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Failing Forward: How Student Failure Builds a Framework for Lifelong Learning

Andrew R. Kurkowski
Bethel University

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FAILING FORWARD: HOW STUDENT FAILURE BUILDS A FRAMEWORK FOR

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FAILING FORWARD: HOW STUDENT FAILURE BUILDS A FRAMEWORK FOR
LIFELONG LEARNING

Andrew R. Kurkowski

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APPROVED

Advisor's Name: Meghan Cavalier, Ed.D.

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

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Abstract

Humans have been dealing with the issue of failure since their existence. No matter the field, whether it be business, athletics, science, mathematics, etc., students and professionals are going to experience minor and major failures in their pursuits. Some may say that the main goal of the educator is to encourage students to pursue lifelong learning. With this being the case, one question that this paper aims to address is how to teach students use these inevitable life events as tools for growth in the academic environment and whether this mindset is effective in accomplishing the development of lifelong learning attributes. Several current teaching models are discussed while two other outside models are also used to propose a potential framework for teachers to use in developing this mindset. Studies have shown that students who are unable to develop a correct mindset towards failure develop failure prevention strategies that dissolve academic performance. On the other hand, students who are able to develop more of a failing forward mindset have been shown to have a greater chance in developing several key lifelong learning attributes.

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CHAPTER I: INTRODUCTION

Winston Churchill once said, "success is the advancing from failure to failure without losing enthusiasm" (Shook, Shook, & Bingaman, 1975, p. 38). Throughout time, failure has been an important fuel for innovation and advancement, making the weak strong and the strong stronger. It is not to be a step backward, but instead an excellent stepping stone to success (Arruda, 2015). Failure is something everyone will deal with. It is an inevitable phenomenon and a part of human nature. Whether these failures are large or small, many innovators, educators, coaches, athletes, artists, actors, and leaders can agree that knowing how to respond to failure is far more important than the failure itself (Wenning, 2017). IBM's Thomas Watson Sr. even said, "the fastest way to succeed is to double your failure rate" (Farson & Keyes, 2002, p. 64). With failure being such a powerful tool, one would think that today's classrooms would be filled with it. Educators working to scaffold and guide students through the curriculum, teaching students how to fail and encouraging them to fail well. This review is meant give the evidence needed to inspire this practice as well as some ideas on how to do so.

Failing forward can be described as the ability to realize that failure is simply the price paid to achieve success and, therefore, use it to learn from mistakes and improve further attempts (Maddock, 2012; Maxwell, 2000). Apart from what successful professionals say about failure, studies also show that students who view failure in this lens, are more likely to engage in constructive activities regardless of the risk that may be involved, (Strum, 1971), enjoy learning and using problem solving skills (Cetin, Ilhan, & Yilmaz, 2014; Tay, Ozkan, & Akyurek-Tay, 2009; House, 2002), give greater effort to overcoming learning difficulties (Cetin et al., 2014; Clifford, 1988), and find pleasure in mastery (Harter, 1974).

Rationale

There are many students developing an irrational paralyzing fear of failure. Unfortunately for many, this fear is not driving the learner to acquire new knowledge from their failure, but is instead encouraging the adoption of fear avoidance strategies and ridding students of powerful learning opportunities. This review will discuss the avoidance strategies of learned helplessness (De Castella, Byrne, & Covington, 2013; Vandewalle, 1997; Fincham, Hokoda, & Sanders, 1989), decreased self-esteem (Cetin et al., 2014; Kocovski & Endler, 2007; Kuhl & Kraska, 1989), performance goal orientation (Cetin et al., 2014; VandeWalle, 1997), defensive pessimism (De Castella et al., 2013; Martin & Marsh, 2003; Martin et al., 2003), and self-handicapping (De Castella et al., 2013; Bartels & Herman, 2011; Zuckerman & Tsai, 2005; Martin & Marsh, 2003; Martin et al., 2001). As these avoidance strategies are explained, it becomes clear as to how they are not only damaging to the individual learner, but also the learning environment as a whole.

Growing up, I was fortunate to live in an environment where the development of an irrational fear of failure was unlikely as I was constantly encouraged through my successes as well as my downfalls. My home was built on a foundation that taught me and my siblings that we would always be loved, no matter the results we produced. Unfortunately for me however, I didn't prioritize the mentors at home and instead chose to listen to my peers who loved me only if I could hide failure and display some sort of desirable trait. This being said, failure was very hard for me and I spent an early part of my life very broken over not doing well in what I had valued. By God's grace alone, I was able to turn this fear into motivation for success, which drove me to work harder than everyone else in the areas that I valued the most. As I look back

now, understanding all of the different paths that these failures could have presented, I am continually grateful to God for the ability to respond the way I did. As I write this, I realize that my life could have looked very different without this gift. This literary review is inscribed in hopes of encouraging educators to be facilitators of this grace and create more opportunities for students and athletes to see this tool in the right light.

So many of today's educators are defined by their ability to enable their students to get the correct answers on standardized tests (Porter, 2015). Though this may be an excellent form of accountability for teachers (Boser, 2015), these tests have tempted many to abandon the goal of creating lifelong learners and only to develop the short term success of these students. This literature review is compiled in hopes of creating classrooms that value failure and the opportunity it presents while also helping instructors remember an important goal in education, to create passionate, creative, resourceful, lifelong learners who are ready to take risks (Littky & Grabelle, 2004).

Definitions of Terms

Important terminology, used throughout this paper, is defined as follows:

Failing Forward: Ability to realize that failure is simply the price paid to achieve success and, therefore, use it to learn from mistakes and improve further attempts (Maddock, 2012; Maxwell, 2000).

Fixed Mindset: Within this type of a mindset, people believe their basic qualities, like their intelligence or talent, are simply fixed traits. They spend their time documenting their intelligence or talent instead of developing them. They also believe that talent alone creates success, without effort (Dweck & Elliot, 1983).

Growth Mindset: Within this type of a mindset, people believe that their most basic abilities can be developed through dedication and hard work, brains and talent are just the starting point. (Dweck & Elliot, 1983).

Intrinsic Motivation: Motivation to engage in a behavior arising from within an individual due to the natural satisfaction associated with the engagement (Cherry, 2017).

No-Fail Systems: An often unwritten rule incorporated by many teachers in schools that heavily discourage awarding any student with a failing grade (Miller, 2009).

Performance Goal Orientation: Performance oriented students are interested in demonstrating their competence. Studies show that performance-oriented goals foster avoidance of challenging tasks due to anxiety about failure (Dweck & Leggett, 1988).

Personalized-Learning Environments: Goodwin (2017) says that and educator is creating a personalized-learning environment when their practices include using data to create student profiles and set personal learning goals, offering students multiple pathways to demonstrate learning, shifting teaching from providing information to guiding individual learning, and providing flexible spaces for large and small groups, mentoring, and independent learning.

Computer Mediated Instruction: Computer mediated instruction/learning is an umbrella term that describes the efficient and effective use of computer and/or technology to support and facilitate teaching and learning activities (Yu, Yu, & Lin, 2010).

Playing In the Zone: A state of platonic ecstasy in which challenges are just barely surmountable, building in difficulty without halting the flow of game play and success (Vallett et al., 2014).

Serious Educational Games: A game designed for a primary purpose other than pure entertainment (Djaouti, Alvarez, & Jassel, 2015).

Zone of Proximal Development: Distance between what students can achieve alone, and what they can achieve with help from peers or a teacher (Vygotsky & Cole, 1978).

Guiding Question

So many of today's educators are judged based on whether their students answer the right questions on a test or not (Porter, 2015). Therefore, in the pursuit for recognition and accomplishment in their careers, educators are seeking these high scores. This is not a bad thing as these test scores have been used to determine how to help many educators improve (Boser, 2015), but if this pursuit means an over-simplifying of the curriculum (Reading Today, 2010), students may miss what can be considered the main point of education, to create passionate, creative, resourceful, lifelong learners who are ready to take risks (Littky & Grabelle, 2004). Though it may sound contrary to the goal of high test scores, the use of failure and the development of a failing forward mindset has been found to increase these the likelihood of student adoption of lifelong learning attributes. For this reason, this literature review will seek to answer the question: How do students benefit from guided failure in the academic environment? As well as: How can educators implement the use of failure in the classroom?

CHAPTER II: LITERATURE REVIEW

The first section of this chapter aims to lay the groundwork of why the practice of failing should be immediately considered by educators, summarizing the meaning of failure, the current system, and fearing failure. The final two sections cover how failure is being successfully used and the behavioral implications of students who learn to fail forward. These last sections will provide the reader proven tools and expected outcomes of the impact that they will have on learners.

The Meaning of Failure

Bernada Nicole (2014) shared many reasons as to why alternative outlooks on failure should be considered. Through her own life experience and the observation and study of others, she has found that failure is not an unfortunate life speed bump, but instead a required stop along the way to success.

