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DARING GREATLY: IMPLEMENTING FAILURE SKILLS IN THE LEARNING PROCESS

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OF BETHEL UNIVERSITY

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MEGAN K. TIMM

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DARING GREATLY: IMPLEMENTING FAILURE SKILLS IN THE LEARNING PROCESS

MEGAN K. TIMM

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APPROVED

Advisors name: Seann Dikkers, Ph.D

Program Director's Name: Molly Wickam, Ph.D

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Abstract

Failure plays an unavoidable role in the life of everyone. From the most mastered professionals to the toddler taking his first steps, everyone will experience failure at one point or another. In the educational setting, both educators and students will have failure experiences, and will undergo the consequences of that experience, whether positive or negative. This literature review will summarize fields of research that highlight both the negative and positive consequences of experiencing failure and will also introduce "failure skills," which is defined as the key to producing positive consequences from experiencing failure. Examples of the "failure skills" are: Grit, Growth Mindset, attitude, agency, and resilience. Though this literature review emphasizes two opposite sides of the field, the gap between is bridged by the discussion of "failure skills" in the search for how to ensure failure experiences are conducive to learning.

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CHAPTER 1: INTRODUCTION

> *"It is not the critic who counts; nor the man who points out how the strong man stumbles, or where the doer of deeds could have done them better. The credit belongs to the man who is actually in the arena, whose face is marred by dust and sweat and blood; who strives valiantly; who errs, who comes short again and again because there is no effort without error and shortcoming; but who does actually strive to do the deeds; who knows great enthusiasms, the great devotions; who spends himself in a worthy cause; who at the best knows in the end the triumph of high achievement, and who at the worst, if he fails, at least fails while daring greatly" (Theodore Roosevelt, 1910).*

"If he fails, at least he fails while daring greatly." What a line. When I read that line, I can start to feel my heart rate quicken as a burst of energy courses through my veins. I can picture the movie scene so clearly: The triumphant soundtrack sings behind me as the camera whirls around my dirtied, bloodied, and exhausted body - but I am not defeated. (To be honest, I am picturing myself as Russel Crowe in Gladiator.) After all, many individuals want to be determined, persevere, and taste sweet victory after overcoming adversity against all odds? As a first born, Type A, perfectionist individual, I have been struggling with the concept of failure the entirety of my life. I try to always be the hardest worker in the room, and I consistently strive for excellence, wanting to set an example for others. After years of carrying a silent crushing weight on my shoulders, I had an epiphany in the middle of a panic attack before a collegiate race one day: I had a crippling fear of failure. As I ventured into student teaching, I started watching for students who were wrestling with their fear of failure, and was overwhelmed with how many students I encountered. It was through the experience of loving students who suffered through

this mind game that I decided to find out how to create a classroom environment where students would be comfortable with, dare I say, embrace failure and not be fearful of it. I want my classroom to teach students how to be resilient, to show resilience and press on when they encounter adversity. As it turns out, there is a substantial field in the research world that is exploring the very same question I am after.

In our world today, it does not take much digging to notice the "Failing Forward" trend, coined by Maxwell in 2007. "Fail early, fail often, but always fail forward," Maxwell shouts from the stage. Businesses are adopting this "fail forward model" all over the country, and Google is flooded with articles of "How to Fail Well." The author Kathryn Shulz said, "To many in our success-driven society, failure isn't just considered a non-option - it's deemed a deficiency…. We are wrong about what it means to be wrong, the capacity to err is crucial to human cognition" (Success, 2016, p.1).

Historically (and presently) the term "failure" often carries a negative connotation, particularly in academic contexts (Maltese et al., 2018). In line with this, Manola and Kapur (2018) remark, "All too often, failure is viewed negatively in educational settings. It is considered as something to be feared and avoided" (p.1). To add to this, Simpson and Maltese (2016) note, "The term failure typically evokes negative connotations in educational settings and is likely to be accompanied by negative emotional states, low sense of confidence, and lack of persistence" (p. 223). These views of failure in an educational setting are shown as data in a 2017 study done by Lottero-Perdue and Parry. Their study highlighted elementary school teachers' view of failure in their classrooms, and found 84% of the 254 teacher participants disclosed they rarely (if ever) use terms like "failure" or "failing" in their classrooms. Lottero-Perdue and Parry also found most of these teachers had a negative connotation with the term

"failure." For the participants, thoughts such as "giving up" or "not successfully meeting the high expectations of others and/or "institutional norms" flooded their minds. To add to this, O'Brien (2016) found "Students can negatively internalize failure as evidence of just another thing that they don't do well" (p.1).

Conversely, educational research has many scholars who have found foundational data for Maxwell's "fail forward" movement. After all, everyone loves the quote by Thomas Edison, "I have not failed. I've just found 10,000 ways that won't work." In 2018, Manola and Manu stated, "Failure is essential to successful learning. Without failure, we cannot find out what we have not learned yet, and what aspects we might need to improve in what we are attempting to learn" (p.1). To add to this, Duckworth, the renowned scholar on Grit, noted in an interview, "[I have] seen lots of very smart kids who don't know how to fail… They don't know how to struggle, and they don't have a lot of practice with it" (Remake Learning, 2014)." Gee (2007) speaks to the "gamification" of education: "Video games are awesome- they call it "pleasantly frustrated." Keeps you in the loop, but allows you to fail time and time again, while keeping the attitude, "I can do better." Video games have perfected 'the game.' Schools have lost" (p.3). These scholars align with the "fail forward" model discussed above, highlighting the positive impact failure can have. If successful individuals and businesses are adopting "failure cultures," should schools as well?

So what is the verdict? In the education setting, is failure something that should deliberately expose our students to, or is it something to be avoided in its entirety? Is the actual problem that individuals do not know how to fail, or that failure is bad in it of itself? There are clusters of scholars on either side of the spectrum of philosophies, leaving the "most correct" classroom difficult to define. This paper will explore different research studies, with the intent of

answering these two research questions: *What impact does experiencing failure have on the learning process?* and *How can educators ensure failure experiences in the learning process are conducive to learning?*

Terms

Failure

So what is failure, exactly? While a commonly used term, researchers in this field understand the depth and controversy of this term in educational settings. The Failure Institute (2020) notes that "failure" [is a] concept accepted and agreed upon by the social imaginary to describe abstract feelings, situations, and events, based on definitions that constantly change throughout time, social and cultural context." To add to this, Maltese, Simpson, and Anderson (2018) note, "Failure has a personal component that influences how it is identified and responded to by those experiencing it" (p.117). There is no universally accepted definition of failure, and the implications of failure differ depending on the situation, setting, and individuals involved.

In their own words, Maltese et al. (2018) define failure broadly: "Failure is when they give up. Success is when they persist" (p.120). Though this definition of failure is broad, it shifts the focus of failure from being result oriented to attitude/resilient oriented. In a slightly different perspective, Leoni (2012) defines failure as, "When someone has failed, s/he did not succeed and have no chance to do so in the future" (p.2). Leoni's definition speaks to the finality of failure. In discussing Common Core Standards, Lenz (2015) notes, "Failure is not achieving as highly as they are capable of" (p.1). In other words, Lenz's definition of failure speaks to individuals not reaching their full potential.

For the purposes of this paper, specific definitions must be chosen to serve the purposes of my topic. For failure, the simple definition provided by Maltese et al. will be used, "Failure is

when they give up." While this definition is broad, it also shifts the focus of failure away from results, and turns it towards students' Grit and resilience. These are observable measures that can be used as clear outcomes in student behavior.

Productive Failure and Gamification

Because many scholars find failure to be a beneficial and unavoidable occurrence in the learning process, researchers are developing teaching strategies that intentionally set students up for some experience of failure. In 2008, Kapur coined the definition "productive failure," which is defined as, "a learning design that affords students opportunities to generate representations and solutions to a novel problem that targets a concept they have not learned yet, followed by consolidation and knowledge assembly where they learn the targeted concept" (p. 52). In other words, Kapur's "productive failure" is a learning design that intentionally allows students to struggle with foreign material (and inevitably experience failure) before they are formally taught new information.

Simply defined, gamification is the "use of game-design elements for a non-game purpose" (Gee, 2017, p.1). In presenting how he implements this in his classroom, Gee notes, "If [my students] have successfully navigated the mechanics, they cannot fail – even if their project did not deliver as expected – because they have learned from the process and even a failed deliverable can demonstrate successful learning" (p.2). In other words, gamification means setting up classroom pedagogy like a video game, providing enticing material and challenges that don't scare students away when they fail. In fact, failure is expected and needed to be successful.

For the purpose of this paper, Kapur's coined definition of productive failure will be used; "Productive failure is a learning design that affords students opportunities to generate representations and solutions to a novel problem that targets a concept they have not learned yet,

followed by consolidation and knowledge assembly where they learn the targeted concept" (p. 52). Gee's definition of gamification will also be used; "use of game-design elements for a non-game purpose."

Grit and Resiliency

Failure, as an operational concept, is often tied to adversity and struggle by the previous authors. Depending on the degree of internal motivation, the ability to overcome adversity has a clear connection to the impact of failure on a learner. Angela Duckworth (2016), for instance, defines Grit as "the passion and perseverance for long-term goals." In her research, Duckworth notes, "Grit entails working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and plateaus in progress" (p. 1087-1088). Even before the term "Grit" was properly defined and used in the literature, Vallerand (2003) found "passion can fuel motivation, enhance well-being, and provide meaning in everyday life" (p.756) when researching why different individuals work tirelessly to achieve their goals. To add one more researcher into this discussion, Mori (2020) explained, "Grit is about sustained, consistent effort toward a goal even when [individual's] struggle, falter, or temporarily fail" (p.3). All three of these researchers argue Grit means not giving up, no matter what adversity or road block stands in the way.

