of the curriculums is a Social-Emotional Learning class. In this class, you will be playing a game where you must make choices.

1. Explore this game and speak aloud about anything that comes to your mind.
2. Talk about why you are making each of your choices.

Remember, there are no right or wrong answers, just your opinion, and your opinions are valued. To parents – Please refrain from giving any advice or opinions. It is important to see the child's choices without any guidance.

Interview questions after the test

1. Did you feel like the owl had anything helpful to say? If not, can you help me understand the reasons why you made a different choice in the later journeys?
2. Did any of the journeys in the game feel similar to issues you might face in real life? If so, can you tell me about that? If not, do you have any ideas about what would make the journeys feel more realistic?
3. What did the stars tell you about your performance in the game?
4. From 1-5, 1 being boring and 5 being enjoyable, how would you rate this game?
5. If anything, what would you change about this game?

Chapter 5: Results

The results were analyzed based on observing 8 participants. Scenarios 1 and 6, 2 and 7, 3 and 8, 4 and 9, 5 and 10 were compared. The quantitative results were mixed with only modest improvements; however, the qualitative feedback discussed in the final section of this chapter was encouraging.

In the category of self-management, journeys 1 and 6 posed similar scenarios in which participants do not have enough time to complete a given work. The results were positive in that the overall scores for journey 6 were higher than the overall scores for journey 1. The 25% who assessed the problem poorly and had negative thoughts successfully assessed the problem and had more positive thoughts on the second scenario. However, the actions chosen by the participants in the two scenarios did not show clear improvement. The 75% who chose to get help for the first scenario chose not to get help in the second scenario, even though getting help in a difficult situation is considered an emotionally wise choice. In journey 6, only 37.5% (2 participants) chose to get help. However, the 25% who chose not to do the work in journey 1 did choose to do the work for the second scenario, so that for journey 6 there were six participants (62.5%) who chose to do the work even if they would be unable to finish the work. This indicates that the feedback from “Wise Owl” may not have been clear enough to reinforce good choices or guide future choices appropriately.

A second set of journeys posed questions related to self-management: journeys 4 and 9 posed similar scenarios where participants could not do something with their friend. Results for journeys 4 and 9 were also mixed. The 12.5% who assessed the problem inaccurately in the first scenario actually increased to 25% for the second scenario. However, 100% chose a successful solution to the problem the second time around. Assessing the problem with positive thoughts decreased but successful solutions to the problem increased.

Table 1

Self-management

	0 star	1 star	2 stars	Improved
Journey 1 – assess	25%	0%	75%	
Journey 6 – assess	0%	0%	100%	Yes
Journey 1 – solve	25%	0%	75%	
Journey 6 – solve	0%	62.5%	37.5%	No

	0 star	1 star	2 stars	Improved
Journey 4 – assess	12.5%	0%	87.5%	
Journey 9 – assess	25%	0%	75%	No
Journey 4 – solve	0%	12.5%	87.5%	
Journey 9 – solve	0%	0%	100%	Yes

In the area of relationships, journeys 2 and 7 posed similar scenarios about encountering problems with their friends. In these two journeys, there were questions that asked participants to assess the situation and to choose actions to resolve the situation. Participants did noticeably better in journey 7 about assessing the situation positively and accurately: the number of participants receiving the maximum points for these questions increased. Only 50% had positive thoughts in the first scenario, but it increased to 100% in the second scenario. However, the quality of the solutions to the problem decreased in

journey 7. In journey 2, 100% chose to speak to friends directly when they had a problem with a friend, but this number decreased to 75% in journey 7.

Table 2

Relationships

	0 point	1 point	2 points	Improved
Journey 2 – assess	12.5%	37.5%	50%	
Journey 7 – assess	0%	0%	100%	Yes
Journey 2 – solve	0%	0%	100%	
Journey 7 – solve	0%	25%	75%	No

In the category of social awareness, journeys 3 and 8 posed similar scenarios where characters must deal with bullies. For journeys 3 and 8, the users' successful assessment of the problem by deciding to seek help from an adult (generally the safest response to bullying) increased from 62.5% to 87.5%. Participants solutions to the problem also improved. 50% chose to tell an adult for journey 3, and this numbers increased to 87.5% for journey 8.