Regarding prevention or total avoidance as a natural response to failure, Nicole (2014, p. 12) writes how the successful person is going to instead view failure as opportunity saying, "the truth of the matter is that no one is perfect and in order to succeed, it is imperative that you fail at something". The reality is, human beings will make bad choices. Therefore, when this poor decision occurs, whether it lie in the realm of school, sports, relationships, spirituality, etc., in order to advance as an individual, they must respond in a fashion that would allow them not to experience the same type of disappointment again (Nicole, 2014).

The sooner individuals can make the switch from the normal practice of failing backward and move to a routine that applies failing forward, the sooner they will enable themselves to be a better father, mother, husband, wife, employee, leader, and the list goes on. As NCAA Coach,

Rick Pitino, believes, 'failure is fertilizer' and the reality is that 'if you're not failing, you're probably not really moving forward' (2014, p. 12).

The Current System

Believing that this type of learning is not being recognized or utilized in its full potential, Vallett, Annetta, and Kaufman (2014) thoroughly criticize the methods used in the modern day classroom and believe that educators should be pursuing the use of failure described above. Posner, Strike, Hewson, and Gertzog (1982), make this evident by pointing out the fact that rote memorization of 'right' answers are not going to drive our students to the goal conceptual understanding. They also add that many of the 'teaching to the test' strategies that are implemented in today's schools are not only discouraging mastery of the content, but also ridding of the students of the intrinsic motivation that would enable them to do so.

Along this line, J.R Miller, in his 2009 Fox News article, criticizes these educational strategies saying that the 'no-fail' systems are sending the message that 'the final product doesn't matter as much as having made an attempt, and that they will be accepted regardless of the outcomes of their efforts' (Miller, 2009). Seeming as though the current public school system has abandoned the old saying of 'if at first you don't succeed, try, try again' and replaced it with 'if at first you don't succeed, accept the poor grade and move on', Vallett et al. (2014) challenge to seek a design that encourages failure and activates the student's intrinsic motivation. Why? Vallett et al. (2014) believe that this motivation is needed to seek the necessary learning that will enable the student to overcome and note that if we want to increase conceptual understanding, we must take advantage of the strategy of failure and harness the power that intrinsic motivation has for learning.

Sources of Student's Fear of Failure

The main sources of the fear of failure demand our attention. While the list below is not a comprehensive explanation of where fear of failure is sourced, there may be some points that educators can absorb on how not to motivate learners.

In effort to discover the origins of the mindset that is labeled fear of failure in adolescent athletes, Sagar and Lavallee (2010) separately interview three athletes along with their parents (six, making nine total interviewees). Each individual was interviewed a total of three times. After analyzing the results of the interviews, Sagar and Lavalle (2010) were able to pinpoint three different parental socialization practices (or interactive processes whereby one person passes on their traits, values, attitudes, etc. on to another person through the use of education, observation, and experience) that heavily contributed to the athletes fear of failure, preventing them from being able to use the tool to advance, and, inherently, lessening the likelihood of their child's progress.

Punitive Behavior

Sagar and Lavalle (2010) labelled the first of these parental socialization practices punitive behavior. This practice included strategies such as criticism, punishment, and threat. When implemented, the athlete would see success in the sporting realm as pleasing his or her parents. These successes would also be connected to privileges such as receiving the parent's love and support as well as seeing them delight in watching them compete. The problem with this strategy was that it socialized a behavior in the student athlete that also saw failure as losing these privileges of love and enjoyment from their parents. Sagar and Lavalle (2010) give the example (that occurred in four of the interviews) of the dad walking away from the competition

when the athlete was doing poorly. This punitive action suggested that the parent only found pleasure in watching them compete if they were doing well and not failing in any way. Aligning with what Sagar and Lavalle (2010) find with punitive behavior in the sporting realm, Lewis (1992) also suggests that if an athlete notices the withdrawal of parental love as a result of failure, they start to see failure as shameful and connect it with not being worthy of love or affection from anyone. These connections can teach the athlete, student, etc. that failure will always come with the loss of love. This, therefore, causes the athlete to lose the correct view of failure and instead develop a fear of it (Conroy, 2001).

Controlling Behavior

Controlling behavior was the second parental socialization practice that Sagar and Lavalle (2010) discovered had a connection to the creation of the fear of failure in adolescent athletes. The authors expand on how this socialization suggests that by controlling their children, parents believe that they can bring about competitive victories and therefore make it more likely for them to become noticed by coaches. Much of the time, this controlling behavior is brought about from the parent's connecting their own success with the young athlete's, believing that others will think that they are more or less of a parent based on how their athlete performs in competition.

Though this practice does not sound so damaging at the surface, what Sagar and Lavalle (2010) found, over controlling attitude from parents produces a lack of autonomy in the young athlete, while simultaneously revealing the parents' fear of failure. As the young athlete would experience failure in competition, he or she would learn to feel guilty for letting down his or her parents, and all the time that they had put into ensuring his or her success. The failure was no

longer about the athlete's own growth, but it was about damaging the parents' ego, and fearing that the parents would feel as though he or she had wasted their time. As mentioned, when a student would start to compete for the sake of his or her parents, he or she would begin to lose his or her own sense of autonomy. This connection is crucial because autonomy also has been shown to be strongly connected to a student's self-determination, self-esteem, and intrinsic motivation (Barber, 1996), all of which are required to fail forward. Along with the loss of autonomy, as the athlete would realize that it happened to be the parents' own fear of failure driving thier controlling behaviors, the researchers found that this same fear would then have greater potential of creeping into the attitude of the child (Sagar and Lavalle, 2010).

High Expectations

The third and final socialization from Sagar and Lavalle (2010) fell into the simple label of 'high expectations'. Having high expectations for students, athletes, and one's own children in itself does not encourage fear of failure, but it occurs when parents communicate this socialization by suggesting, commenting, or displaying via body language that their expectations of their children are not being met when the athletes experiences competitive failure. Athletes that experience this type of socialization quickly associated failure with another even more impactful failure, letting their parents down. Sagar and Lavalle (2010) go on to suggest that athletes who experience this type of socialization are crippled from being able to see any benefit in their athletic failure as they concern themselves only with its avoidance in order to meet their parents' high expectations.

Fear of Receiving Negative Criticism

In effort to include research outside of athletics and parent influence, Jacobson (2013) as well as Cetin et al. (2014) include discoveries on how the fear of failure could potentially be sourced from a fear of receiving negative criticism.

Using Dweck and Elliott's (1983) definitions of fixed and growth mindsets when categorizing students, Jacobson (2013) observed that the students who shy away from failure, or as Dweck and Elliott (1983) would suggest, the students with a fixed mindset, saw the classroom as more of a stage than a than a place of learning. This is dangerous, it implies that the students with this mindset will be likely to completely avoid asking questions, or perform any sort of concept experimentation for that matter, in order to be perceived by their teacher and classmates as 'smart' (Jacobson ,2013). While on the other hand, Jacobson (2013) also found that the students who were characterized as having a growth mindset, recognized the value of failure by seeing the classroom as more of a place of learning and believed that this learning was brought about by conflict, experimentation, trial and error, and resolution.

In addition to what Jacobson (2013) sought to discover in his research, Cetin et al. (2014) published a study regarding the relationship between the fear of receiving negative criticism and taking academic risk, a key aspect of failing forward. Though these variables have been believed to have some relationship in the past, Cetin et al. (2014) sought to prove this assumption via a survey of 215 Dicle University students spread throughout various content areas.

In order to correctly scope the levels of the two variables (academic risk and fear of receiving negative criticism) in the students, each was broken down into a few different determining factors. These factors were then used to create questions that would enable the

researchers to gauge the student's levels of fear when receiving negative criticism or willingness

to take academic risk and allow an the assumption of correlation to be considered. First, the

factors involved in measuring the student's interest in taking academic risk were:

1) Recovery After Failure and the Tendency to Become Active Again (RFFTBA)

2) Tendency to Prefer Difficult Actions (TPDA)

3) Tendency toward Negativity After Experiencing Failure (TNAF)

4) Tendency to Skip Homework (TSH)

When developing questions, the researchers assumed, based on the research of Oner,

Sunkur, Ilhan, Kinay, and Kilinc (2013), that the students who are willing to take academic risk

would be high in RFFTBA and TPDA and low in TNAF and TSH . Second, the factors used to

measure whether the student had a high or low levels of fear of receiving negative criticism were

based off of student anxiety, attitude, interest, and motivation through straightforward and

reverse scored survey items.

As expected by past assumptions and studies, Cetin et al. (2014) found that there is a

relationship between the fear of receiving negative criticism and academic risk taking,

correlating at a rate of 35%. This, along with all of the other potential causes of fear of failure, is

important to note as educators look at how to create the failing forward mindset.

Outcomes for Those Who Develop an Irrational Fear of Failure

Though the results of putting forth effort and trying hard are undeniable, in the academic

and athletic environment, this effort is associated with high levels of risk (De Castella et al.,

2013). If one succeeds without trying, he or she displays great competence in their lack of effort.

On the other hand however, if a student shows great effort and encounters failure, especially in front of others, he or she is perceived as highly incompetent as he or she failed in the midst of their determination (De Castella et al., 2013). The results of this reality creates a student who implements defensive strategies in order to protect his or her self worth.