Resilience, while certainly related to Grit, is a valid quality to discuss in its independence. Masten and Reed (2002) claim resilience "refers to a class of phenomena characterized by patterns of positive adaptation in the context of significant adversity or risk (p.75). In a simpler definition, "Resilience is our ability to bounce back after we have struggled, faltered, or failed… it involves optimism (Mori, 2020, p.3). In 1994, Wang et al. defined academic resilience as "the heightened likelihood of educational success despite personal vulnerabilities and adversities brought about by environmental conditions and experiences"

(p.142). Finally, Luthans, W., Luthans, B., and Chaffin (2018) add to this by saying, "resilient individuals learn to better cope with mistakes, failures, and setbacks and do not allow bad circumstances to keep them from performing at high levels" (p.41).

As previously stated, failure is often tied to adversity and struggle. Individual Grit and resilience, therefore, are necessary links to examine when considering the concept of failure. When individual's fail, they will need to overcome obstacles and challenges; Resilience and Grit can be determinants of how individual's will handle their adversity, (or, in this case, handle failure) in both the short run (resilience), as well as the long run (Grit). For the purposes of this paper, Duckworth's definition of Grit**,** "the passion and perseverance for long-term goals," will be used. In regards to resilience, Mori's (2020) definition will be modified and used. Resilience is [an individual's] ability to bounce back with a positive attitude after they have struggled, faltered, or failed.

Ego Threat and Mastery Orientation

Leary (2009) points out that many modern researchers defines ego threat as "a threat to a person's self-image or self-esteem" (p.151). Since shame and embarrassment are often hand in hand with failure, (Burton, 2014) it is no surprise failure often comes with an attack on individual ego.

The research field concerning ego-threat dates back to 1978 with scholar Dieter Frey. Frey found, "[The test] was evaluated more negatively under public than under private failure" (p.172). Frey uses his research to discuss public failure feedback was consistently received more harshly than private failure feedback. In a classroom setting, it is easy to imagine private failure feedback given to students by their teachers on exams and assignments. However, the reality of

peer groups in schools mean most private failures quickly become public information, causing many private failures in the learning process to become public failures.

Park and Colvin (2015) add yet another layer to this argument by saying, “Individual's [may] lash out and derogate others to bolster their feelings of self-worth in response to assaults on their ego” (p.340). Many individual’s egos are fragile, and experiencing failure can be a “trigger” for many people, causing a detrimental reaction. Ego threat is often an automatic reaction to failure. When individual’s egos are threatened, they can shut down, tune out, and lash out.

For the purposes of this paper, Leary’s definition of ego threat will be used: “A threat to a person’s self-image or self-esteem.”

In regards to mastery orientation, Brooke (2012) stated, “Mastery orientation is described as a focus on learning and improvement… Psychologists tend to agree that a mastery orientation is highly adaptive and carries the most positive qualities, including perseverance, seeking out challenges and a desire to learn” (p.1). This definition speaks to an advanced learner, embracing challenges and acting as a self-starter in their learning.

In 2019, Buzzetto-Hollywood, Mitchell, and Hill (2019) added to the data by describing students who have a mastery orientation. Buzzetto-Hollywood et al. stated, “Students with [mastery orientation] have a focus on acquiring knowledge and self-improvement, are self-designated and internalized rather than being based on external indicators……. [it is an indicator] of success” (p.139).

For the purposes of this paper, Brooke’s (2012) definition of mastery orientation will be used: “A focus on learning and improvement.”

Agency, Attitude, and Growth Mindset

Read previously, failure has the ability to bring up a wide array of different emotions and personal attributes. How individuals react to these emotions is a critical component to this discussion. Agency, attitude, and Growth Mindset act as the positive side of ego threat, serving as a cultural construct of how individuals handle adversity, struggle, and failure.

Cole (2019), defines agency as, "the thoughts and actions taken by people that express their individual power." Cole further clarified her definition by saying, "Agency is the power people have to think for themselves and act in ways that shape their experiences and life trajectories" (p.1) Cole argues individuals have power in their choice, having control of their actions and therefore choosing how to respond to victories, as well as failures.

As Cole claimed individual agency was of the utmost importance, Dweck (2019) adds another layer to this research by discussing 'Growth Mindset.' Dweck defines Growth Mindset as "individuals who believe their talents can be developed through hard work, good strategies, and input from others" (p.26). Dweck claims no one is born with a Growth Mindset, rather, individuals must set out to attain a Growth Mindset, and it is a process that will continue for the entirety of an individual's life. "When we face challenges, receive criticism, or fare poorly compared with others, we can become insecure or defensive, which inhibits growth" (Dweck, 2019, p.27).

In his "Magic Word" speech, Earl Nightingale (1957) defines attitude as "the position or bearing as indicating action, feeling or mood." Eagly and Chaiken (1993) add to the discussion by defining attitude as "…a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (p.575). Finally, Hogg and Vaughan (2005) found that attitude is "a relatively enduring organization of beliefs, feelings, and behavioral tendencies

towards socially significant objects, groups, events or symbols" (p.150). In other words, attitude is how individuals choose to view or feel about a circumstance.

While closely related, agency, attitude, and Growth Mindset hold important definitions as independent terms. Since agency is the "the thoughts and actions taken by people that express their individual power," (Cole, 2019, p.1) it can be assumed that one must use their *agency* to choose to have a *Growth Mindset* and a positive *attitude.* For the purposes of this paper, the following definitions will be used. Agency will be defined by Cole, saying: "Agency is the power people have to think for themselves and act in ways that shape their experiences and life trajectories." Dweck's definition of Growth Mindset will also be used: "Individuals who believe their talents can be developed through hard work, good strategies, and input from others." Attitude will be defined by Earl Nightingale, (1957) "the position or bearing as indicating action, feeling or mood."

"Failure Skills"

Further, the term "failure skills" will be defined as: The skills needed to have positive consequences from failure experiences. Examples of "failure skills" are: Grit, Growth Mindset, attitude, agency, and resilience. The addition of this term was important to this paper because it takes all of the above examples and combines them into one cohesive term. In this paper, the use of "failure skills" will be explored as the bridge between having negative consequences and positive consequences from failure experiences.

CHAPTER 2: LITERATURE REVIEW

The following research is divided into three main topics: The Negative Consequences of Failure, The Positive Consequences of Failure, and "*Failure Skills*." All three topics will be explored through research done by scholars in the field, with the intent of exploring the research questions: *What impact does experiencing failure have on the learning process?* and *How can educators ensure failure experiences in the learning process are conducive to learning?*

Keywords: Failure, Growth Mindset, Grit, resilience

The Negative Consequences of Failure

While overcoming failure and adversity makes for a great movie scene, this field is filled with more than heartwarming accounts of the impact of overcoming failure. The following research highlights the main arguments in the field for failure having a negative impact on student learning.

Failure in Reaching Goals

As this field of research has been developing over the last few decades, it is important to review sources from and earlier date. In their 2004 study, Soman and Cheena set out to "study situations in which individuals who are trying to attain a particular goal fail to do so" (p.52). Specifically, Soman and Cheena explored the impact of goal setting, and focused on the consequences of failing a goal. Two mixed methods studies were conducted, having almost 200 professors and students from a Hong Kong University participate. In the first study, participants partook in a hypothetical decision-making task, focusing on a financial savings and purchasing goal setting situation. In Study two, participants were told to find grammatical errors in a journal article and meet a strict deadline. For both studies, participants were randomly assigned to receive different levels of goals and instructions (some participants were given ample

instructions and guidelines, while others were given little to no assistance). Soman and Cheena then took the data and analyzed the participants' reactions after they had failed to reach a goal. In their conclusion, Soman and Cheena "found support for the potential counterproductive effects of goals" (p.60).

In regards to participants failing to meet their goals, Soman and Cheena noted, "We believe that failure to achieve a goal will result in negative emotions and decreased self-efficacy…..When the violation of one's goal is coded as failure, it can result in demotivation, negative emotion, and consequently a poorer performance" (p.52). "We propose that the violation of a goal can be demotivating to continuing efforts, resulting in a deterioration of performance. As a result, it might be better not to have a goal than have a goal that one fails to achieve" (p.61).

Through their mixed method studies, Soman and Cheena called attention to the negative effects individuals often endure when they experience failure in regards to a goal they have set. Their results identify this experience of failure can be "demotivating...deteriorate performance… [lead to] negative emotions, and decrease self-efficacy." In the education setting, goal setting is frequently used on both a group level and individual level. Teachers may set goals for the class to achieve a certain average grade on a test, or an individual may set personal academic goals in regard to their performance. Within their research, Soman and Cheena present the data on the negative consequences individuals may experience from failing to reach a set goal.

Alongside this research, it must be noted this study has its limitations. In their research, Soman and Cheena used goals that participants did not have emotional or personal connection to, rather, they were hypothetical situations. Thus, the results do not take into account the emotional connection and/or motivation individuals may have when they create personal goals. This study

must also be weighed against the abundance of research that points to the benefits and success of setting attainable goals (Annarella, 2001 and Latham, 2004). While Soman and Cheena address the consequences of failing a goal, their conclusion of experiencing negative emotions, decreased self-efficacy, and demotivation after experiencing failure is noteworthy. Since goal setting is naturally part of the learning process, this study holds relevance to this paper in discussing the possible consequences individual's face after they have failed a goal.