Journeys 5 and 10 also fall into the category of social awareness, and they posed similar scenarios in which characters must deal with a friend who is in trouble. In journey 5, the friend struggled with alcohol; for journey 8, the friend struggled with serious depression. 100% of participants chose the best possible answers for journey 5, thereby earning perfect scores in journey 5. This result suggests that these participants are well-prepared and knowledgeable about how to respond to serious or dangerous situations involving alcohol. However, only 87.5% chose the best possible choices for journey 10, the scenario about serious depression, which is a lower score. It seems likely that participants have previously encountered some training about how to respond to

situations involving alcohol but are less familiar with the seriousness of depression and are less prepared to choose good solutions.

Table 3

Social awareness

	0 point	1 point	2 points	Improved
Journey 3 – assess	0%	37.5%	62.5%	
Journey 8 – assess	12.5%	0%	87.5%	Yes
Journey 3 – solve	0%	50%	50%	
Journey 8 – solve	0%	12.5%	87.5%	Yes

	0 point	1 point	2 points	Improved
Journey 5 – assess	0%	0%	100%	
Journey 10 – assess	12.5%	0%	87.5%	No
Journey 5 – solve	0%	0%	100%	
Journey 10 – solve	12.5%	0%	87.5%	No

When comparing the total scores of the participants, half of the participants received the same number of total points in the first five journeys as they did in the last five journeys. For three participants, their scores improved in the second set of journeys. For one participant, the score decreased for the second journey.

To break it down further, for self-management, participants earned identical scores 50% of the time, improved 25% of the time, and were worse 25% of the time. For relationships, participants earned identical scores 25% of the time, improved 50% of the time, and did not improve 25%. For social awareness, participants earned identical scores 62.5% of the time for social awareness, improved 25% of the time, and got worse for 12.5% of the participants.

Table 4

Overall improvement per participant

	Journey 1&6 Self- management	Journey 4&9 Self- management	Journey 2&7 Relationship	Journey 3&8 Social Awareness	Journey 5&10 Social Awareness
Participant1	5/5 & 4/5	5/5 & 5/5	5/5 & 5/5	3/5 & 5/5	5/5 & 3/5
Participant2	5/5 & 4/5	5/5 & 5/5	4/5 & 5/5	4/5 & 5/5	5/5 & 5/5
Participant3	3/5 & 4/5	5/5 & 5/5	4/5 & 5/5	3/5 & 4/5	5/5 & 5/5
Participant4	5/5 & 4/5	5/5 & 5/5	3/5 & 5/5	5/5 & 5/5	5/5 & 5/5
Participant5	5/5 & 5/5	5/5 & 3/5	4/5 & 5/5	5/5 & 5/5	5/5 & 5/5
Participant6	5/5 & 5/5	5/5 & 5/5	5/5 & 5/5	5/5 & 5/5	5/5 & 5/5
Participant7	1/5 & 4/5	2/5 & 3/5	5/5 & 4/5	4/5 & 3/5	5/5 & 3/5
Participant8	3/5 & 5/5	5/5 & 5/5	5/5 & 4/5	4/5 & 5/5	5/5 & 5/5

Table 5

Total stars earned in each category

	Self-management	Relationship	Social awareness
Participant 1	19 out of 20	10 out of 10	16 out of 20
Participant 2	19 out of 20	9 out of 10	19 out of 20

Participant 3	17 out of 20	9 out of 10	17 out of 20
Participant 4	19 out of 20	8 out of 10	20 out of 20
Participant 5	18 out of 20	9 out of 10	20 out of 20
Participant 6	20 out of 20	10 out of 10	20 out of 20
Participant 7	10 out of 20	9 out of 10	15 out of 20
Participant 8	18 out of 20	9 out of 10	19 out of 20

Debriefing Questions

Question 1: Did you feel like Owl had anything helpful to say? Three participants read all or most of Owl's advice and thought it was helpful, and sometimes made different choices based on Owl's advice. Four participants read most or some of the Owl's advice but did not feel like Owl's advice was helpful or affected their decisions in subsequent journeys. One participant did not notice Owl's advice, and therefore did not read it. One participant has already had a social/emotional learning curriculum in school, and she actually had a perfect score in all categories. This participant attends school in Germany and her school teaches SEL. This participant read Owl's advice but did not feel that his advice affected her choices.