In effort to further support their survey validity, Cetin, Bayram, Ilhan, Mustafa, Yilmaz, and Ferat (2014) discover many useful differences between the behaviors of those who study, work, and just learn in general with fixed mindset versus a growth mindset. Along the same lines, De Castella et al. (2013) examine the relationship between fear of failure, success orientation, and student disengagement, also find some interestingly applicable results that encourage the idea why failing forward is needed to develop lifelong learning skills. Before unfolding the work, it is important to note that De Castella et al. (2013) apply Covington and Beery's (1976) self-worth theory that suggests that the highest human priority is the search for self-acceptance and can give rise to either a fear of failure or a reason to persevere in hopes of experiencing success.

Learned Helplessness. In discussion of the defensive strategies brought about from a learner's fear of failure, De Castella et al.'s (2013) emphasis lies on learned helplessness as it is one of the most debilitating responses a student, or human in general, can have to failure. Learned helplessness is a condition in which someone suffers from a sense of powerlessness to overcome a certain failure, it holds negative implications in the realms of student motivation, academic performance, general adjustment, and psychological health (Fincham et al., 1989).

Seeking to see how Dweck's (1986) discussion of goal orientation applied to those in the workplace, VandeWalle (1997) also found that when employees with a fixed mindset were given

feedback, asked to be observed, or faced with any sort of partially negative evaluations, instead of bringing out positive results, as most feedback is meant to do, it actually decreased the employee's future ability to learn. Regardless of how the employees dealt with the stress, they could not get over the anxiety associated with the idea of their failure and use the guidance that was being given to them to grow.

Decreased Self-Esteem and Academic Success. The second resulting behavior of a fixed mindset that Cetin et al. (2014) mentions is a decrease in a student's level of academic self-esteem and academic success. In support of these notions, using a sample of 174 undergraduate students at York University, Kocovski and Endler (2007) find that if an individual had shown to have a high level of social anxiety that he or she would rate lower in areas such as goal achievement expectancy, self-esteem, and frequency on self-reinforcement. Also, as mentioned above, Kuhl and Kraska (1989) also suggest that these students with a fixed mindset are less likely to reach the academic success of those students who have more of a growth mindset.

Performance Goal Orientation. The third problem behavior that Cetin et al. (2014) discuss is an increase in a disposition towards learning as an opportunity to demonstrate one's competence rather than increase it. In his study of goal orientation in the workplace, VandeWalle (1997) exemplifies these results by finding that those employees with more of a fixed mindset see feedback, or any opportunity for it like observations or evaluations, as tests where they must perform and show their competence rather than opportunities to advance their skill as their supervisor or evaluator intends. This therefore causes the employee with a fixed mindset to respond defensively and miss out on the learning all together.

Defensive Pessimism. One popular reaction to failure is defensive pessimism. De Castella et al. (2013) note that this defense can be seen in students who hold unrealistically low expectations for tasks where they are to be evaluated (Norem & Cantor, 1986). All of the 33-44% of college and high school students engaging in this type of defensive strategy (Martin & Marsh, 2003), use it to change the meaning of failure while control others' expectations as well as their own. Despite what the student's goal is with this strategy, namely, to avoid failure and preserve self-worth, research shows that when compared to optimism, defensive pessimism is closely linked with lower grade-point averages, significantly higher global life stress and dissatisfaction, and increase psychological problems (Martin, Marsh, & Debus, 2003).

Self-Handicapping. Bartels and Herman (2011) present a relationship between a student's fear of failure and the negative emotions created when failure happens. Bartels and Herman (2011) also discovered a relationship between the relief of negative emotions resulting from failure when self-handicapping defenses were being implemented by the student.

Aiming to find evidence for a relationship, Bartels and Herman (2011) surveyed 48 University of Minnesota, Rochester undergraduates containing students with high fear of failure and low fear of failure ratings. These participants were given a 25-item survey where they would rate (1-5) the level of their negative reactions (unhappy, disappointed, humiliated, and ashamed) in various classroom scenarios (Bartels & Herman, 2011). Their scores contained many subcategories: fear of devaluing one's self-estimate, fear of an uncertain future, fear of upsetting important others, fear of experiencing shame and embarrassment, and fear of important others losing interest (Bartels & Herman, 2011). Students were placed in several scenarios: a self-handicapping scenario that involved the use of a self-imposed obstacle prior to an exam, a

scenario in which lack of ability was implicated in failure (ex. an exam that the student had spent a good amount of time studying for), and a scenario in which no cause of failure was indicated (Bartels & Herman, 2011).

Bartels and Herman (2011) share that in every scenario (self-handicapping, personal failure, and ambiguous) those students with high fear of failure ratings showed greater negative emotions when faced with failure (see chart 1 in Appendix A for official results). Secondly, Bartels and Herman (2011) also found that among those students with high fear of failure, responses were found to be less negative toward the self-handicapping failures scenarios than the ambiguous failure scenarios. These results meant that the students who were more afraid of failure would aim to protect their self-esteem by incorporating some of these self-handicapping strategies (e.g. procrastination).

De Castella et al. (2013) also make note of this defensive strategy saying that self-handicapping also tries to manipulate the meaning of failure, but in a different way. The self-handicapping strategy is used by students to redirect the failure to excuses, one being procrastination. Students would rather tell others that they failed due to their lack of preparation rather than talk about how they worked hard and still received a poor grade as it would suggest a lack of self competence (De Castella et al., 2013). Finding the regular use of self-handicapping in 6-10% of the reported high school and university students (Martin & Marsh, 2003), this defensive strategy is noticed through many behaviors including task avoidance, denial, deliberately withholding effort, procrastination, lack of practice, reporting illness or other physical symptoms, drug or alcohol use, and the choice of other performance-debilitating circumstances (De Castella et al., 2013). Though it is not as common as defensive pessimism,

self handicapping is found to predict lower self-esteem and more negative affect over time (Zuckerman & Tsai, 2005), poor self-regulation, lower academic achievement, and increased likelihood of later withdrawal from studies (Martin, Marsh & Debus, 2001).

Defensive Strategy Effectiveness

De Castella et al. (2013) measured the likelihood of applying some of these strategies by conducting questionnaire with 1,423 Japanese high school students as well as 643 Australian students. In order to sort the results effectively, the outcomes of the students' with high fear of failure were separated from those who had low fear of failure levels. In both studies (Japanese and Australian) the results showed that the students who had a greater fear of failure were more likely to apply the defensive strategies of self-handicapping and learned helplessness (see charts 2 and 3 in Appendix A for official results). Breaking down the data further, De Castella et. al. (2013) also found disengagement, truancy, and lower overall grades more heavily associated with those students who possessed fear of failure (see charts 4, 5, and 6 in Appendix A for official results). These findings suggest that students who have high anxiety when it comes to facing a situation when failure is a possibility will place a higher value on staying safe, and therefore apply one of the three defenses, rather than the learning or improvement they could gain from experimentation. Despite the motivation behind the defensive strategies, De Castella et al. (2013) suggest that those students who are seeking to preserve the appearance of their competence are unable to escape these fears as the strategies that they are applying are keeping them from becoming competent and leading to further failure by preventing the potential learning that could occur.

In support of the conclusion above, Elliot and Church's (2003) study suggests that self-handicapping strategies are a result of fear of failure, while Bartels and Herman (2011) also suggest that students who are identified as having a high fear of failure, underutilize cognitive strategies (e.g. metacognitive thinking) that would help them recover from their failure. Instead, they over utilize cognitive strategies (e.g. self-handicapping) that would actually increase the likelihood of future failure. In other words, Bartels and Herman (2011) propose that students who are not taught how to view failure are going to be more likely to use these self-handicapping strategies to spiral deeper into it.

Failing Forward Educational Practices

Knowing that the failing forward mindset is hindered by the creation of an irrational fear of failure, it will be important to now note how to intentionally bring about the mindset of failing forward. In effort to do so, this section discusses teaching strategies along with alternative forms of education that have successfully encouraged the use of failure in curriculum.

Personal Learning Environments

As personal learning environments shift teaching from providing information to guiding individual learning, the strategy becomes one way to encourage the practice of failing forward. After the initial learning and instruction has taken place, Goodwin (2017) notes that when applying the strategy of personal learning environments, there are four new educational elements required in the curriculum. First, educators must use student learning data to set individual learning goals for each student. Second, teachers must offer students multiple paths to get to this personalized goal. This opens up the learning so that it will not favor one intelligence over another. Third, Goodwin (2017) says that instead of providing information, educators using this

type of learning strategy are there to instead facilitate the individual learning that is occurring.

Finally, in order for these first three steps to be possible the last element that Goodwin (2017)

noticed teachers need to create a flexible workspace that allows for the use of large and small

groups, mentoring, as well as independent learning.

Seeking information on the effectiveness of the practice, Goodwin (2017) shared the

results of a few recent studies. Though these studies are particularly unscientific as they do not

take into account many outlying factors such as parental support, Goodwin (2017) applauds the

strategy as each study displayed a positive result for the students engaged in a personal learning

environment.