Failure Emotions in a Culture of "Happiness"

Building on this work, through a mixed method approach in two separate studies, McGuirk, Kuppens, Kingston, and Bastian (2018) set out "examine whether people ruminate more about their negative emotional experiences in social contexts in which happiness is portrayed as important and valuable" (p.756). The purpose of the research was to "Investigate the causal relationship between making the social expectation for happiness and increased rumination in response to a negative experience salient" (p.757). Both studies selected participants who were either American or Australian, as these cultures "are more apparent in their display of cultural valuations on emotional experiences" (p.757). In Study 1, 120 freshmen psychology students were randomly assigned to complete a task in one of three possible experimental conditions: (1) Participants were assigned an impossible anagram task (guaranteeing their failure), and were located in an environment that placed high value on happiness (the room was decorated with motivational posters, books, sticky notes, and a bystander that talked of the importance of being happy in life). (2) Participants completed the same impossible anagram task, but did so in a neutral environment. (3) Participants were assigned a solvable anagram task, and worked on their task in the environment that placed value on happiness. As a follow up, participants were also given feedback depending upon their room

environment. Participants in condition 3 were given reassurance, being affirmed that the anagrams were very difficult and near impossible to complete. Participants in the condition 1 and 2 were told, "I thought you may have gotten at least a few more, but we'll move onto the next task" (p.759). As a final step, all participants completed a five-minute breathing exercise (specifically created for this study), designed to measure worry. During the breathing exercise, 12 different tones were played intermittently, and participants were asked to describe what they were focusing on each time a tone played. Following this, in Study 2, 227 American participants (recruited using Amazon Mechanical Turk or MTurk) were given a questionnaire focusing on evaluating the following factors: Frequency and intensity of negative emotions, social expectancies, rumination, depression and well-being, and potential confounds. (Each different subject had specific questionnaires and evaluations to fill out.)

In conclusion, McGuirk et al. found two norms that were associated with overemphasizing happiness: The importance of "seeking positive emotion" and "avoiding negative emotion" (p.761). Researchers note how these two norms "have implications for how people respond to their negative emotional experiences…. Specifically, we find that in these contexts people are more likely to ruminate on their negative feelings and negative experiences" (p.761). McGuirk et al. went on to state,

> When people experience failure in a context in which they believe that others either expect them to experience positive emotion or not to experience negative emotion, they focus more on their failure, and this, in turn, increases their levels of negative affect… Experiencing failure is a negative emotional experience that is inconsistent with the goal of feeling happy, and leads people to engage in

unconstructive, negative, and self-focused thinking on the reasons for their failure (p.762).

McGuirk et al. conducted research studying the emotional impact of individual's experiencing failure in a society that stressed the importance and need for happiness. As researchers stated, Americans have a culture in which "[citizens] are more apparent in their display of cultural valuations on emotional experiences" (p.757). Since American schools are embedded into American culture, it is no surprise this cultural value of happiness and positive emotion has been weaved into our schools and classrooms. While this is not a negative cultural norm, McGuirk et al. highlight the danger of individual failure within it. In these types of cultures, researchers' data discussed the high expectation for individuals to experience positive emotions caused individuals to concentrate more on their failures. This led to a higher concentration of negative emotions from the additional pressure placed by the culture.

In 2004, Soman and Cheena found, "Failure to achieve a goal will result in negative emotions and decreased self-efficacy…. [failure] is demotivating to continuing efforts, resulting in a deterioration of performance" (p.52). McGuirk et al. s research echoes these findings, highlighting the added pressure from American culture (that stresses "happy" emotions), and emphasizing the consequences that happen when individuals fail. Both studies discuss how individuals who fail are subject to become unmotivated, discouraged, and adopt a destructive mindset. This finding warranted further study in the negative impact of failure with an eye towards psychological responses.

Failure Feedback on Learning Process

A year later, in 2019, Eskries-Winkler and Fishbach conducted a quantitative research project focusing on failure feedback. The study included over 1000 participants (based on career

and MTurk approval rating) across five studies, titled as followed: (1) “Not Learning from Failure in the workplace”, (2) “Not Learning from Failure in Controlled Studies,” (3)” Comparing Failure Feedback with No Feedback,” (4) “Mediation by Ego Threat,” and, (5) “Moderation by Ego Threat- Learning from Other People’s Failures.” In each study, participants were given a quiz in which their knowledge (both general knowledge and career-specific knowledge, depending on the study) was tested. The participant’s goal was to perform at their highest ability on the tests, and they were all randomly preprogrammed to receive one of the following feedback types: success feedback, failure feedback, or no feedback. Participants would be shown these preprogrammed feedback results regardless of their actual score.

Mainly, “across five studies, participants learned less from failure feedback than from success feedback. Failure feedback undermined learning motivation because it was ego threatening: It causes participants to tune out and stop processing information” (p.1743). This is significant. If information is actually not being processed, any hope of advanced learning is interrupted when students encounter too much failure. To add to this, in Study 3, “Participants who received failure feedback were significantly more likely than participants who received success feedback to feel that their self-esteem had been compromised. The sense that failure was ego threatening in turn undermined learning” (p.1739). When results determined “participants learned significantly more from others’ failures than their own failures” (p.1740), researchers were able to conclude that the ego-threat was the source of disengagement. Eskries-Winkler and Fishbach concluded their research by stating, “In sum, the more failure is dissociated from the self, the less people tune out, and the more they learn from failure” (p.1740).

While this research was done outside of a school setting, the fact that Eskries-Winkler and Fishbach focused on “failure feedback” makes this research very applicable to this paper.

Educators are constantly giving feedback to students, whether orally or written on assignments. Inevitably, students will fail at some point in their education, allowing this opportunity for failure feedback to be received. In their research, Eskries-Winkler and Fishbach found failure feedback to be harmful to the learning process, in fact, undermining it in its entirety. Their research pointed to failure being so ego threatening, individual's immediately tune out and stop processing information. Taken alongside both Soman and Cheena (2004) and McGuirk et al. s (2018) work, these researchers are representing the field of research that has identified the consequences failure has on an individual's self-efficacy, emotion, motivation, ego, and learning process.

Fear of Negative Criticism and Academic Risk

Finally, Cetin, Ilhan and Yilmaz (2014) conducted a quantitative research study to examine the relationships between the fear of receiving negative criticism and taking academic risk. Using the Brief Fear of Negative Evaluation Scale and the Academic Risk-Taking Scale, Cetin et al. implemented a questionnaire to 215 university students, "all of whom were studying Primary School Teaching" (p. 148).

> *Brief Fear of Negative Evaluation Scale: Based on a 5-point scale, participants were given 8 items related to fear of being negatively evaluated by others. A sample question is as follows: "I am frequently afraid of other people noticing my shortcomings."*
>
> *Academic Risk-Taking Scale: This scale measures students' level of course and willingness or reluctance to deal with adversities during the education process. Made up of three different dimensions, participants self-evaluate their willingness/reluctance to take academic risks.*

After performing a canonical correlation analysis, Cetin et al. found, “The results… demonstrated there to be significant relationships between the fear of receiving negative criticism and academic risk-taking behavior… calculated as having a 35% correlation” (p.154). In other words, “in general, as the fear of negative criticism increases, the tendency to take academic risk decreases” (p.154). In regards to implications for educators, Cetin et al. suggest “class environments [need to be formed in which students [are] able to witness that their fear of receiving negative criticism [is] not realistic” (p.154). Educators need to consistently demonstrate that negative criticism is not a shameful or bad thing, rather, a great learning opportunity to highlight the potential the student’s work has. Educators also need to demonstrate their awareness of “fear of failure” and their genuine effort to eliminate this, and use constructive criticism as a way to set their students up for success. These are strategies that serve in minimizing the negative. Cetin et al. end their research by suggesting teachers construct projects that are processed based rather than product based, and to “inform students of scoring criteria used during the evaluation process so that their fear of receiving negative criticism may be alleviated and their courage to take academic risks promoted” (p.154).

Cetin et al. conducted research that found significant correlation between the fear of receiving negative criticism and taking academic risk, and also noted how detrimental fearing negative criticism can be to a student’s learning experience. Educators how beneficial taking academic risks is for our students’ learning process (Harper, 2018). Therefore, this research is pertinent to this paper because of the negative effect of “fearing failure feedback” can have on the learning process. While Cetin et al. s work can be aligned with all of the above research, it has strong connections to the work of Eskries-Winkler, calling attention to the negative impact of failure feedback on the learning process. Eskries-Winkler’s research identified failure feedback

to be ego-threatening, causing individuals to tune out to whatever they were doing. Cetin et al. s research showed individuals who fear failure feedback stop taking academic risks, which inadvertently undermines the learning process.

This research offers a unique middle ground for the view of failure in the education setting, as Cetin et al. highlight the negative effects failure feedback can have, while also offering solutions for evolving failure feedback into a helpful tool in the learning process. Cetin et al. end with suggestions of how to produce a learning environment where the fear of failure feedback is eliminated, creating an environment which would allow and encourage students to take risks and act with courage.