Question 2: Did any of the journeys in the game feel similar to issues you might face in real life? If so, can you tell me about that? All participants felt that the issues in the game were realistic. Six participants have experienced all or most of the issues in real life. Two participants have not experienced any but felt that they would face those issues in real life someday.

Question 3: What did the stars tell you about how you did in the game? Three participants did not notice the stars at all during the progress of the game. The stars were located on the bottom of the page throughout the journey. Two of the participants noticed the stars but the stars showed them how many questions they answered so far. That is, these participants interpreted the stars as a progress bar. Only one participant noticed the stars and understood that they were collecting stars in each category as they progressed.

Because most participants did not notice or did not understand the stars, this gamification element likely did not contribute to the participants' satisfaction with the game.

All participants thought the final scores helped them see their strengths and weaknesses in each category.

Question 4: 1 being boring and 5 being enjoyable, how would you rate this game? When asked for their enjoyment level, 3 participants gave it a 5, 4 participants gave it a 4, and 1 participant gave it a 4.5. Most of the reasons were that they thought it was fun because the game made them think about what they would do if a particular scenario happened in real life, and they felt that it was helpful to think about these situations. Some of the comments were that they liked seeing the results of their choices written in words. Participants also enjoyed the final score, where they could see how well they did in overall performance. They liked the fact that they were able to see the areas they were good at and see the areas they need to improve.

Question 5: what would you change about this game? Most participants wanted more choices or an area to write their choice if the given choices do not reflect their own. They also wanted Owl to be more noticeable and to provide clearer advice, and they wanted to see a clearer narrative outcome before making more choices. Given the importance of narrative in understanding moral dilemmas, it makes sense that this element of the prototype needed to be expanded.

Chapter 6: Discussion

Although the raw results show that students improved slightly in each of the three categories of social-emotional skills addressed in the game, these improvements are too small to be statistically significant. At the same time, the results show clear errors in the user interface that caused participants to miss essential parts of the learning process. However, utilizing the game element to teach SEL skills was promising because all the users found the game enjoyable and helpful. Users stated that the game made them think about the problems and think about their choices throughout the game. The game also reminded them of times when they were faced with some of the issues in real life. Some reacted based on negative emotions and therefore experienced harmful consequences. They recalled that experience and used the game to think more logically about their choices and to make different choices in the game to see if these choices led to better consequences. The premise of this game was to allow students to explore various choices, including choices that may lead to negative consequences, so that students could learn from their mistakes in the game rather than in real life.

Based on Information processing theory, repeating experiences will help children recall that experience and is likely to help them improve their decision-making process. Although this project was inconclusive, the participants' positive response to playing the game, and their willingness to play it again suggests that these sorts of games are worth further exploration.

The next steps would be to improve the game based on the feedback from this first group of participants, which would involve improvements to the visual interface (the placement and explanation of the stars), adding more narrative elements to the feedback/results of student choices, tightening the narrative relationship between student choices and narrative results, and highlighting the Owl's advice by giving the advice its own screen. It was also clear that the clarity of Owl's advice should be improved through testing.

The SEL game helped users recognize their feelings by speaking about their feelings when faced with given challenges. It also helped them to put themselves in a situation and see the choices that they would make in that situation. It continues to be possible, therefore, that playing the game may help students gain some of the experience they need to create healthy relationships and help increase their social awareness.

The results also showed that the participants who have not experienced any of the given issues in real life and who read Owl's advice were more likely to make more successful choices the second time as compared to the participant who did not read Owl's advice. Vygotsky theorized that children learn from a more experienced peer or an adult. The Owl played the advisor role and gave them advice to make better choices the second time around. Results also showed that students who had already experienced some of the given issues were also more likely to choose successful answers—presumably because they have already experienced similar situations and experienced the consequences.