The RAND Corporation completed a study that focussed on 11,000 low-income and

minority students over a three year period and found positive results when the students scores on

national assessments were compared with their peers nationwide (Steiner, Hamilton, Peet, &

Pane, 2015). Starting below average, the students who experienced the personalized learning

environments over the three years ended scoring above average on the national assessments.

These results displayed their strength in the particular areas of math and reading with 0.27 and

0.19 effect sizes.

Another promising study was undertaken at four California high schools containing a

majority of low-income students of color (Friedlaender, Burns, Lewis-Charp, Cook-Harvey, &

Darling-Hammond, 2014). Concluding the study, Stanford University found that the students

from the schools that implemented these personalized learning environments had outperformed

many of their peers in nearby schools displaying higher graduation rates, greater gains on state

achievement tests, more enrollment in college preparatory courses, and higher

college-persistence rates (Friedlaender et al., 2014).

Lastly, Goodwin mentioned a study completed at Columbia Teachers College (Ready, 2014) that included 4,117 students representing 15 schools. After only a year, students exhibited mathematics learning gains that were 47 percent higher than the national norms, a considerable gain considering that the strategy had only been implemented one year.

Noting that though the studies mentioned could have been more scientifically performed, in the summary of his observations, Goodwin (2017) was mostly positive as each of the studies compared a similar group of students and used similar state achievement tests. This being said, Goodwin (2017) summed up his observations by recommending guided failure through personalized learning environments as these environments were shown to be more effective in not only increasing the students' test scores, but also increase the likelihood of them becoming lifelong learners.

Electronically Scaffolded Failure

Encouragingly, failing forward is not totally foreign to young adults and is actually practiced by many young people in environments outside of the classroom. Vallett et al. (2014) compare the failure that young people must face in the athletic or video game realm to the counterintuitive systems that are put in place in the classroom.

Spending ample time on the topic of video games and how game developers almost accidently apply the scaffolding and Zone of Proximal Development concepts of Vygotsky and Cole (1978), Vallett et al. (2014) also describe much of what educators can learn from this realm of society. The advancement towards a goal in a video game, as in sports, is always paired with

defeat or failure. The failures that the gamer may experience such as the player's avatar dieing, losing a race, or not meeting the current military objective are coupled with the appropriate consequences, which, most of the time, is having to start a segment of the game over forcing the gamer to rethink their strategy in order to better master the failed situation. This 'playing in the zone' model that developers' strive for provides gamers with just the right amount of challenge without completely halting the 'flow of game play' (Annetta, 2010), and instead of being hindered by these challenges, players are motivated to proceed because of them.

Computer-mediated instruction. Vallette and Annetta (2013) used their findings to suggest the use of computer-mediated instruction (CMI) and serious educational games (SEG). Vygotsky and Cole (1978) say that in order for students to learn, as well as be motivated to learn, they should be kept in what is called the Zone of Proximal Development (ZPD). This zone is attained when the student is challenged to a degree that is just beyond his or her reach, but is encouraged and enabled to meet this challenge with the help of an expert. Vygotsky and Col (1978) considered this expert to be face-to-face, and even sometimes one-on-one training. What Vallett et al. (2014) suggested is that the ZPD, a place where there is a high likelihood of failure and learning, can be effectively reached through the expert guidance of a professional through the medium of computer games.

In effort to prove the effectiveness of computer-mediated instruction in education, Proserpio and Magni (2012) analyzed the use of a business education game with 173 undergraduate students. To implement this CMI, the instructor would interact with the class only during introduction and conclusion while also taking time to check in with groups as they progressed in the game. Believing that some of the best learning can come from peer

conversation and interaction about a topic, the authors chose to compare how much influence the game had in comparison to the group interaction. Upon collecting data via a survey that was conducted after the completion of the learning segment, Proserpio and Magni (2012) suggested that the perceived learning is even more influenced by the technical features of a game than the group interaction. Results also surprisingly showed the interaction of the professor had a negative effect of perceived learning, as it only drew the students away from their focus on the education that they were absorbing by progressing through the CMI.

There are other examples of CMIs, and video games in general, being able to effectively use the ZPD to capture attention and heavily encourage the overcoming of failure to produce learning and increase competence. One example being a test of 275 seventh year students in Chile (Garcia, Nussbaum, and Preiss, 2011). This test was used to show that the use of information and communication technology in school increased the development of student's working memory. Also, in an analysis of ninety undergraduate and graduate students, Hutton and Sundar (2010) suggested that video games, specifically Dance Dance Revolution, increased student arousal. These same authors suggested that this arousal is connected to the amount of energy students use to be creative, saying that at their highest points of arousal, students were using less mental energy to construct creative ideas.

Serious educational games. Much like CMI, through the use of a serious educational game (SEG), educators can lock into the ZPD by enabling students to learn in the social context by interacting with an in-game expert (Blumen, Gopher, Steinerman & Stern, 2010). Vygotsky and Cole (1978) believed that learning could be better accomplished in the social context, where the learner interacted with a challenging environment that was scaffolded by an expert. Without

the guidance, or at least scaffolding from the experts, students may reach a point of failure and not know how to overcome it (Vygotsky and Cole, 1978). Vygotsky and Cole (1978) believed that experts needed to be involved to give the student the minimal amount of scaffolding needed to understand and conceptualize the topic of challenge. In the case of student failure, Vygotsky and Cole (1978) also suggested that access to this social interaction would better enable learning to occur from the failure rather than the alternative result of confusion and discouragement.

How do video games capture this social aspect? When most think of the concept of video games they picture a young person sitting in front of the TV with a controller hardly taking the time to blink much less interact with others (Matthews, 2001). Within the concept of SEGs, and actually most video games, there is an aspect of social interaction with an expert. How else would it be possible for young people, and older adults (Blumen, Gopher, Steinerman & Stern, 2010), to overcome their incompetencies of a game when first introduced to it? If observed, most games take the time to have the gamer's avatar interact with experts via tutorials, introductory missions, other players, etc.. These experts are used to train and ensure that they gamer is beginning to understand the new virtual environment that they have entered. From these 'in-game experts', a gamer learns different strategies throughout the progression of a game that will enable them to overcome the increasingly harder, more complicated aspects of the game's storyline. As gamers progress and meet testing intellectual challenges, the 'in-game experts' are used to remind the user of what he or she has learned up to this point as well as what part of the learning may be helpful in overcoming the current obstacle (Vallett et al., 2014).

There is no question that gamers meet failure throughout the progression of a video game, the question is however, why are they motivated to overcome their failure? Vallett et al.

(2014) suggest that the answer lies in the idea of ZPD. When gamers meet these failures, they are not met with what they see as an impossible task, but one that can be overcome if they execute the mission, race, or task slightly differently during their next attempt. Vallett et al. (2014) claim that this 'deliberate practice' is part of the process of gaining conceptual understanding, and that in order to become an expert, or master the content at hand, students must have the opportunity to execute deliberate practice, which can be attained through the use of SEGs. The authors suggest that this deliberate practice, which forces a student to think about their failure and how they may change to overcome, could be the reason that so many educational organizations such as the military, medical, and business schools have implemented the use of SEGs.

Modern Video Game Model

Regardless of the use of SEGs, CMIs, etc. this model of having just the right amount of challenge needs to be present so students can encounter failure and learn what strategies are going to be useful in helping them overcome such obstacles (Vallett et al., 2014). Vallett et al. (2014) noticed the challenge does not seem to be getting educators to agree with this, but the challenge instead lies in enabling them to perform this task with thirty, forty, or even fifty students, all of whom may be at different levels within the learning segment. This dilemma brings points back to the age old question of how does one teacher help the students who haven't learned while also helping the students that are learning and have already learned the content. After analyzing some of the study associated with independent learning via the use of CMIs and SEGs, it seems as though these may be an answer, but SEGs, in themselves, are not the only way that this can be successfully accomplished (Vallett et al., 2014). What must still be discussed is

how these strategies used to build effective SEGs such as interactivity, identity, scaffolding, reaching 'pleasurable frustration,' and assessment can be applied in today's classroom without the use of SEGs.

In effort to discover why his six year old son's video game held his attention so well, James Gee (2007, p.2), a Professor at the University of Wisconsin - Madison, ended up discovering many of the reasons why video games are such effective teachers and how to implement what they are doing in the classroom. Not having encountered the addictive challenge of video games before, Gee (2007) was amazed at how they were able to draw so many young people to pay good amounts of money only to 'engage in an activity that is hard, long, and complex', but after his first encounter with his son's game, he was enthralled with how the video game was designed to hold his attention so well. Therefore, in effort to more thoroughly discover how good games kept the attention and motivation of the learner, Gee (2007) worked his way through many other high end games like *Halo*, *Legend of Zelda*, etc.. After doing so, Gee (2007) developed the following points on how teachers can enable students not only work through hard, long, and complex learning where they will experience failure, but also enjoy it.