Summary of Negative Effects

What impact does experiencing failure have on the learning process? Thus far, the negative consequences of experiencing failure in the learning process have been identified. Soman and Cheena (2004) discussed the "demotivation, negative emotion, and... poorer performance" (p.52) that comes after individuals fail to reach a goal. McGuirk et al. (2018) highlight the inadvertent pressure of American culture to feel "happy." When individuals fail, and do not "feel happy" about their failure, it "leads people to engage in unconstructive, negative, and self-focused thinking on the reasons for their failure" (p.762). Eskries-Winkler and Fishback (2019) added to the discussion by showing how failure feedback undermines the learning process because it is ego threatening, and causes individuals to immediately tune out and become unmotivated in their task. Finally, Cetin et al. (2014) found a strong correlation between fearing failure feedback and taking academic risks. When individuals fear failing, they shut down and cease taking academic risks, which ends up undermining the learning process. Experiencing failure can have detrimental effects to individual's motivation, self-efficacy, and

emotional state. This is not productive for learning. When analyzed in isolation, it is easy to quickly label failure as a negative experience, which consistently brings up negative consequences for those experiencing it. This may be stereotyping a human experience that has another side to it. While failure is discouraging to many, Cetin et al. end their research findings with a glimmer of hope about experiencing failure. Cetin et al. discuss how to create a classroom culture in which failure is not something to be feared, rather, failure is something to be learned, and is an opportunity to grow. The question then is "What are the positive consequences of experiencing failure, and how can educators create a classroom culture where students have positive failure experiences?" This perspective of failure will be seen in the following section of this research paper.

The Positive Consequences of Failure

While the previous research data needs to be taken into account, the opposite side of this field must also be explored. There are many scholars finding the positive consequences to failure, especially on the learning process. The following research highlights the main arguments for positive consequences of failure in the learning process.

Emotions and Attitudes after Failure Experiences

Through a mixed methods approach, Tulis and Ailey (2011) conducted two separate but identical studies with the aim of finding out how students emotionally responded to success and failure. Participants included 182 fifth grade students who were asked to work with a personalized computer-based mathematics learning environment. The math tasks were set up to allow students to experience a wide range of emotions during it, and those experiences were then investigated in relation to self-perception of ability, and the subject value to learning from errors. Tulis and Ailey looked for patterns in emotional responses, and let their research be guided by

this question, “Are there students who experience positive task-specific emotions (particularly interest, enjoyment and pride) after failure?” (p. 6). While Tulis and Ailey used questionnaires to determine participants' self-concept of ability, subject value, and students’ error orientation, their main focus was placed on participants’ state emotions. To measure their emotions, popular emoticons that displayed nine different emotions (enjoyment, pride, interest, relief, boredom, anger, sadness, shame and anxiety) were used. The emoticons were chosen because of participant’s familiarity with them, as well as the ability to respond quickly to the pictures. After each test, students were asked to pick three emoticons to describe their reactions to success or failure.

In their discussion, Tulis and Ailey found several conclusions. The first being, “As expected, positive emotions were reported more often after success, whereas negative emotions were reported more often after failure experiences…However, a significant number of students who reported interest, enjoyment, and pride after success remained positive even after experiences of failure” (p.8). Researchers go on to note,

> Positive attitudes towards making mistakes are linked with experiencing interest, enjoyment, and pride on successful tasks, and also on tasks where students have not performed well.... Students who have a positive orientation towards their mistakes and who see error feedback as an opportunity to learn are more likely to experience positive emotion when receiving error feedback (p.23).

As a final conclusion, researchers noted, “Mastery orientation was associated with lower negative emotions following success and higher positive emotions following failure… Students who experience positive emotions after failure experiences are likely to be more mastery

oriented than those who report patterns of negative emotion" (p. 21). In other words, students who experienced more interest, enjoyment, and pride on tasks where they experienced success were more likely to feel positive emotions after failure experiences. These students were also more likely to develop a mastery orientation over time because of their emotional reactions to failure.

In regards to limitations with this study, Tulis and Ailey self-identify that more research needs to be done, and these results can only provide immediate indications that need to be addressed in future research. Researchers highlight their finding that a positive attitude after a failure experience is needed in order to be successful and develop a mastery orientation. However, the difference between students who remained positive after failure, and those who did not is not explored nor identified in this research. This leaves many questions and holes in the research; Mainly, "What is the difference between students who react positively to failure experiences, and those who do not?"

Experiencing Failure is Necessary for Success

To add to this research, Simpson and Maltese (2016) used a qualitative study and interviewed 99 professionals across STEM fields (chemists, biologists, physicists, etc.), seeking to "understand the role failure played in the persistence of individuals who enter and pursue paths toward STEM related careers." The data from this study was mainly collected from the interview question, "What role did failure play in your development as an individual in your field?" Simpson and Maltese note, "Participants who spoke of academic failures were not necessarily failing as receiving a grade of F, but more than likely not meeting their personal expectations of what it means to be proficient or advanced in a particular course of content specific-area" (p. 227). When asked about failure, one participant mentioned, "I never really

think of the term failure. Like if an experiment doesn't work or something, it's not a failure. It's just part of what I'm doing" (p.228). Participant's interview answers continued to point to the necessary role of "failure" in their careers. In fact, many pointed to failure as being necessary in their success. In their conclusion, Simpson and Maltese "argue that failure was a part of [the] participants' current success and will be part of their ongoing success in their respective field." All participants attributed at least partial success to their experiences with failure. "Failure was able to shape participant's outlook of failure, their trajectory within the program, and provided them with additional skills and qualities that may not have otherwise been developed."

Simpson and Maltese's research looked at adults with successful and professional STEM careers, investigating the role failure played in their development as an individual in their field. After analyzing all of the qualitative research, it was evident that all of the STEM professionals identified failure as being one of the reasons, if not one of the main reasons, for success in their career. That said, it is necessary to look at how these scholars set up their research question. By leading with the question, "What role did failure play in your development as an individual in the field?" the researchers were already assuming failure played at least a partial role in participants' success. The framing of the research questions serves as a significant limitation in this research.

While this study does have its limitations, pieces of Tulis and Ailey's (2011) work tie into this research. Tulis and Ailey present the necessity of positive emotions and attitudes after failure in order to experience success. The STEM professionals in this research displayed an obvious positive attitude about failure, as well as after their failure experiences, which eventually allowed them to obtain a master orientation of the STEM careers. Both of these studies point to benefits of failure, while also emphasizing the necessity about developing a positive attitude

when you encounter failure. Still, the answer to the question, "What is the difference between students who react positively to failure experiences, and those who do not?" has not been found.

Failure in Maker Space Classrooms

In 2018, Maltese, Simpson, and Anderson provide research that begins to answer this question. Scholars conducted a mixed methods research project with 107 maker educators across the United States. A survey with both closed and open-ended questions was provided to the maker educators to ask about how their students, and themselves as educators, attended to, interpreted, and responded to failure. (Maltese et al. define failure broadly as "an experience where the result does not match the outcome expected by the maker" (p.116).) Maker space teachers first responded by saying, "Failure is a poor word to describe the creative and inventive progression and process toward manifesting a well refined solution. Failure is used by those who really do not understand the essence of how we all make real progress and develop beyond constraints and limits in the real world" (p.122). When asked about their maker-space learning environments, almost all participants indicated "failure is a common occurrence [in their classroom], or "[failure] happens all the time" (p.117). These teachers explained they often try to make it 'very clear to youth that failure is 'an integral part of the engineering design process,' and is common when youth or others lack the expertise to make their ideas come to fruition" (p.118). When asked, *What terms/phrases come to mind when you hear the word "failure,"* the most common answers given were, "opportunity, learning, and learning opportunity" (p.118). Maltese et al. found "the primary goal of maker educators was to help youth deal with failures in a productive way that would help advance their projects, their learning, and their persistence in the face of obstacles" (p.123).

Maltese et al. concluded, while these maker-space educators did not minimize the negative aspects of failure (youth quitting activities, and experiencing negative emotions because of failure), “maker educators in this study valued and celebrated failure within their makerspaces” (p.122). After analyzing participants' answers, “it was clear that a primary goal of these maker educators was to help youth deal with failures in a productive way that would help them advance their projects, their learning, and their persistence in the face of obstacles” (p.123). In their own words, Maltese et al. ended by stating, “We value the learning experience of not succeeding on your first try. We feel that multiple attempts to solve something only enhances the learning experience. We encourage our students to remain positive, keep trying and analyze what went wrong” (p.120). Maltese et al. also suggested strategies for educators to create learning spaces where youth can deal with failure in productive ways. These strategies include: “model troubleshooting behavior and minimize strong emotional response to “normalize’ failure, minimize constraints that add stress on projects, resist the urge to step in and directly fix something for youth, and meet a request for help with questions that guide youth to find their own set of possible solutions” (p.123). These suggestions for teachers the work from Cetin (2014), discussing the need for teachers to create classrooms where failure is “acceptable” and model an attitude in which failure is a great learning opportunity, rather than an inhibition to the learning process.

While this research is embedded in an educational environment, it is critical to note the setting in which the research took place in. O’Brien (2016) published an Edutopia headline saying, “Makerspaces encourage student success by demonstrating the value of failure, engaging students... motivating them to care, and demonstrating real-world uses for education” (p.1). Maker spaces are designed to encourage students learning *through* failure. Although Maltese et

al. concluded that failure is a necessary part of the learning process, it must be weighed against the bias in their research. While they gather strong evidence for their conclusion, the bias in their research setting is a limitation in the relevancy. Maltese et al. partially answer the question from above, "What is the difference between students who react positively to failure experiences, and those who do not?" These scholars would argue the classroom environment and educators are responsible for creating a culture where failure is celebrated and expected, encouraging positive emotions after failure. In regards to my research question, *How can educators ensure failure experiences in the learning process are conducive to learning?* Maltese et al. would bring their observations from the makerspace classrooms. To ensure failure experiences in the learning process were conducive to learning, these scholars would argue that educators need to display a value of "learning from failures" Specifically, Maltese et al. would answer this question by suggesting educators: "Model troubleshooting behavior and minimize strong emotional response to "normalize" failure, minimize constraints that add stress on projects, resist the urge to step in and directly fix something for youth, and meet a request for help with questions that guide youth to find their own set of possible solutions" (p.123).