The game needs three critical improvements in user interface design. First, some students wanted to see a clearer narrative consequence from their choices before moving on to making more choices. During the journey, one screen is for users to identify the problem, and the following screen has a consequence written on top of the screen with more choices for them to solve the problem. However, this consequence needs to appear on its own screen, and should be customized based on the student's choices. Thus students can experience various paths through the narrative based on their choices. When students identify the problem, future iterations of the game will have a dedicated screen that shows the narrative consequences with supporting images. Adding a clear consequence page that is separate from the page showing the next set of choices will help players focus on the interim outcome, rather than moving too quickly to focus on their next set of choices. Separating a consequences page and the choice pages will give players a clear break between identifying a problem and solving a problem, and help them connect their choices with narrative consequences. Experts in SEL should be involved in developing these narratives, to ensure that the messages of the game are appropriate.

Second, some participants skipped or glanced over the Owl's advice. When they saw that Owl said "excellent," they knew they made the right choice, but some did not read to see why they made the right choice. However, the Owl's advice needs to be more effective in helping students learn *why* their choices were or were not optimal. Improving Owl's advice could involve focus groups and experts in SEL. To make the Owl more visible, the game could have a dedicated screen for Owl's advice. When users reach the end of the journey, the next version of the game will add a screen with the Owl with slight head movement and the sound of "hoo," with a button that says, "get advice from Owl the Wise." This way, users can focus on Owl's advice before moving on to the next journey

There are also some interface improvements to be made. Based on the user testing results, most students did not know the purpose of the stars in each journey/scenario. The purpose of the stars is to show them how well they did on that journey. Incorporating a movement and sound may be more effective for displaying those elements that the users dismissed. The users did not notice that the stars increased depending on their choices at the bottom of each journey. To make this element more visible, when users make choices, the stars they earned can fly out from the button accompanied by a sound. Then stars can move to the bottom of the screen and the number of stars will change. This solution will be more visible than having the numbers simply update at the bottom of the screen.

Chapter 7: Conclusion

In conclusion, this study found that using game elements in SEL was promising because participants found it enjoyable and helpful, even though the players did not show marked progress over the course of a single instance of playing the game. This game held the user's attention and engagement using a storytelling journey that invites users to make choices. This study also found that participants who read Owl's advice did tend to make more successful choices for the second similar experience, although this difference was not statistically significant. Speaking aloud about their thoughts and feelings, and seeing the possible choices written in words, helped them make more successful choices. The benefit of life experiences was confirmed by the fact that participants made better choices when they had already experienced a similar situation or negative consequence in real life. If students can learn from game situations and apply this experience in real-life situations, students are likely to experience fewer negative outcomes. Thus, it remains hopeful that by playing this game, students can learn better coping skills that will aid in their overall well-being as they transition from childhood to adulthood.

Limitations of this Study

The results of this study are primarily limited by the small sample size and by the lack of time for iterative development of the game. This study should best be seen as a pilot study. Another limitation is that all the participants are from a higher socioeconomic class, and some attend private schools. All participants had parents who were well educated, supportive, and involved with their children's lives. According to Steinberg & Morris (2001), children who grow up in a supportive environment have an advantage over children from non-supportive environments when it comes to social-emotional development. Children from lower socioeconomic homes may make different choices than children from higher socioeconomic backgrounds, and may need different levels of support.

The study participants also skewed female. Although four male participants were recruited, only two male participants' results were included in the analysis because the other two male participants did not meet the target age range. Because of the small number of male participants, the test results could not measure the effectiveness of this game across gender differences. Although the testing did confirm that both male and female participants made decisions based on similar aspects of moral reasoning in real-life dilemmas, testing more male subjects would be beneficial.