Identity. Gee's (2007) first discover is that effective video games connect players to the learning by making them identify with the avatar. He suggests that this identification with the game's focus character enables learners to value the learning as they see it almost as themselves advancing through the virtual world. This connection to the identity of the character builds in the gamer the intrinsic motivation needed to progress through the game's challenging curriculum. Suggesting that no learner, whether in academics, athletics, or professional life, will

experience deep learning without making an extended commitment, Gee (2007) commends the way video games are able to help do this and proposes that educators work to enable identification to the various professionals associated with the curriculum.

Interaction. Unlike our books in education, Gee (2007) points out that gamers live in a world of interaction. Nothing happens in the game until they make a move and either succeed or fail. They must act so the game can act back and give the gamer feedback as to how to conquer the challenge at hand. Gee (2007) applies this by suggesting that educators work to create an environment where students actions within the content are followed by immediate reactions from learning world around them. Using manipulables such as craft sticks, water beads, legos, computer programs, or apps to teach counting or number sorting is one example of how this strategy is currently being implemented in many K-12 math courses (Martin, Spader & Johnson, 2017).

Production. Gamers are part of a world that they help create. Gee (2007) states that they don't only read the story that is created, but help write the story as they progress through the game. Different decisions that a gamer makes while progressing through a game can mean slightly, or sometimes even totally different outcomes later in the storyline. By letting students have options that let them have a say in the destination of their discipline is a way educators can take advantage of this way of learning (Gee, 2007).

One example of how this production method is being implemented in today's classroom is via the use of field experience. Vanderbilt University's Claiborne, Morrell, Bandy, and Bruff (2017) give several examples of how this type of learning can be implemented in any discipline. Through the thoroughly planned use of research field trips, service learning, and outside of the

classroom technology, educators can give their students the chance to creatively produce some of the results involved in their learning (Claiborne et al., 2017), and, as Gee (2007) suggests, create more motivation to learn from their failure.

Risk Taking. In his observations, Gee (2007) notices that video games have low consequences for failure. This inherently encourages the gamer to risk more than they normally would in effort to advance, learn, and progress through the game's curriculum. If the consequence for failure was too high, though the gamer would possibly be more careful in their attempt at the game's challenges, they would progress through the game's curriculum at a slower rate. Learning from the mistakes that the gamer makes in the first attempt would not be possible without it, namely the first failed attempt. Based on the results low risk has in the video game learning, focusing on how to enable experimentation by lowering the consequences for early, formative failure is what Gee (2007) suggests for the classroom.

It should be noted that this particular observation of Gee's may help give inspiration to teachers looking to combat the use of fear avoidance strategies. Many of the students who implement learned helplessness, defensive pessimism, or self-handicapping find some of the motivation to do so in the idea of staying safe, as they see the failure as a high risk situation. Lowering the risk involved in activities such as practice quizzes and giving effort to create classrooms that are safe spaces for students to explore and try things are some ways teachers are currently using this strategy (Martin et al.,2017).

Customization. Gee (2007) noticed that gamers are normally enabled to customize a game to fit their learning or playing styles. Missions are able to be completed in various forms and gamers are enabled to apply their "interests, desires, and styles" in order to complete the

challenges they face (Gee, 2007). Much of the time, gamers can also customize the level of difficulty they will face when trying to complete an objective, enabling the less experienced learner to conquest through the learning at the same rate as the more experienced gamer.

Supporting the effectiveness of customization, Wilson (2011) notes three different areas for potential, student lead customization of curriculum. If a student were to have some flexibility in their content, schedule, and length of courses, Wilson (2011) states that just rising the opportunity for this slight customization would not only increase student satisfaction, but would also give more of an opportunity to cross-curricular application.

Agency. Along the same lines, as Gee (2007) progressed through each of the game's' challenges, he was motivated by the sense of ownership over what was accomplished in the game. In multiplayer modes, a player's achievement is often rewarded with a special equipment, badge, or level upgrade that can be seen and admired by other players in the virtual world. As recognition is considered an essential piece to workplace culture and ownership (Brick, 2012), there is no reason to ignore the effect that it could have in the classroom.

Well-Ordered Problems. Instead of problems being randomly placed and unused throughout normal educational curriculum progression, Gee (2007) along with Vallett et al. (2014) point out how games are designed to constantly incorporate and require the use of previous learning for success. Challenges that players overcome early in the game are used to develop ideas of how to overcome later obstacles the gamers are faced with (Gee, 2007). Much like many mathematics, physical education, and technical education classrooms, Gee (2007) suggests bringing level based curriculum to the classroom by requiring the use of earlier learning throughout course progression.

Challenge and Consolidation. Similar to Bandura's (1997) research on building student self-efficacy, the belief he or she can perform a certain task, via repetition, and eventually, successful repetition, Gee (2007) perceived that the games that really captured the learner were the ones that continually brought them through challenging situations. In his study he notes how these repetitions enable the learning to be internalized and instinctual and therefore encourage the gamer to use and modify their theories about the virtual world as the game difficulty progressed. Bereiter and Scardamilia (1993) label these repetitions as the "Cycle of Expertise", making a strong statement saying that it is virtually the only way to become an expert at anything. Providing and motivating these repetitions for students will enable educators to take similar advantage of challenge and consolidation and (Gee, 2007).

'Just in Time' and 'On Demand'. Recognizing that people have a hard time understanding many new words when they are out of context, Gee (2007) applauds video game developers for giving the gamer the information they need right when they can apply, use, want, and is ready for the information. Instead of giving a list of words at the beginning of the game's level, chapter, mission, etc. video games are designed to give the gamer only the information that they need to succeed in the moment. This strategy rids of any sort of forceful memorization of terms while still helping the gamer understand the context of the situations they face. One way this strategy is being implemented is through the teaching of vocabulary via storytelling. After studying several different vocabulary teaching strategies, Ananthia (2016) noted that her preference of teaching via story was due to the method's ability to motivate the learners to understand the terms in order for them to fully grasp the narrative.

Situated Meanings. Instead of defining a word with only other words, in his research and observation, Gee (2007) notices how video games introduce new vocabulary to the gamer. He points out that they give the learner everything that the research of Barsalou (1999) and Glenberg (1997) suggests they need to grasp the term. By situating the meaning of the new word with the 'actions, images, and dialogues they relate to' (Gee, 2007, p.8), the gamers are able to grasp and master the use of the new terms so they can understand how to advance further in the game's story. Educators applying this to the classroom will not only keep content language connected to the the context but will also define the needed vocabulary with the experiences and situations they refer to (Barsalou, 1999; Glenberg, 1997).

Pleasantly Frustrating. Keeping the gamers right on the edge of their competence, Gee (2007) suggests that these gamers are pushed to overcome challenges that are just out of their reach, as these challenges are perfectly placed to motivate the gamer. No one would invest in a game that was too easy or did not challenge the gamer to increase his or her abilities within the virtual world. Therefore, combined with the other strategies listed, Gee (2007) believes that good game developers are excellent at motivating learners to overcome via the correct amount of challenge and that educators should also work to create this pleasant frustration for students in the classroom.

Agreeing with Gee (2007) and his notion of pleasant frustration being a motivator within video games, Martin et al. (2017) share ideas on how to potentially make this a reality in a classroom. First, by exploring the 'wicked problems' in the professional field that the learning is applied in, Martin et al. (2017, p. 9) believe that educators can motivate the learners to be creative in how the course content could be used to address these problems. They also suggest

implementing simple applications such as a 'challenge of the day' and 'low stakes/high difficulty practice tests' (Martin et al., 2017, p. 9).

System thinking. Gamers are forced to think about relationships throughout their gaming experience. In most game campaigns, when players make choices or take various actions within the game, they have to think about how it will affect their own future within the game's storyline. Going further, within video game multiplayer settings, they not only have to think about how it will affect their own virtual world but others around them as well (Gee, 2007). Knowing that our world is becoming more globally connected everyday, Gee (2007, p. 9) states that 'such system thinking is crucial for everyone.

Explore, Think, Rethink. Instead of inspiring gamers to move through a game and conquer the missions as fast as they can, game developers build games where players will get the richest experience if they incorporate in-depth exploration before moving on to the next objective (Gee, 2007).   This model of exploration, thinking, and rethinking enables gamers to use in-depth knowledge (gain supplies, find a key, learn a piece of important information, etc.) of the virtual world to more effectively overcome challenges they may face later in the game. So often in today's classrooms, much of 'being smart' includes moving as quickly towards an end goal (ex. assessment) as possible (Gee, 2007).

One way that this has been implemented in the classroom is via the use of sandboxes. Martin et al. (2017) describes a sandbox environment as one 'where students feel comfortable sharing and trying out their ideas and beliefs. Applicable forms of this environment could be simply implemented via the use of a discussion board aimed at exploring certain content and is graded only based on participation (Martin et al., 2017).

Smart Tools and Distributed Knowledge. Gee (2007) also notices that in order to meet exceedingly challenging objectives, players must know vast amounts of information. He states that video games do a great job of teaching each of these different aspects of the virtual world through the gaming experience, but while the gamer is progressing through the storyline, early in the game these said 'smart tools' kick in to enable the gamer to continue without having to be an expert in every facet of the virtual world. These smart tools may show up as virtual members that are a part of your team, group, squadron, etc. and can execute a necessary piece of the puzzle or eventually give you direction on how to advance when faced with a new situation. So often in education, students are faced with very large and unfamiliar concepts. Gee (2007) suggests that the use of these 'smart tools' may be a good answer in helping the student handle a digestible amount of information at a time while still allowing them to see how it fits in the big picture.