Productive Failure

In regards to creating a classroom culture where failure is expected, Kapur (2008) adds to this discussion with his research on "productive failure." Using a quantitative study, Kapur started his study with the purpose of "test[ing] the hypothesis of productive failure: whether or not there is a hidden efficacy in the un-scaffolded, problem-solving efforts of groups of learners solving ill-structured problems and if this efficacy can be extracted using a contrasting-case design" (p.384). Kapur also hypothesizes, "It is conceivable that leaving learners to struggle and even fail at tasks that are ill-structured and beyond their skills and abilities may in fact be a

productive exercise in failure" (p.380). In his study, 309 eleventh-grade science students from English speaking high schools in the National Capital Region of India were used as participants in this study. These participants were randomly formed into groups, and these groups were then randomly assigned either "well-structured problems" (WS groups), or "ill-structured problems" (or IS groups). Groups in the WS groups were given problem scenarios in a structured format, whereas the IS groups were given the same scenario, but left on their own to discuss how to solve the problem. The problem scenarios were all based on a car accident situation, and were deliberately designed to be beyond the abilities and skills of the participants. No additional help was given to either group once the scenarios were presented.

To analyze the success of each group, post tests were given after the experiment, where the knowledge and findings of both WS and IS groups were analyzed using the Quantitative Content Analysis. "As hypothesized, IS groups engaged in discussions that were, on average, more complex, chaotic, and divergent when compared to those of WS groups" (p. 409). In his conclusion as a whole, Kapur found, "Despite the greater struggle, complexity, and divergence in the discussions of IS groups resulting in failure, participants from IS groups outperformed those in WS groups on both well-structured and ill-structured problems post-test… demonstrating an existence proof for productive failure" (p.410). Although the IS groups had to grapple with adversity and deal with failure head on, they outperformed the WS group in both results and in their depth of conversation and collaboration.

Among limitations, it must first be noted this study was conducted 12 years ago. While it does not serve as a current piece of research, it was chosen based on the foundational data Kapur collected on "productive failure." Another limitation is the participants. This study was conducted on a specific age group in a specific part of the world, thus limiting its relevance.

However, a major voice in the field today, Kapur is continuing on in his productive failure research, constantly adding validity and relevance to the field. This study is foundational for Kapur's coined term of "productive failure," stating: "Productive failure is a learning design that affords students opportunities to generate representations and solutions to a novel problem that targets a concept they have not learned yet, followed by consolidation and knowledge assembly where they learn the targeted concept" (p. 52). Kapur is one of the researchers leading the way in this field, highlighting the benefits productive failure can have in the learning process. The research of Maltese et al. on makerspace educators ties in with Kapur's research on productive failure, stating, "It was clear that a primary goal of these maker educators was to help youth deal with failures in a productive way that would help them advance their projects, their learning, and their persistence in the face of obstacles" (p.123). Kapur argues that even despite setbacks (those discussed in the beginning of this chapter) that can result from a failure experience, the final outcome is worth the struggle. Kapur saw (and continues to see) more complex and developed collaboration, critical thinking, and understanding of content in his productive failure design. The key to his success, however, is partially credited to the environment and structure of the productive failure design. These students were not randomly thrown a curveball and found success through accidental teamwork. In "productive failure" designed scenarios, students are given designed unstructured problems, and are given the freedom and encouragement to fail together, so they can succeed together.

Kapur's research validates the work of Soman (2004), Cetin (2014), and Eskries-Winkler (2019). These three researchers explained the detrimental consequences of experiencing failure, and how easily failure can significantly hinder the learning process. However, when students are immersed in a learning environment where failure is demonstrated as a regular event in life and

is a foundational part of the learning process, the consequences of failure can be altered. For example, Eskries-Winkler and Fishbach (2019) discuss the ability of a failure experience to be so threatening to an individual's ego that they shut down, disengage, and end the learning process entirely. However, if educators presented situations in which students are "supposed" to fail in their learning process, it would protect ego and give students freedom to make mistakes. Soman and Cheena (2004) found "Failure to achieve a goal will result in negative emotions and decreased self-efficacy...When the violation of one's goal is coded as failure, it can result in demotivation, negative emotion, and consequently a poorer performance" (p.52). If educators can alter the "goal" students have in their education, making it "process-based" instead of "goal-based," students would have freedom from their fear of failing to reach their goal. Finally, Cetin et al. (2014) discuss the significant correlation between a fear of receiving negative criticism and the fear of taking academic risks. If educators were able to remove the fear of negative criticism, and turn "negative feedback" into a learning tool, students would be able to embrace the feedback and take academic risks without fear of negative consequences. *How can educators ensure failure experiences in the learning process are conducive to learning?* According to Kapur, providing students with "productive failure" learning opportunities will ensure students' failure experiences have positive consequences and are not demotivating nor intimidating.

Productive Failure Flipped Classroom

Using Kapur's "productive failure" classroom design, Yanjie and Manu (2017) set out to investigate the impact of a Productive Failure Based Flipped Classroom (PFFC) in comparison to a "traditional flipped classroom" by using a mixed method approach. This study was conducted at a Secondary school with two 7th grade classes, made up of 25 students each. Dissimilar to the traditional flipped classroom (TFC) (where students review material at home before attempting

to solve problems in class), the "productive failure" design in a flipped classroom allows the opportunity for students to "explore, discuss and solve problems related to the new concepts first in class even though they might come across failures" (p. 292). After having a day to experiment, learn, and, inevitably fail, these students are then sent home to read the classroom material (the same material the TFC was exposed to before they came to class) after they have been exposed to the new material. Through pre, mid, and post-domain tests, as well as interviews, Yanjie and Manu concluded "The PFFC group significantly exceeded the TFC group in terms of conceptual understanding and problem solving skills" (p.303). Yanjie and Manu went on to point out that the PFFC "also extends the learning process outside class that allows students to have more time for thinking and discovering in class, thereby promoting their problem-solving skills" (p. 303). These students also needed less time to learn and less repetition of materials. In a direct comparison, students in the flipped classroom with "productive failure" outperformed the traditional flipped classroom.

One limitation of this research is the small sample size. To provide relevance for their findings, a research study with a larger sample size should be conducted. This research, though focusing on a flipped classroom setting, showed clear evidence that students who were encouraged to "fail productively" and investigate to find solutions on their own had a further advanced learning process than those who were in the traditional flipped classroom. This study gives additional relevance to Kapur's work on "productive failure."

Gamification

As there is growing research on the American education system producing "student boredom [and] lack of personalized and relevant instruction" (Haskell, 2012), the field of gamification is burgeoning. Scholars like Gee (2017) and Steinkuehler (2016) are producing

research studies that are transforming the traditional school structure into "meaningful, engaging, and individualized learning" (Haskell, p.1). Within this emerging field of study, O'Brien and Pitera (2019) used a qualitative research method and set out to answer their research question: "How can gamification principles be applied more generally to facilitate students' development of critical lifelong learning mindsets?" (p.193). O'Brien and Pitera double as university librarians and scholars in the field of gamification. In this study, researchers used *Breakout EDU* (an educational game platform) to bring game-based techniques into their learning context at their respective universities (University of Albany and Skidmore College), specifically utilizing escape rooms. As librarians, time with students is often seen as "one-shot instruction" (p.194), where these librarians have "one shot" to "generate enthusiasm, interest, and motivation into their students while teaching essential habits and mindsets that will help students succeed in their research and broader academic endeavors. (Note: These qualities are quite similar to Tulis and Ailey's (2011) findings on the qualities students need to experience in order to handle failure well and be successful in the long run.)

At the University at Albany, the Breakout EDU games were implemented with three sections of a required class for first year students: "Writing and Critical Inquiry." Typically, the class was split into two teams, and each team was assigned a box to unlock. The instructor would review the rules for everyone, and set a time limit. There was always 15 minutes left at the end of class to debrief the activity, and allow the instructor to clarify misunderstandings. "Student and instructor feedback indicated that the experience taught students the value of perseverance and risk-taking, encouraged collaboration and teamwork, and helped students put inquiry and Growth Mindset into practice" (p.196). One student commented, "I enjoyed the game, I like putting my brain to the test against activities like this… the activity was both challenging and

fun… we never gave up and kept trying until the end" (p.198). Following this study at Skidmore, Breakout EDU games were used in a required first-year seminar that was required by all first-year students. This escape room was designed to have students team up and embark on a scavenger hunt to find a squirrel, all while learning information from the class. Results were optimal, as 60% of respondents from the optional feedback survey rated the game as "very enjoyable" (p.198), and many respondents commented on the high level of engagement they experienced. In their conclusion, O'Brien and Pitera noted three main outcomes from gamification at their universities: High engagement of students, facilitation of team building, and the fostering of a Growth Mindset. "Gamified learning fosters critical thinking mindsets such as inquiry, problem-solving, and teamwork… learning to "fail better" helps students transition from... binary thinking to a more exploratory mindset" (p.211). "Educators need to shift from didactic, content-focused approaches to more active, learner-centered models that provide students with transferable attributes and mindsets, including resilience, persistence, adaptability, problem-solving, and teamwork" (O'Brien and Pitera, p.192).