The journeys/scenarios in this game also failed to include much examination of internalizing vs externalizing behaviors. Most of the choices available for participants to choose were associated with internalizing behaviors and the game did not present enough externalizing behavior choices. Some of the choices included deciding not to speak out and internalize the problem. Adding more choices where participants decide to act out their frustrations may provide opportunities to explore the consequences for externalizing behaviors.

Further Work

Further study is needed to see how effective this game would be for children from different socioeconomic households. It would be beneficial to conduct testing on children from lower socioeconomic homes to see their test scores compared to the tested group. Also, the next version of the game should add more choices for externalizing behavior so that children who are more prone to internalizing symptoms vs externalizing symptoms would have an opportunity to explore potential consequences and alternatives to externalizing. It would be also helpful to find out if males and females have similar or different responses to the game, and to see if additional adaptations need to be made in order to meet the needs of both genders.

Most of all, further work would need to expand the content available in the game, involving SEL experts in expanding narrative consequences and the advice provided by OWL. Further testing would be needed to determine whether or not students would continue to find value in the game over time. Most of all, further testing would be needed

Gamified Social-Emotional Learning

39

to find out whether or not improvement in their choices in game successfully transfer to their choices in real life.

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Appendix A: Game Scenario

Intro

Welcome

You make choices every day, and the choices you make define who you are.

Collect stars as you make choices along the journey.

At the end of each little story, you will get some advice from Owl the Wise!

Journey 1 (new scenario) – self-management

Scene 1

You have a test next week. It's your least favorite subject, and you have been avoiding it, so you are behind.

Recognize how you feel (all feelings are important, so users get 1 star for self-management for expressing their feelings)

I feel - blank space for users to talk about their feelings

Scene 2

You have not been keeping up with your studying because...

3 choices for defining the problem

Choice 1: I will never be good at it (0 stars)

Choice 2: I didn't spend enough time studying. (2 stars for self-management)

Choice 3: I don't care very much about that subject (0 stars)

Scene 3

Now you really have to catch up with studying for the test, so you...

3 choices for setting a goal to solve the problem

Choice 1: Call a friend or a classmate who likes that subject, and ask to study together (2 stars for self-management)

Choice 2: I'll get to it later. (0 stars)

Choice 3: tell my parents that I don't feel confident about the test and ask them what I should do. (2 stars for self-management)

Scene 4

Consequence/advice

Advice 1: Excellent choice! You can get help from your friend/classmate when you study together.

Advice 2: It's good to reach out for help and advice. Is there anyone else who might be able to help you?

Advice 3: It might be a good idea to set a time to study with someone who can help you. Studying with a friend is easier than studying by yourself.

Journey 2 (new scenario) – relationship

Scene 1

Your best friend started hanging out with a different group. You asked your friend to hang out with you, but your friend started ignoring you.

Recognize how you feel (all feelings are important, so users get 1 star for relationship for expressing their feelings)

I feel - blank space for users to talk about their feelings

Scene 2

Your friend is ignoring you, so you think...

3 choices for defining the problem

Choice 1: I should ask other friends why my best friend won't hang out with me (0 star)

Choice 2: I should ask my best friend why they are ignoring me (2 stars for relationship skills)

Choice 3: I should just accept that our friendship is getting weaker (1 star for relationship skills)

Scene 3

You still don't know why you are being ignored, so you decide to...

3 choices for setting a goal to solve a problem

Choice 1: make new friends. (2 stars for relationship skills)

Choice 2: delete my friend from my social media and tell everyone how mean they are (0 star)

Choice 3: let my friend know how I feel (2 stars for relationship skills)

Scene 4

Consequence/advice

Advice 1: Excellent choice! It's always good to let your friends know how you feel. Who knows, maybe there was a misunderstanding between you two.

Advice 2: Making new friends is always a good idea. It's also good to let your friend know how you feel, just in case there was any misunderstanding.

Advice 3: Saying mean things makes everyone unhappy. Besides, it might be a good idea to let your friend know how you feel before you stop being friends. Maybe it's just a misunderstanding!

Journey 3 (new scenario) – social awareness

Scene 1

You see a group of students bullying another student.