One way many business teachers have implemented this strategy is via the use of *The Stock Market Game*. As the tool enables students to make mock financial transactions within their digital platform, educators are encouraged to build on the understanding of these transactions as the game progresses (Higler, 1999). For example, during week one of an investing course, students may be encouraged to log onto the game and make a transaction simply recording some basic information (Higler, 1999). As the weeks progress however, the student may be required to break down future transactions and their meaning more thoroughly as he or she will be more aware of what each transaction entails (Higler, 1999).

Cross-Functional Teams. In order to help gamers increase their competence within a virtual world, many video game multiplayer settings enable gamers to specialize in certain areas of the game and group together as a team, each member with different specialties, to more

efficiently overcome the challenges they face (Gee, 2007). One example of this could be in the military game titled *Call of Duty*. Within this game's multiplayer setting, members of an online team may specialize in distance, short range, explosives, etc. in order to better help the team reach the objective. Based on the player's amount of proficiency in their position, he or she will rank up or down and be paired with players that match their skill level as they progress. Due to the fact of this model being so prevalent in the modern day workplace, Gee (2007) suggests that students will be more ready for this reality if they have the chance to experience and be a part of cross-functional teams in school.

Performance Before Competence. Gee (2007) lastly mentions that video games enable the learner to experience the application of what is being taught before they are totally competent with the material. He suggests that this is what makes it possible for gamers to so quickly adopt the in-depth language and ideas within the virtual world.

After experiencing what many of the good video games have to offer their customers, Gee (2007) found it no surprise as to why gamers were so willing to joyfully work through such complex curriculum. By using much of what research has shown to be effective in the realms of motivation, teaching, and challenge, video game developers are able to hook their audience, create buy in, and encourage their learners to stretch beyond their limits. This, of course, is forced to be brought about because of commercialism as developers know that the customer will not pay for a game, if they must first sit through a class on how to play it. Knowing this, Gee (2007) challenges his audience not to bring video games into the classroom, but to join the many educators who have begun to apply some of the concepts of identity, interaction, production, risk taking, customization, agency, well-ordered problems, challenge and consolidation, just-in-time

learning, situated meanings, pleasant frustration, system thinking, sandboxes, smart tools, cross-functional teams, and performance before competence.

Athletics

Another avenue that may contain some answers of what failing forward looks like can be found in the athletic realm of education. As Vallett et al. (2014) touched on athletics, they described how many students who have experienced participation in sports, especially at the junior varsity or varsity levels, have been intrinsically forced to think about the consequences of failures, and, therefore, motivated to take action to prevent these consequences (Vallett et al., 2014). Some examples include: a team loss, a playing time reduction due to a peer, not making an athletic team, and so on. Students in these environments are challenged to cognitively process their failures and, in avoidance of the consequence, figure out a way to improve their play or not make the same mistake again (Vallett et al., 2014). With fear of failure being such a prevalent anxiety in high school sports, it will be important for this literature to note how successful athletes cope with, or handle, failure when it occurs (Haglind, 2004).

Haglind (2004) stated that it is inevitable that athletes are going to face failure at some point, and how they cope with this failure has a large impact not only on the remainder of the competition, but also the athlete's sporting season. Knowing how successful athletes cope with failure and how good coaches train and enable these athletes to develop these coping strategies may be helpful for educators that desire implement failing forward in the classroom (Barber, 2015). In hopes of pinpointing the coping strategies of some elite high school athletes, Haglind (2004) interviewed seven elite high school track athletes and three high school track coaches. His results contain 385 units of raw data that lead him to the following findings.

First, in analyzing the athlete's initial reaction to failure, not to his surprise, Haglind (2004) found that every athlete responded to failure in a negative fashion. He found that stress, fear, frustration, and even feelings of illness were immediate results of failure on the athletic field. These 'elite athletes' are responding no differently than many of the students who experience failure in the classroom (Hjeltnes, Binder, Moltu, & Dundas, 2015), and may mean that many of the coping strategies that were used by the athletes may also be successful for many students.

After discovering that their initial responses to failure were fairly consistent, Haglind (2004) looked to find out what many athletes saw as the consequences, or what naturally comes about from failure. These findings were encouraging as even though the athletes responded to failure negatively at first, they showed that they knew that there was potential for development and a chance to learn from the failure. Their responses to the consequences portion of the interview suggested that all the athletes and coaches participating believed that an athlete would come out of a failure stronger than he or she had been before the failure had occurred (Haglind, 2004).

This being the case, how does this initial negative thinking shift into a form of constructive or positive thinking about athletic failure, and not run into many of the handicapping strategies that are so common for students who fear failure? Haglind (2004) perceived that the manner in which athletes were trained to cope with the failure could have a connection to how these failing forward mindsets would be brought about. Therefore, in his interviews, Haglind (2004) lastly sought to discover how these athletes were coping with failure and how their coaches were supporting them through this process. What he found was that the

athletes were coping by acknowledging the failure while also taking time to analyze and discuss it with others. This would enable them to both see for themselves where they may have made a mistake and hear constructive feedback from their peers. In order to cope with the reality of each scenario of failure, Haglind's (2004) interview also suggested that it was popular for these elite athletes to intentionally give effort towards turning away the negative thinking initially felt. The athletes did this in order to more quickly initiate the process of uncovering the positive learning this failure could provide and prevent the negative crippling effect that is ever so popular among young athletes.

As far as the coach's role in this coping process, Haglind (2004) found that that it was mainly to adapt the athlete's training in order to prevent the same failure in the future, reinforce what the athlete did well in the midst of their failure, and motivate the athlete to strive for the goals that they had set to accomplish before their failure occurred. By doing these three key activities, coaches were able to remind the athlete that he or she, as their coach, still believed that the athlete could still reach their goals (Haglind, 2004). Haglind (2004) also would also finally suggest that the coaches and athletes form better lines of communication so that they each could see and understand each other's goals better, enabling both the athlete and the coach to overcome the failure quicker and move on to improving the next attempt. This timely communication to the athlete will, to an extent, work to prevent unnecessary consequences sourced from the athlete's contemplation of the failure (Haglind, 2004).

Lifelong Learning Behaviors of Students Who Learn to Fail Forward

Along with the negative results tied to a fear of receiving negative criticism mentioned earlier, De Castella et al. (2013) are also enabled to suggest that the students who have a better

understanding of how to use the tool of failure are less likely to skip class or give up on school and more likely to be engaged in the classroom and produce better overall academic results.

Though the connections presented below have been suggested in the past, Cetin et al. (2014) uses them in this study to create effective survey questions that would have a direct connection between the two variables of fear of receiving negative criticism and taking academic risk. In defense of his survey section regarding the willingness of students to take academic risks, Cetin et al. (2014) note that past research has shown that students who are more likely to take academic risk are going to have the following positive characteristics.

Willing to Participate Despite the Likelihood of Failure. The first positive characteristic associated with students who are willing to take academic risk in the hopes of learning is that they are willing to participate despite the likelihood of failure (Strum, 1971). Focusing on how creative climates promote creativity in the classroom, Strum (1971) found that the students who are put in environments that 1) contain mutual trust, confidence, support for ideas, and open relationships among instructors and peers, 2) challenge and motivate based of the organization's goals, 3) allow for freedom to show initiative, and 4) have pluralism in views, knowledge, and experience, are going to be more likely to use their learning time to experiment and learn from their failure.

Enjoy Learning and Using Problem Solving Skills. The next positive behaviors that Cetin et al. (2014) associate with students who take academic risks are that they enjoy the process of learning, are motivated to learn, and use problem solving skills. Using a sample of seventh, eighth, and ninth grade student from two school districts in Arkansas, and four different survey instruments measuring academic risk-taking, self-efficacy levels, demographics, and

academic ability placements, House (2002) found sufficient evidence to support the assumption that students who took academic risks were those who were motivated to learn. Along the same lines, Tay et al. (2009) took a survey of 103 students found that there was a positive relationship between the students' academic risk taking levels and their problem solving ability level.

Give Greater Effort to Overcoming Learning Difficulties. Cetin et al. (2014) proposed that students who display academic risk give a greater effort to overcome difficulties beset in the learning process. Clifford (1988) also made this claim after analyzing the choices 233 students made when given the option to select 12 of 80-90 problems of varying difficulty. Upon analyzing the results of the student's choices and pairing them with other observations and surveys, Clifford (1988) was able to confirm that these students who are willing to take risks are going to be more likely to work harder, and therefore learn more thoroughly, when faced with an academic difficulty.

Pleasure in Mastery. It is important to note that students not only benefit from failure, but also develop the lifelong learning trait of finding more pleasure in mastery when they are challenged to these levels where failure may be more likely. Harter (1974) was able to provide evidence supporting two important pillars to the idea of failing forward.