To add to the discussion on gamification, Squire and Dikkers (2012) conducted a qualitative research study to "examine youth use of mobile media devices, specifically iPhones, so as to understand how they constructed the devices and understand these implications for learning" (p.458). Participants included students who were homeschooled (2), students in an alternative school (4), as well as students in a traditional school (4). Participants were given unrestricted access to their phones, and researchers monitored their cell phone usage through observations, interviews, and document analysis over a three-week period. Although researchers hypothesized students would primarily use the iPhones for socializing and were concerned the devices would provide a conflict for learning practices, Squire and Dikkers found "no friction

between students' mobile media use and learning, but rather an *embracing* of their use for learning" (p.458). To add to their results, researchers also found,

> "Participants used [the iPhones] for amplifying their access to social networks, interests, and access to information, which together constituted a form of learning. As such, the devices were truly being constructed partly as a media device, partly a communication device, partly an information accessing resources, and partly a tool (like the Swiss-army knife) that empowered them in the world to do 'anything' (p. 458-459).

These findings discuss the enhanced learning tool iPhones were able to be utilized as during daily learning states. Far beyond a tool for socialization, students used the iPhones in creative and productive ways to strengthen their learning experience. After analyzing the positive data from their research with iPhones, Squire and Dikkers conclude, "These data suggest that learning, as we understand it socially, is about to change whether or not schools find uses for or integrate mobile media tools. These students demonstrate a refined understanding of the challenges and growing gap spanning their own interests, pursuits, skills, and lifetime learning to the world that is school" (p.461).

Through both of these smaller scale studies, both the successful implementation of gamified lessons, as well as the need to leverage our ever-evolving daily learning states more effectively into learning spaces with technology can be seen. Modeling Kapur's (2008) "productive failure" classroom design, O'Brien and Pitera (2019) present the need to teach students how to "fail better" in order to have them move into a more exploratory mindset. They highlight the work done by Simpson and Maltese (2016) on STEM professionals, stating that students need to learn how to embrace failure if they are to succeed. O'Brien and Pitera's (2019)

study inadvertently makes Tulis and Ailey's (2011) work shine, as gamification encourages students to have positive emotions after they run into a failure experience. Squire and Dikkers' (2012) work serve as a foundational piece for gamified learning, highlighting the reality and need in our world for technology and gamified learning. *How can educators ensure failure experiences in the learning process are conducive to learning?* "Gamify education," O'Brien and Pitera and Squire and Dikkers would say.

Summary of Positive Effects

How can educators ensure failure experiences in the learning process are conducive to learning? This group of researchers has provided research data that explains the positive consequences to failure experiences in the learning process. Simpson and Maltese (2016) "argue that failure was a part of [the] participants' current success and will be part of their ongoing success...All participants attributed at least partial success to their experiences with failure." As a foundational piece to this section, Tulis and Ailey (2011) found, "Students who have a positive orientation towards their mistakes and who see error feedback as an opportunity to learn are more likely to experience positive emotion when receiving error feedback" (p.23). This research helps in answering the question, "What is the difference between students who react positively to failure experiences, and those who do not?" Many of the above scholars pointed to the necessity of the classroom culture that makes failure "acceptable" and not intimidating. Maltese et al. (2018) found, "It was clear that a primary goal of these maker educators was to help youth deal with failures in a productive way that would help them advance their projects, their learning, and their persistence in the face of obstacles" (p.123). Kapur (2008), the scholar who coined "productive failure" said, "…Leaving learners to struggle and even fail at tasks that are ill-structured and beyond their skills and abilities may in fact be a productive exercise in failure"

(p.380). Finally, in their research, O'Brian and Pitera (2019) concluded, "Gamified learning fosters critical thinking mindsets such as inquiry, problem-solving, and teamwork… learning to "fail better" helps students transition from... binary thinking to a more exploratory mindset" (P.211). While failure experiences have the capability to be destructive to the learning process, this group of researchers provide evidence on the positive impacts of failure experiences, provided they are done in a well-designed learning context and are guided by educated instructors who can demonstrate this type of culture.

"Failure Skills:" Growth Mindset, Grit, Resilience, Agency, and Attitude

So, what is the difference between students who react positively to failure experiences, and those who do not? Is simply having a "failure-safe" classroom culture the answer to successful failure experiences? If an educator creates this type of classroom culture, and sets up well-developed "productive failure" and "gamified" lessons, will students automatically be successful? Or is there another piece to the puzzle? After reviewing scholars who have found failure to be a positive factor in the learning process, it is clear that there are critical factors present in students, teachers, and learning environments for failure experiences to lead to success. In the following section, skills needed in students to have positive failure experiences will be explored; This term is called: "failure skills."

Growth Mindset

In her well-known Ted Talk, Carol Dweck (2014) discusses the concept of "yet," and explains her coined term: "Growth Mindset." Dweck discusses a research project in the beginning of her career, where she studied how children "coped with challenge and difficulty." In her study, she gave 10-year old's problems that were "slightly too hard for them." When assigned the difficult tasks, some kids reacted positively saying, 'I love a challenge!" or, "I was

hoping this would be informative!" Dweck explained, "They understood their abilities could be developed through hard work… they had a 'Growth Mindset.'" But for some children, those trapped in a "fixed mindset," reacted quite negatively to the difficult task they were assigned. Dweck explained the perspective of these students; "Their intelligence had been up for judgement, and they failed…. Instead of luxuriating in the power of "yet," they were gripped with the "tyranny of now." After experiencing failure, Dweck found students with a "fixed mindset" indicated they would do things like: Cheat next time to do better, find someone who did worse than they did so they were able to feel better, or they would "run from difficulty," refusing to partake in something they knew they would fail at. Looking at a study conducted by Moser, Schroder, Heeter, Lee, and Moran (2011), Dweck explains the differences in electrical activity in the brain of a "Growth Mindset" and that of a "fixed mindset." The "fixed mindset" brain had little to no connections happening when they experienced failure, while the "Growth Mindset" brain had a multitude of connections when experiencing failure. In other words, those with "fixed mindset" tend to run away from failure, while those with a Growth Mindset engage deeply with the failure… thus explaining the idea that mindset, and therefore, abilities, can be developed. "We can change students' mindsets directly," Dweck explains. Growth Mindset is the belief that "talents and abilities can be developed over time, and that challenges are the way to do it." Through her research, Dweck presents the argument that mindsets are malleable, and can be influenced and molded. Therefore, it is not the ability and skills of individuals that should be praised, but their hard work, perseverance, and resilience. Dweck's research defends the view that failure is beneficial to the learning process, and educators need to mold the mindset to see failure in a positive light, and as something to grow from.

What is the difference between students who react positively to failure experiences, and those who do not? Dweck's research on Growth Mindset offers two key pieces to this puzzle. The first being her differentiation between a "fixed mindset" and a "Growth Mindset." Someone who has a "fixed mindset" believes that their abilities and intelligence are "fixed traits," and cannot be molded or improved. On the other hand, a "Growth Mindset" is when one believes "talents and abilities can be developed over time, and challenges are the way to do it." When Dweck's work is added into the research presenting the positive impact of failure experiences, the assumption can be made that individuals cannot have positive failure experiences unless they have a "Growth Mindset." In a classroom setting, teachers could set up all the right structures, boundaries, or even "productive failure" designed lessons; But if student does not have a Growth Mindset, Dweck would argue that any failure they experience could be destructive to their emotions (McGuirk, 2018)), ego-threatening (Eskries-Winkler, (2019) and cease the learning process in its entirety (Soman and Cheena, 2004). Thankfully Dweck's research offers a second key to this puzzle: "Growth Mindset" is a teachable trait. Dweck's research supports the research that failure has positive consequences in the learning process. The key is having a Growth Mindset, and raising up educators who know how to train their students on how to develop a Growth Mindset.

Teacher Growth Mindset

Based on the work of Dweck, Seaton (2018) conducted a mixed methods approach research study that focused on teacher mindset training. Seaton gave the training to 37 participating teachers to evaluate the impact of training on teacher mindset and the effecting practice change. Prior to explaining his study, Seaton notes, "There is increasing recognition of the influence of teachers' beliefs on how students perceive their own abilities. Teacher and

student beliefs are linked" (p.47). Seaton conducted six training sessions across two phases, including both in-person training sessions, as well as survey questionnaires to evaluate the impact of the training three months afterwards. Seaton found that participants who attended Growth Mindset training significantly increased in mindset scores, confidence levels, and could more easily identify fixed vs. Growth Mindset, as well as shift a fixed mindset into a Growth Mindset. In a three month follow up after the training, nine out of 10 participants saw significant change in both their own behavior and their classrooms behavior in the four following ways: Change in language, participants change, embedding in practice, embedding in impact. Seaton concluded "teachers who hold a Growth Mindset are able to support their students to consider their own mindset and to develop strategies which support their learning" (p.47). Seaton argues mindset is indeed malleable, and teacher and student mindset can and should be molded to its highest possible potential.

While this study had a small sample size, Seaton added to this field by implementing Dweck's research on "Growth Mindset," and shifting the focus to the impact of educator's mindsets on students, as "teacher and student beliefs are linked" (p.47). The data showed teachers who were trained in Growth Mindset had a significant increase in students who had a Growth Mindset. This research scratches the surface on how impactful the teacher mindset is on the student mindset, highlighting the need to re-train educators in order to sufficiently reach students. While Dweck would argue "Growth Mindset" is a critical failure skill for students, Seaton presents the argument that educators need to have a "Growth Mindset" if they ever hope to teach that failure skill to their students. More studies focusing on teacher mindsets need to be conducted.