Recognize how you feel (all feelings are important, so users get 1 star for social awareness for expressing their feelings)

I feel - blank space for users to talk about their feelings

Scene 2

When you see someone being bullied, you think...

3 choices for defining the problem

Choice 1: I don't want to get hurt. But maybe my friends can back me up and we can tell the bully to stop without any fighting. (1 star)

Choice 2: I need to find a teacher to stop the bullies (2 stars for social awareness skills)

Choice 3: I don't want to be their next target. I should stay out of it and not say anything. (1 star for social awareness skills)

Choice 4: The person getting bullied looks sad. Maybe I could talk to them later. (1 star)

Scene 3

You see that the student is in trouble, so you decide to...

3 choices for setting a goal

Gamified Social-Emotional Learning

46

Choice 1: tell the bullies to stop and threaten to hit them. Show them what it feels like! (0 stars)

Choice 2: find a teacher or a counselor and tell them about what I saw (2 stars for social awareness skills)

Choice 3: stay far away from the bullies so that they never bother me. Don't say anything about what happened. (0 stars)

Choice 4: make sure the bullied person knows that I will be their friend. (1 star)

Scene 4

Consequence/advice

Advice 1: Excellent choice! It's always good to remove yourself from the situation and report to an adult immediately.

Advice 2: It's good to remove yourself from the situation, but you should always let an adult know immediately.

Advice 3: It would be better to get help from an adult instead of starting a fight. You might get hurt or make things worse.

Advice 4: It's good to help the person who is bullied to feel better. But you also need to tell an adult about the problem.

Journey 4 (new scenario) – self-management

Scene 1

You and your friend used to play video games after school. Your friend started playing sports activities after school and making new friends. You sense that you and your friend are drifting apart.

Recognize how you feel (all feelings are important, so users get 1 star for self-management for expressing their feelings)

I feel - blank space for users to talk about their feelings

Scene 2

Your friend is busy with after school sports activities, so you think...

3 choices for defining the problem

Gamified Social-Emotional Learning

47

Choice 1: I didn't join any sports activity because I'm not very athletic. But there are other fun things that I do. (2 stars for self-management)

Choice 2: My friend made new friends and now my friend just doesn't like me very much. (0 star)

Choice 3: I'm not interested in the same thing that my friend is interested in. (2 stars for self-management)

Scene 3

You feel that you are losing your friend, so you...

3 choices for setting a goal to solve the problem

Choice 1: accept that we won't be friends anymore (1 star)

Choice 2: look for an after-school activity that I might enjoy (2 stars for self-management)

Choice 3: join a sports activity with my friend. I might like it. (2 stars for self-management)

Scene 4

Consequence/advice

Advice 1: Excellent choice! It's good to know your likes and dislikes. Who knows, you might make new friends who enjoy the same thing that you like.

Advice 2: It's always good to try something new, and if you find that you don't like it, you can look for something else that you do like.

Advice 3: It might be a good idea to find something that you do like. Who knows, you might meet new friends who like the stuff that you like.

Journey 5 (new scenario) – social awareness**Scene 1**

Your friend is boasting about drinking alcohol and getting drunk with the older kids in the neighborhood. Your friend invites you to join next time.

Recognize how you feel (all feelings are important, so users get 1 star for social awareness for expressing their feelings)

Gamified Social-Emotional Learning

48

I feel - blank space for users to talk about their feelings

Scene 2

Your friend wants you to try drinking, so you think...

3 choices for defining the problem

Choice 1: Look my friend in the eye and say “no, thank you.” Ask my friend if she really thinks drinking is worth it (2 stars for social awareness skills)

Choice 2: I should learn more about the effects of alcohol, so I know what to say to my friend about drinking (2 stars for social awareness skills)

Choice 3: decide that I might want to try it (0 star)

Scene 3

You found out that your friend is doing some risky things while drunk, so you decide to...