The first of these pillars was found using a sample of forty students attending Foote School, a private school in New Haven, Connecticut. Harter (1974) used word anagrams to quiz students one by one to find out whether they would derive pleasure from cognitive mastery on problem-solving tasks. Comparing the students' results to the amount of smiles made throughout the anagram as well as the student's surveyed enjoyment ratings, Harter (1974) was able to conclude that the students who were able to use trial and error to land on the correct solution to

the anagram did have significantly higher levels of smiling (0.42 for correct compared to 0.11 for incorrect) and enjoyment (3.66 when correct compared to 2.88 when incorrect).

The concentrated aim of Harter's research was to provide evidence for the relationship between task difficulty and pleasure derived from cognitive mastery (Harter, 1974). By employing the same tests and surveys mentioned for the first pillar, Harter (1974) was able to measure whether learners do enjoy more challenging problems. In hopes of avoiding some of the mistakes that had been observed in past studies, Harter made sure that the difficulty of the task could be measured from two viewpoints. The length of the word was the first way that Harter (1974) measured the difficulty of unscrambling various lengths of words, noting that a longer scrambled word is clearly more difficult to rearrange than a shorter one. Second, Harter (1974) used word anagrams (e.g., tale) and nonsense anagrams (e.g., inem) and attributed greater difficulty ratings to the word anagrams. After gathering the data from only those students who were able to solve the anagrams, Harter (1974) was able to conclude that the smiling repetitions increased throughout the increase of the word length (from a 0.34 smiling level for three letter anagrams to a 0.48 smiling level for five letter anagrams) as well as anagram type (five letter nonsense anagrams - 0.35 to five letter word anagrams - 0.60). Realizing her results, Harter (1974) confidently suggested that students are more intrinsically motivated to strive for mastery when challenged with tasks that they see as more difficult.

In summary, failing forward is essential for K-12 students, as it will not only prevent them from learning to implement defensive strategies such as learned helplessness (De Castella et al. 2013, Fincham et al. 1989), defensive pessimism (De Castella et al., 2013; Martin & Marsh, 2003; Norem & Cantor, 1986), and self-handicapping (De Castella et al., 2013;

Zuckerman & Tsai, 2005; Martin & Marsh, 2003; Martin et al., 2001) but also will create

lifelong learners who are willing to participate despite the likelihood of failure (Strum, 1971),

enjoy learning and using problem solving skills (Cetin et al. 2014; Tay et al., 2009; House,

2002), give greater effort to overcoming learning difficulties (Cetin et al., 2014; Clifford, 1988),

and find pleasure in mastering their content (Harter, 1974). Some of the ways educators can

bring about this more constructive view of failure is by making sure their students harness the

value of critical feedback and how to use it to get better. One current teaching model that was

introduced was the strategy of personal learning environments (Jacobson, 2013). Though this is

the only official and comprehensive strategy discussed within the review, it has very encouraging

statistical results for those educators thinking of enacting it. Alternatively, in order to bring

about this way of thinking, teachers could also enable their students to enter the ZPD by

effectively applying the less comprehensive strategies that are being implemented by current

video game developers (Vallett et al., 2014; Gee, 2007) as well as many sports' coaches (Barber,

2015; Vallett et al., 2014, Haglind, 2004). All in all, if educators are able to foster this mindset

of failing forward and rid of the fear of failure that is fairly popular in the current society, a likely

outcome will be learners who carry the lifelong learning attributes of academic risk taking, an

enjoyment for learning and using problem solving skills, grit, and pleasure in mastery.

CHAPTER III: DISCUSSION AND CONCLUSION

With failure being such a prevalent and necessary piece of human existence, much has

been written on how one should view and respond to the phenomenon. The main alternative,

called failing forward, or learning from what went wrong (Maddock, 2012), is what some

researchers believe is the best option for learners when faced with failure. As fear of failure

has various negative repercussions, failing forward has shown promise in helping students develop the lifelong learning skills needed to succeed.

Though there is evidence supporting the positive learning results associated with the failing forward concept, Miller (2009) suggests that the current education system has moved away from the idea of teaching through failure, stating that this shift can be seen through the exceptional climb in students graduating from high school with an A average (Toppo, 2017). Though this normally would be looked at as a positive statistic, Toppo (2017) states that though today's high school seniors are graduating with more A's (up 8.1% since 1988), their SAT scores are shrinking (from 1,026 in 1988 to 1,002 in 2016). Harvard has also pointed out that only 56% of college students complete a four year degree while only 29% of those who start a two-year degree earn it within three years (Symonds, Schwartz & Ferguson, 2011). Miller (2009) uses these statistics to suggest that these A's are not a result of better student learning, but are evidence of lower standards in the classroom. Though failure may be more likely, setting standards closer to what these students are going to experience after graduation will give them more opportunity to meet the standard as well as how to respond when it has not been met (Lemov, 2010).

Uncovering why today's students are so afraid of receiving any form of failure, researchers discovered multiple socialization practices that can come from parents or a very personal direct influencer, that support this mindset. The first of these practices, punitive behavior, connects the learner's failure with the loss of love and affection from a parent (Sagar & Lavalle, 2010). Second, along with losing his or her sense of autonomy in the learning, when a student is experiencing over controlling behavior by a parent, interviews have shown

that he or she can begin to adopt the parent's own fear of failure that is driving the controlling behavior (Sagar & Lavalle, 2010). Third, high expectations from parents that are followed up by overly obvious communications of disappointment, teach the learner to fear failure and avoid it in order not experience the even more damaging failure of letting down his or her parents (Sagar & Lavalle, 2010). In the last socialization discussed, Cetin et al. (2014) suggest that students who are taught to see school as a place to display their abilities, rather than develop them, are more likely to fear failure and not take advantage of what this tool has to offer the learner.

Being challenged to change the mindset towards failure, educators have good tools and models available. Holding some statistical backing, Goodwin (2017) states that personal learning environments have shown promise when it comes to increasing academic outcomes. With many of the facets of this teaching strategy focused on exploration and students learning from their failure, personal learning environments are a way to enable students to have the opportunity to fail and learn from an experience (Goodwin, 2017).

Other studies have shown the effectiveness of computer-mediated instruction (CMI) as well as educational games (SEGs) in the classroom. This being said, Vallett et al. (2014) suggested bringing these applications and advancements into the classroom. By providing students with computer-based activities focused on the learning topics, researchers have found that in some cases, CMI, with their embedded training experts, can be even more effective than peer group or instructor interaction (Vallett et al., 2014).

Similar to CMI, SEGs take advantage of how many great game developers have applied the idea of the 'playing in the zone' (Vallet et al., 2014). By enabling their learners to take

advantage of what Vygotsky and Cole (1978) call learning in the social context, SEGs motivate

learners to overcome various learning challenges by keeping them in the ZPD (Vygotsky and

Cole, 1978). These educational games are able to sustain learning as they constantly stretch

and enable the student to connect to experts in the game that help them overcome the learning

challenges that occur (Vallet et al. 2014).

As video game developers have been driven by the capitalistic motivation to succeed,

they have found excellent ways to apply the studies of great educational researchers (Vallet et

al. 2014). Looking for a way to use what these game developers have discovered as far as

intrinsic motivation and the use of failure, Gee (2007) studies good games (i.e. games that that

incorporate good learning principles supported by current research in Cognitive science [Gee,

2004]), to find out what makes them such effective teachers. After discovering sixteen

different strategies on how games capture the learner, Gee (2007) found it no surprise as to

why gamers were so willing to joyfully work through such complex curriculum. Explaining

how many video game developers effectively make use of identity, interaction, production, risk

taking, customization, agency, well-ordered problems, challenge and consolidation,

just-in-time learning, situated meanings, pleasant frustration, system thinking, sandboxes,

smart tools, cross-functional teams, and performance before competence, Gee (2007) suggests

that educators adopt many of their same philosophies in order to create this environment in the

classroom.

With failure being a regular part of high school athletics as well, Haglind (2004) sought

to find how successful athletes and coaches were trained in how to successfully overcome and

learn from their failure. Finding that even the successful athletes respond negatively at first,

Haglind (2004) notes the coping mechanisms that are used to turn these reactions positively. In his findings, Haglind (2004) was able to conclude that these athletes were able to effectively cope by acknowledging their failures, talking about them with their peers, seeking and accepting feedback, and giving effort towards turning away the natural negative thinking associated with failure.

Much of why the failing forward concept is so encouraged is due to what its alternative, an irrational fear of failure, can bring about in a learner. The fear avoidance behaviors of learned helplessness (De Castella et al., 2013; Vandewalle, 1997; Fincham et al., 1989), decreased self-esteem (Cetin et al., 2014; Kocovski & Endler, 2007; Kuhl & Kraska, 1989), performance goal orientation (Cetin et al., 2014; VandeWalle, 1997), defensive pessimism (De Castella et al., 2013; Martin & Marsh, 2003; Martin et al., 2003), and self-handicapping (De Castella et al., 2013; Bartels & Herman, 2011; Zuckerman & Tsai, 2005; Martin & Marsh, 2003; Martin et al., 2001) are not only damaging the student's ability to learn, but they are not beneficial in keeping the student from failure as they prevent them from the opportunity to learn how to overcome the challenges they face (Bartels & Herman, 2011).