Grit

Adding to the list of "failure skills," Duckworth, Peterson, Matthews, and Kelly (2007) set out to answer the research this question: "Why do some individuals accomplish more than others of equal intelligence?" (p.1087). Due to the lack of adequate tools, Duckworth and her team created a self-report questionnaire titled "Grit Scale." Duckworth et al. conducted six different studies with over 5,000 participants, focusing on different groups of people for each study. Duckworth and her team set out to measure the Grit level of individuals of similar age, defining "Grit" as the "passion and perseverance for long-term goals" (p.1088). In Study 1 and 2, researchers found, "Grittier individuals had attained higher levels of education than less Gritty individuals of the same age...Grittier individuals [also] made fewer career changes than less Gritty peers at the same age" (p.1092). In Study 3, the research team found "Undergraduates at an elite university who scored higher in Grit also earned higher GPAs than their peers" (p. 1093). In Study 4 and 5, Grit was found to be a better predictor of first summer retention at West Point Military Academy. Finally, in Study 6, "Gritter competitors in the Scripps National Spelling Bee outranked less Gritty competitors of the same age" (p 1095). After analyzing the data from the six studies, Duckworth et al. concluded, "Across six studies, individual differences in Grit accounted for significant incremental variance in success outcomes over and beyond that explained by IQ, to which is was not positively related" (p.1098).

Duckworth et al. conclude,

> In our view, achievement is the product of talent and effort, the latter a function of the intensity, direction, and duration of one's exertions towards a goal...Whereas the amount of energy one invests in a particular task at a given moment in time is readily apparent both to oneself and to others, the

> consistency of one's long-term goals and the stamina with which one pursues these goals over years may be less obvious (p. 1099).

In other words, individuals who do not give up, who consistently strive towards their goal despite the amount of time or struggle have "Grit." Those who demonstrate stamina, who take their experiences of failure in stride and press on towards their goal despite setbacks and adversity have "Grit." In an interview with TIME, Duckworth notes, "I think people can learn to be Gritty, I really do." If you were to ask Duckworth what a key failure skill is, she would probably say "Grit." Duckworth's research presents the view that individuals need to have Grit in order to valiantly strive towards a goal, especially over a long period of time. She would argue that if individuals are to handle failure experiences well, they need to have "Grit" in order to be able to press on in adversity with "passion and perseverance." Education is not a short-term goal, but one that requires time, hard work, and commitment. In Duckworth's opinion, a successful education requires Grit. Similarly to Kapur's (2008) work, Duckworth's (2007) research on "Grit" is not current, but necessary in this paper as it provides foundational research in the field.

Educational Resilience

While similar to Grit, resilience is another failure skill in itself. In 2013, Williams and Bryan set out to find what contextual factors and processes contribute to the educational resilience and success of urban African American Youth. (As a reminder, this paper defines resilience by using Mori's definition: "Resilience is the ability to bounce back with a positive attitude after [individual's] have struggled, faltered, or failed" (p.1).) Researchers used individual and group interviews of eight African Americans who grew up in poverty, experienced chronic unemployment, crime, and grew up in an area that had the highest rates of homicide involving African American youth. Researchers found nine factors that contributed to the participants'

academic success: School-related parenting practices, personal stories of hardship, positive mother-child relationships, extended-family networks, supportive school-based relationships, school-oriented peer culture, good teaching, extracurricular school activities, and out of school time activities. Williams and Bryan noted, "Taken together, these results suggest that home, school, and community contexts play a key role in fostering resilience and academic success" (p.295). In sum, Williams and Bryan found relationships and community-based groups made a substantial difference in both the individual's lives, as well as their ability to develop educational resilience. While the small sample size and specific demographics are a notable limitation to the research, this study highlights resilience as a critical failure skill. This research also points to the important role of educator, family, and community relationships on student resilience and academic success.

Educational Resiliency at an Individual Level

Six years later, Calhoun, Snodgrass, and Coulson (2019) expanded upon Williams and Bryan's research by looking at educational resilience on the individual level. Calhoun et al. studied how resilience was impacted by relationships and support students had in a rigorous environment. Calhoun et al. conducted a research study using interviews and focus groups to research 28 students who were attending an Early College High School (ECHS) located in Texas. All 28 participants were in 10th, 11th, or 12th grade. Calhoun et al. set out to answer these three questions: (1) "What was the nature of the challenges students were facing? (2) What are the individual and social assets that the students had? (3) What environmental factors helped students to be resilient and adapt to meet the challenges?" (p.303). Calhoun et al. remark, "The questions served as conversation starters with the aim of probing deeper research questions that sought to *explain* success in such a rigorous program" (p.312). In the case studies, students spoke

of the following challenges: Rigor and competition in coursework, drastic change of lifestyle as well as the combination of stress, anxiety, and sleep. Calhoun et al. found the most common individual and social assets used for coping with these challenges were: Seeking help, learning how to manage work, self-determination / motivation, and relationships. Calhoun et al. note in their conclusion, "In general, we found that the students interviewed described responding to the challenges they faced by drawing upon their own individual assets together with those available to them in the ECHS environment (e.g., teacher and peer relationships) and from their families to adapt their behaviors and attitudes...."This process of adaptation - educational resilience - emerged as the underlying factor for success among these students," (p.312). Calhoun et al. spoke of the necessity for students to make their own choices for their educational success. "Students… also emphasized the need to be self-starters… this additional marker of students' growing resilience fostered values of self-determination" (p.317).

"Resilience is neither inherited nor stable, and can be cultivated in children, thus enhancing the likelihood they will overcome challenges" (p. 307). Calhoun et al. argue, while external supports (caring adults, like minded peers, positive classroom environment) are valuable to the development of educational resiliency, the trait itself needs to come from an individual's agency. It is the students themselves who seek out support from a trusted individual, break off toxic relationships, and in large, choose the path of their own educational process. Students must use their autonomy to utilize the tools provided by teachers, peers, parents, etc. One limitation of this research is its small participation group, and its specificity to one specific ECHS program. To further this research, Calhoun et al. would need to find a larger group of participating students and ECHS programs. Secondly, this student was also based on the perception of the participants, meaning that the answers could be biased and not entirely reliable.

Limitations aside, Calhoun et al. present the data that resilience can be "cultivated in children," and they go on to discuss how it is a combination of both individual agency as well as peer influences that allows the development of individual resilience among students. Playing off of Williams and Bryan's work, Calhoun et al. discuss the necessity of resilience in the ability to "overcome challenges," again highlighting the need for positive teacher-student relationships and the benefits that can come when a teacher acts as a role model for resiliency, as it is something that can be cultivated in students. However, Calhoun et al. note that it is not solely up to positive peer relations, but that individual's must use their agency to choose to use the resources to become resilient. Calhoun et al. argue both agency and resilience are both essential "failure skills" for students to have.

Attitude about Adversity

To add one more failure skill to the toolbox, Chee (2019) conducted a qualitative study that looked at personal stories of adversity from different medical students, and found facing failure and adversity was an inevitable part of the education process. Chee conducted a qualitative research study which analyzed 17 different personal stories about individual struggle in the public, high-pressure culture of Chinese education. Individual stories in this study were taken from individuals who "lost at the starting line," those who were either born with a physical and/or learning disability, or acquired one through an accident. From the personal accounts, Chee found "three different ways resilient students understand adversities: Adversities as something negative and unfortunate, adversities as part of life, and adversities as a driving force" (p.745 - 746). Chee presents the argument that "students exposed to similar risk factors can have very different interpretations of their circumstances" (p.750) "Some students see adversities as a "negative experiences," other see it as "[a natural and unavoidable] part of life… yet some others

paradoxically turn their challenges into a positive driving force" (p.750) Risk factors are perceived differently based on the individual, and it is a combination of both individual agency and attitudes modeled by teachers, parents, and peers that have the most impact on how an individual views adversity. Chee places a high value on the social responsibility of educators to "model motivation and academic resilience" (p.751) throughout the learning process to demonstrate a positive attitude towards adversity.

Chee found that individual's often view the concept of adversity in diverse ways. Whether individuals view adversity as a natural part of life or a negative experience, Chee makes the argument that an individual's attitude towards adversity is malleable. Since failure is often linked to adversity and struggle, Chee's research is relative to this paper. This research demonstrates that attitude toward adversity (failure) can be changed through influential individual's modeling said attitude. Chee's research shows that educators can model how to have a positive emotional reaction after a failure experience and display an attitude of "academic resilience" to impact how their students respond to adversity and failure. Chee then, would argue attitude is another critical failure skill for students to have. Chee's research aligns with Seaton (2018), Dweck (2014), Duckworth (2007), Calhoun (2019), and Williams' (2013) research, as all speak of the malleability of student mindset, and the impact educators can have on molding that mindset.

Summary of "Failure Skills"

"Failure Skills:" Perhaps the final piece to the puzzle on *How can educators ensure failure experiences in the learning process are conducive to learning?* This final group of researchers has shifted the focus on this paper away from the discussion of failure in itself, and shifts it towards inherent personal traits and tools that can be used to press on in the face of

adversity. Dweck et al. (2014) coined the term “Growth Mindset,” which is defined as the belief that “talents and abilities can be developed over time, and that challenges are the way to do it.” Seaton (2018) then took Dweck’s research on Growth Mindset and implemented it on studying teacher mindsets. Knowing teacher mindsets could heavily influence student mindsets, the data showed participants who attended Growth Mindset training significantly increased in mindset scores, confidence levels, and could more easily identify fixed vs. Growth Mindset, as well as shift a fixed mindset into a Growth Mindset. When Mori’s definition of resilience is used, “the ability to bounce back with a positive attitude after [individuals] have struggled, faltered, or failed” (p.1) Williams and Bryan found relationships and community-based groups made substantial difference in both the individual’s lives, as well as their ability to develop educational resilience. Following this, Calhoun et al. (2019) found, “Resilience is neither inherited nor stable, and can be cultivated in children, thus enhancing the likelihood they will overcome challenges” (p.307). Finally, Chee (2019) placed a high value on the social responsibility of educators to “model motivation and academic resilience” (p.751) throughout the learning process to demonstrate a positive attitude towards adversity. While Growth Mindset, Grit, resilience, agency, and attitude are all “failure skills,” it is also notable that the above scholars showed that Growth Mindset, resilience, and attitude are all malleable traits that can be cultivated in students.