3 choices for setting goal

Choice 1: don't say anything because I don't want my friend to get in trouble (0 star)

Choice 2: tell a teacher or a counselor about what I've heard (2 stars for social awareness skills)

Choice 3: tell my parents about what I've heard and ask them for help (2 stars for social awareness skills)

Scene 4

Consequence/advice

Advice 1: Excellent choice! It's always good to let an adult know immediately so they can help your friend from getting into more trouble.

Advice 2: It's good that you let your parents know about what is happening. Ask your parents to help your friend stop getting into more trouble.

Advice 3: Staying silent will not help your friend. Your friend might get into bigger trouble down the line. Let an adult know what is happening.

Journey 6 (similar to journey 1) – self-management

Scene 1

You watched a movie with a friend today, and now you started working on a project that is due tomorrow. You don't think you will be able to finish it on time.

Recognize how you feel (all feelings are important, so users get 1 star for self-management for expressing their feelings)

I feel - blank space for users to talk about their feelings

Scene 2

You didn't start work on the project earlier because...

3 choices for defining the problem

Choice 1: I'll probably get a bad grade, but it's OK because this project is dumb. (0 star)

Choice 2: I would probably get a bad grade anyway, so it doesn't matter if I don't spend much time on this project. (0 star)

Choice 3: I should have started earlier, and now I might not have the time to do my best job on it. But I'll do the best I can. (2 stars for self-management)

Scene 3

You know you don't have enough time to finish the project, so you...

3 choices for setting a goal to solve the problem

Choice 1: ask my parents for help so I can get it done. (2 stars for self-management)

Choice 2: I'll skip it and do something else instead. (0 star)

Choice 3: get in touch with my teacher and explain the situation. Ask if I can get extra time on it. (2 stars for self-management)

Choice 4: I'll work on it as much as possible even if I don't finish. (1 star)

Scene 4

Consequence/advice for

Advice 1: Excellent choice! By talking to your teacher, you might be able to get some extra help.

Advice 2: It's good to get help. Think about who else might be able to help, if anyone.

Advice 3: It might be a good idea to reach out to someone who can help you. Maybe there's a way to simplify the project so you can still finish?

Advice 4: If you don't turn in anything, you'll get a zero. Maybe you could reach out to someone who can help you finish.

Journey 7 (similar to journey 2) – relationship

Scene 1

Your group of friends started to exclude one of your friends, named Riley, from the group. You made plans to hang out with Riley after school, but now your friends want to do something. It sounds like they didn't invite Riley.

Recognize how you feel (all feelings are important, so users get 1 star for relationship for expressing their feelings)

I feel - blank space for users to talk about their feelings

Scene 2

Your friends are ignoring your friend Riley, so you think....

3 choices for defining the problem

Choice 1: maybe my friends don't really mean to exclude Riley. I should ask them. (2 stars for relationship skills)

Choice 2: I can still be friends with Riley even if my friends don't want to spend time with Riley anymore (2 stars for relationship skills)

Choice 3: ask my friends if I should hang out with Riley (0 stars)

Scene 3

You don't know why Riley is being ignored by your other friends, so you decide to...

3 choices for setting a goal to solve the problem

Choice 1: tell Riley that I won't be able to hang out (0 stars)

Choice 2: ask my friends to include Riley because it's not nice to leave Riley out on purpose (2 stars for relationship skills)

Choice 3: hang out with Riley because I can hang out with my friends some other time. (1 star for relationship skills)

Scene 4

Consequence/advice

Advice 1: Excellent choice! It's always good to let your friends know how you feel. Who knows, maybe there was a misunderstanding between your friends and Riley.

Advice 2: It's great that you decided to spend time with Riley. Maybe you can ask your friends to spend time with Riley. Or maybe you and Riley can find new friends together.

Advice 3: Good friends don't make other people feel sad on purpose. Maybe you should find out why your friends decided to ignore Riley, in case you can all be friends. Or just hang out with your friends another time.

Journey 8 (similar to journey 3) – social awareness

Scene 1

A group of students started bullying you. They threatened to hurt you if you told anyone.

Recognize how you feel (all feelings are important, so users get 1 star for social awareness for expressing their feelings)

I feel - blank space for users to talk about their feelings

Scene 2

While they are being mean to you, you think...