CHAPTER 3: DISCUSSION AND CONCLUSION

Reading from different scholars in the field, this paper set out to answer the question, *What impact does experiencing failure have on the learning process?* and *How can educators ensure failure experiences in the learning process are conducive to learning?* The articles cited in chapter two explored both the positive and negative consequences failure experiences have, as well as the impact of "failure skills."

Summary of Literature Review

In chapter one, the growing controversy of how scholars in our world today view failure was reviewed. Some have found failure experiences can be "demotivating...deteriorate performance… [lead to] negative emotions, and decrease self-efficacy" (Soman and Cheena, 2004, p.52). Other scholars have found failure to serve as an enhanced learning opportunity. Maltese et al. (2018) for example, said, "We value the learning experience of not succeeding on your first try. We feel that multiple attempts to solve something only enhances the learning experience" (p.120). However, before continuing to review research in the field, the term "failure" needed to be defined. Failure is a multidimensional term that does not have a set definition in this field of research. For the purpose of this paper, failure was defined by a definition provided by Maltese et al. (2018), stating, "Failure is when they give up" (p.120). This definition was chosen to shift the focus from the results to, what would later be defined as, "failure skills." This definition, along with several other key words, were defined in the rest of chapter one to provide a clear foundation for what the rest of the paper. Finally, in chapter two, scholars researching both the negative and positive consequences of experiencing failure were reviewed, and the chapter concluded with the literature review of "failure skills," which may be the key for having failure experiences in the learning process that are conducive to learning.

Even though the first two sections of chapter two (Negative Effects of Failure and Positive Effects of Failure) represent opposite sides of this field of research, they do not invalidate each other; rather, they both provide critical pieces of research to this paper. Scholars like Soman (2004), McGuirk (2018), and Eskries-Winkler and Fishbach (2019) all present research that reveals negative consequences of experiencing failure, and thus, reasons why failure experiences should be avoided. On the other hand, scholars like Maltese (2018) and Kapur (2015) present research that points to the positive consequences of failure experiences in controlled environments, both in the classroom and beyond. Both sides have merit: data was reviewed in this paper that acknowledged both the positive and negative consequences of experiencing failure. This is why "failure skills" are so critical. How do you avoid the negative consequences of experiencing failure? "Failure skills." How do you try to ensure your students experience positive consequences from experiencing failure? "Failure skills." *How can educators ensure failure experiences in the learning process are conducive to learning?* Again, it is "failure skills." It is the missing link from turning negative consequences into positive consequences when one experiences failure. Receiving positive consequences from a failure experience is not a coincidence; No amount of perfected instruction or lesson planning can ensure an individual will not experience negative consequences from this experience. As previously identified, 'failure skills' are malleable, and can be taught to individuals. By this logic, if educators want to create positive consequences from failure experiences, they need to first acquire "failure skills."

Professional Application

As an educator, there are several professional applications that can be taken from this literature review. The first application is understanding the relevant fear of failure many students

are battling. After exploring the negative consequences failure experiences can bring, it is not surprising students (and educators) often fear experiences of failure. Cetin et al. (2014) discuss this practical application in their research, saying, "class environments [need] to be formed in which students [are] able to witness that their fear of receiving negative criticism [is] not realistic" (p.154). Cetin et al. (2014) go on to suggest educators create projects that are processed based rather than product based, and are designed to "inform students of scoring criteria used during the evaluation process so that their fear of receiving negative criticism may be alleviated and their courage to take academic risks promoted" (p.154). These are tangible ways educators can create classroom cultures that encourages students to conquer their fear of failure. To add to Cetin et al. s (2014) suggestions, educators can also create this kind of culture by having open discussions about failure and implementing self-reflections on how students are processing their failure. When educators "normalize" the fear of failure, they can teach from a more understanding perspective, construct lessons that incorporate "productive failure," as well as develop a better understanding of the need to instill "failure skills" in their classroom. Secondly, providing educators with holistic training on "failure skills" would change the way educators think and teach, and therefore, would change the way students think and learn (Seaton, 2018). "Failure skills" include things like Grit, Growth Mindset, attitude, agency, and resilience. If educators want to instill this in their students, they need to first provide training to the educators; not only training them how to develop their own "failure skills," but how to demonstrate "failure skills" and ingrain them within their students. When looking at how to provide this holistic "failure skills" training, research should look to the experts who founded the research in the foundational "failure skills. For example, Carol Dweck (2006), the expert on Growth Mindset, wrote the book *Mindset: The New Psychology of Success,* along with multiple research studies

and several Ted Talks on the topic of Growth Mindset. Angela Duckworth (2016) can be credited with the research on Grit, along with her book, *Grit: The Power of Passion and Perseverance,* research studies, and multiple Ted Talks on the subject. Finally, Manu Kapur (2008) is a specialist on "productive failure," leading the field of research and presenting his findings all around the world. When looking to these scholars and the research they have conducted, a reliable framework for "failure skills" training can start to be developed. Since "failure skills" are teachable skills, it would be beneficial to create specific teacher training programs on "failure skills" based on these experts. Once teachers have received training, they can then bring "failure skills" into their classroom. Whether it be intentional lessons and activities to teach an aspect of "failure skills" (for example, a lesson specifically about *attitude)* or having "failure skills" embedded into the lesson, bringing in "failure skills" to any classroom would benefit both students and teachers.

Finally, educators can look to incorporate teaching strategies like "productive failure" and "gamification" into their learning environments. Modeling "productive failure" lesson plans from Kapur (2008), and using gamification strategies and lesson plans from scholars like Gee (2017) are tangible ways to teach and encourage students to use and develop their "failure skills," and continually work to defeat the fear of failure. Not only will these "failure skills" help students excel academically, but they will be able to use these skills for the rest of their lives.

Limitations of Research

There are several limitations within this literature review. Primarily, most of these studies took place in America. While this provides relevance for American teachers, it is a limitation in its lack of exploring other geographic locations and cultures. Specifically, as McGuirk et al. (2018) discussed, the American culture places high value on feeling 'happy," thus increasing the

weight of disappointment in failure experiences. This high stress on "happiness value" is *not* seen all over the world, and it might have a very different impact on how these cultures view failure experiences and the emotions that come with them.

Another limitation is the lack of research focusing on training teacher's methodology (or Iterative Design). Most of the research articles reviewed focused on student's failure experiences in a learning environment, but made no mention of any training the educators received. Therefore, this serves as a limitation to this paper because well trained teachers vs poorly trained teachers were not compared. This limited the paper from exploring the impact educators can have on a student's experience of failure in the classroom.

Finally, while the basic concept of "productive failure" and "gamification" were explored, these areas were not explained in their entirety, nor provided "blueprints" for educators in how to practically implement "productive failure" lessons or "gamified" lessons into their curriculum. My next topic of research would be gamification. I want to explore this practical application that highlights "failure skills" and see how it looks in the classroom.

Implications for Future Research

In regards to further steps this line of research, studies where specific training to both students and teachers in "failure skills" is needed. While scholars cited "failure skills" to be teachable, studies need to compare teachers and students who have had "failure skills" training and those that have not. Specifically, this training could be researched in a "productive failure" class setting, a "gamified" class setting, or a standard general education course. The impact of the training could be compared to student and teacher, as well as the setting in which they are asked to use their "failure skills."

After reviewing the research, I believe there are many strategies educators can take into their classrooms in regards for eliminating the fear of failure in students. The first is changing the way students are graded. Instead of grading students on the final product of their work and focusing on a grade, I think educators need to focus more on the work ethic and give feedback on the steps and progression of a project (Cetin et al., 2014). This will alleviate the fear of failure by setting up a grading system where students are not intimidated about failing the assignment or messing up something important, but rather, are able to be graded on their effort and progress. This will give educators an opportunity to give constructive feedback that is separate from failure feedback, as students can be affirmed for the work they have done, and given clear direction for their next steps. A practical way to apply this is by using transformative rubrics. This will give students clear outlines of their expectations and what is expected of them while simultaneously alleviating their fear of failure.

Secondly, I believe educators have the ability to change students' mindsets through modeling their own actions. Educators' actions are being watched by their students every day, and they have ample opportunity to model positive behaviors that alleviate the fear of failure. For example, educators can be upfront about their own failures, and discuss them openly and honestly with their class. When students see their teacher owning their own failures and "normalizing" it, I believe this will have a notable impact on how students view their own failures. This strategy can be taken into account for "failure skills" as well. I believe if teachers demonstrate their growth mindset, positive attitude, etc., students will pick up on it and start to learn these "failure skills."

Conclusion

"...And if he fails, at least he fails while daring greatly" (Theodore Roosevelt, 1910). As an educator, I want my students to embrace failure, take it in stride, and use it as one of their greatest tools in their lifelong learning process. Failure can be intimidating, and as this paper stated, failure experiences can bring many negative consequences, causing students to fear failure experiences in their entirety. Thankfully, educators have many opportunities to ensure failure experiences have a positive impact on the learning process. Whether planning a "productive failure" or "gamified" lesson, creating a classroom environment where failure is celebrated, or cultivating "failure skills" within their students, educators have all the tools and resources they need to create positive consequences from failure experiences and ensure failure experiences are conducive to the learning process. While altering classroom environments and cultivating "failure skills" in students is not something that happens overnight, this transition in both educator and student mindset is worth the battle. And, if educators fail in initiating this culture in their classroom, well, at least they failed while daring greatly.

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