3 choices for defining the problem

Choice 1: I should stay quiet, so they'll leave me alone sooner (0 stars)

Choice 2: I should ask them why they are picking on me or get ready to defend myself (1 star)

Choice 3: There's probably someone who can help me. I should get away if I can, and look for help (2 stars for social awareness skills)

Scene 3

Bullies are threatening you, and they say they'll come find you again, so you decide to...

3 choices for setting a goal

Choice 1: don't tell anyone and try to avoid the bullies (0 stars)

Gamified Social-Emotional Learning

52

Choice 2: tell my parents or a counselor about what happened (2 stars for social awareness skills)

Choice 3: tell the bullies to stop picking on me (1 star)

Scene 4

Consequence/advice

Advice 1: Excellent choice! It's always good to tell an adult immediately.

Advice 2: It's good that you stood up for yourself, but it would be better to get help from an adult. Who knows, you might get hurt or start an even bigger fight.

Advice 3: Staying silent will not make the bullies go away. It would be best if you let someone know what is happening. Remember that you are not alone and that there's always help.

Journey 9 (similar to journey 4) – self-management**Scene 1**

You are working on a group project. You weren't teamed up with your friend. You were teamed up with a classmate that you don't know very well.

Recognize how you feel (all feelings are important, so users get 1 star for self-management for expressing their feelings)

I feel - blank space for users to talk about their feelings

Scene 2

You don't know your new team mate very well, so you think...

3 choices for defining the problem

Choice 1: I don't know much about this classmate--they are shy and don't talk much. But they might be nice. (2 stars for self-management)

Choice 2: I don't know if I'll get along with this classmate since they don't talk much. I wish I had someone else! (0 star for self-management)

Choice 3: I should have asked my friend first before I got teamed up with someone, I'm not friends with. (0 star)

Scene 3

Now it's time to start the project, but you still don't really know your teammate, so you...

3 choices for setting a goal to solve the problem

Choice 1: split work so we can just work separately on our own part of the project. (1 star for self-management)

Choice 2: ask the classmate to switch partners so I can team up with my friend. (0 star)

Choice 3: arrange to meet with the classmate after school so we can get to know each other. (2 stars for self-management)

Scene 4

Consequence/advice

Advice 1: Excellent choice! You didn't judge people when you don't know them very well. Who knows, you two might get along really well with each other.

Advice 2: Splitting the work so you can get your project done is a good idea. It's also good to try to get to know someone first before you decide that you won't get along with them.

Advice 3: It might be a good idea to get to know your classmate. Who knows, you might get along really well with each other, and you might make a new friend.

Journey 10 (similar to journey 5) – social awareness

Scene 1

Your best friend pretty much stops talking to everyone and doesn't seem to want to hang out with anyone anymore.

Recognize how you feel (all feelings are important, so users get 1 star for social awareness for expressing their feelings)

I feel - blank space for users to talk about their feelings

Scene 2

Your friend asks you to leave him alone, so you think...

3 choices for defining the problem.

Gamified Social-Emotional Learning

54

Choice 1: My friend might need more help than I can give. Maybe I can talk to someone about what's happening. (2 stars for social awareness skills)

Choice 2: I should stop bothering my friend, obviously he doesn't want to be friends any more. (0 star)

Choice 3: I should tell him I care about him and that I'm worried about him, but without pushing. (2 stars for social awareness skills)

Scene 3

Your friend seems to be withdrawing more and more, so you decide to...

3 choices for setting goal

Choice 1: stop being friends with him. (0 star)

Choice 2: ask my parents or a school counselor what I should do (2 stars for social awareness skills)

Choice 3: learn more about depression so I can understand my friend better (2 stars for social awareness skills)

Scene 4

Consequence/advice

Advice 1: Excellent choice! It's good to listen carefully and to learn more about the challenges your friend is facing.

Advice 2: It's good to get help from an adult and to get advice and help for your friend.

Advice 3: It might be a good idea to get help from an adult instead of leaving your friend to be unhappy on their own.