Apart from the negative behaviors related to an irrational fear of failure, researchers have also found several positive traits of those students who successfully learn how to fail forward. As these students learn to use their failures to grow, they are more willing to participate in activities despite the likelihood of failure (Strum 1971), enjoy learning and using problem solving skills (Cetin et. al, 2014; Tay et al., 2009; House, 2002), give greater effort to overcoming learning difficulties (Cetin et al., 2014; Clifford, 1988), and find pleasure in the mastery (Harter, 1974).

Professional Application

To showcase the effectiveness of failing forward, Jacobson (2013) sought to provide educators with some common responses that they will see from a fixed mindset student facing challenging situations. By identifying these students Jacobson (2013) hopes to enable educators to locate, and help shift, these mindsets while exemplifying how this fixed mindset, or one that does not see failure as an opportunity, can damage not only the individual learner but also the learning environment.

Through his research and observation of student failure, Jacobson (2013) found many of the popular responses to be simple, such as misinterpretation of teaching cues, cheating, and giving up to assume teacher help. These responses are the opposite of what an educator hopes to see in the classroom, and after realizing his findings, Jacobson (2013) suggested one action in particular that will enable this generation to overcome these self-conscious tendencies. Jacobson (2013) stated that educators must work to shift these students from a fixed mindset, the student's belief that he or she is either 'smart' or 'dumb', to a growth mindset that believes that despite the minor failures they may face, hard work and perseverance will allow for further learning and development to occur in it (Dweck & Elliott, 1983). Noting that the goal of the fixed belief is to 'look smart' and that the goal of the growth student was to 'get smarter', Jacobson (2013) continues by encouraging educators to shift the classroom from a stage, where students have to impress their peers and teacher, into an academic language-rich environment. More specifically, Jacobson (2013) also issues a challenge to educators to combat this mindset by giving better, more specific feedback, asking open-ended questions while giving a good amount of response time, engaging the disengaged in the classroom, and finally, by encouraging educators to

examine their own mindset to prevent the predestination of certain students to success or failure in certain areas of study.

In their discoveries on the fear of failure and failing forward, Cetin et al. (2014) also suggest that educators work to create an environment where students know that having an irrational fear of failure is futile. To do this, they recommend teachers focus on guiding their students through process-based objectives rather than goals that have more of a product focus. This, along with helping the students know how they will be graded throughout this process, will encourage academic risk and decrease fears of negative criticism (Cetin et al., 2014).

With the worldwide game industry hitting $91 billion in revenue for 2016 alone (Takahashi, 2016), it is important to consider what Gee (2007) found as to the effectiveness in enabling learners to overcome the challenges in their complex curriculum. By taking and applying some of the brilliantly used concepts of game developers (see chapter 2), Gee (2007) believes that many educators could help students be motivated through failure and, in turn, highly increase content mastery.

For instance, Gee (2007) stated that educators could take advantage of game developer's use of the agency and identity factors. These two factors could be used by educators to encourage learners to stick with and overcome the failure involved with any grueling curriculum by helping them build and identity as either a scientist, mathematician, philosopher, computer scientist, etc. (Gee, 2007). Gee (2007) stated that this identity adoption would also help to create the agency effect, and encourage students to have ownership in their work as they identify with the profession, bringing pleasure to content mastery.

With production and customization also contributing to a gamer's enjoyment of the in-game learning, Gee (2007) suggested that educators could build learning environments where students have more control over the curriculum. Knowing that creativity requires trial and error, and therefore some amount failure, Strum (1971) also suggested that educators work to generate creative environments and gives four guidelines to follow. Sturm (1971) stated that these creative environments will contain: mutual trust and confidence and support for ideas from teacher and peers; challenge and motivation along with commitment to the organization's goals and operations; freedom to seek information and show initiative; and characters who have pluralism in views, knowledge and experience, and are willing to exchange of opinions and ideas. Teachers can use these guidelines to build a more customized learning environment where students take part in the production of the curriculum and, in turn, are more likely to learn from failure as investment in the learning process increases.

In most good games, or games that that incorporate good learning principles supported by current research in cognitive science (Gee, 2004), interaction, system thinking, smart tools, distributed knowledge, and cross-functional teams are all factors that contribute to the gamer's ability to digest the vast and complicated curriculum that they contain (Gee, 2007). Gee (2007) believes that educators who can create environments where students are constantly interacting with the content, allowing them to see how different pieces of the course material respond and react in different situations, will ignite a curiosity that will drive the student to want to understand the depths of the material. Demonstrations where student actions are separated from content responses are important, but by applying the above cognitive science applications

of student trial and error via interaction, learners will be more likely to generate a motivation

for content mastery (Gee, 2007).

Just-in-time learning, on-demand access, and situated meanings are different ways that

Gee (2007) noticed game developers help gamers comprehend the difficult, and sometimes

totally foreign, vocabulary associated with a game's storyline. Instead of listing of terms at the

beginning of a chapter, Gee (2007) suggests that educators incorporate these video game

teaching strategies by giving vocabulary to the students right when they are going to use it,

allowing students to work, or interact, with the language in context. This is important, for

robust vocabulary instruction requires multiple, meaningful, and contextualized interactions.

By connecting the language with the context, while also linking the terms with the 'actions,

images, and dialogues they relate to', Gee (2007) believes students will obtain a greater chance

at mastery than if they were to use typical rote memorization.

Explore-think-rethink, well-ordered problems, and performance before competence, all

of which contain a good chance of failure, are tactics Gee (2007) observed good games use to

develop and build understanding within a game's content. Much of the time learners will have

ideas about how the content will work as they approach it for the first time. By allowing them

to have structured time to explore and test their theories before they are competent in the

material, Gee (2007) stated that students will be more likely to desire to spend time in

experimentation and, like what is observed in video game users, develop a motivation for

mastery instead of a desire to just check it off of the list of to dos. Also, organizing the

curriculum in a sense that requires the use of previous learning within student experimentation

will further increase the student's abilities to retain the content as they continuously are using past problem solving methods to overcome repeatingly more complex tasks (Gee, 2007).

With enjoyment and appreciation of the learning process being an essential gateway to the failing forward mindset, Gee (2007) encourages educators to note how video game developers enable their learners to enjoy the process of overcoming the many failures encountered within the games. Gee (2007) believes that educators can do this simply by strategically making the material challenging. Game developers know where their learners are at based on how far they have progressed in the game. Therefore, Gee (2007) suggests that if teachers can find a way to gauge their learners in a similar fashion, they will be able to keep growing them in the content by challenging them just beyond what they can currently reach.

By producing these types of learning environments and applying the various teaching strategies mentioned above, educators can work towards not only preventing students from fearing failure but also enabling them to understand how to use this tool that humans have used throughout their existence in a positive manner rather than a negative one.

Limitations of the Research

Though the connections from the athletic realm of education were mentioned and assumed based on Barber (2015), more research could be done in the area of relating how successful strategies in athletics could also be used to help students overcome and learn from their failures in academics. The amount of athletes and parents referenced in Haglind's (2004) research was low with only three families of elite athletes going through the full surveying process. This being said, more research, or even further implementation and analyzation of Haglind's survey, would be useful in backing the sources of the fear of failure. Second, though

they displayed a fair amount of effectiveness, there were few examples, and therefore a less than satisfactory amount of evidence backing the use of Computer Mediated Instruction as well as Serious Educational Games. Therefore, further research and observation of the use of CMI and SEGs in the classroom could be called for. Third, finding more teaching strategies, and examples of their use, that associate with the methods that are implemented by video game developers (Gee, 2007), would make it easier for educators to transition Gee's (2007) findings into the classroom. Lastly, the studies referenced in this review covered a broad spectrum of educational ages. Focusing on how different ages respond to the use of failure in education would be helpful to educators looking to apply the mentioned strategies to certain age groups.

Implications for Future Research

Additional research should be completed on how successful athletes cope with failure and how these coping methods could be used in the classroom. More could also be done to support Haglind's (2004) findings ensuring these coping methods that were found to be successful for the athletes interviewed are similar to a broader range of athletes in different sports.

Though the effectiveness of CMI and SEGs have been theorized as successful strategies for education, more could be done to measure their effectiveness, as each is implemented more and more in today's classroom. As these tools are developed, especially in the realm of SEGs, more opportunity will arise for researchers to ensure what has been theorized about the effectiveness of the educational games.

Discovering how educators are following in the paths of game developers and working to create a sort of pleasurable challenge in their content will be helpful for educators. As Gee's (2007) findings are implemented in the classroom, it will be interesting to note how educators are doing this as well as what video game ideas transfer well to the classroom and which ones do not.

Research showing the post education successfulness, or lack thereof, of those students who have a failing forward mindset could be helpful motivation used to encourage the education of failure as well as more research on how this can be done well. Taking a look to see what employers appreciate in an employee and how this matches up with failing forward attributes could be an early form of research to be completed. Later, more drawn out, research could follow learners with this mindset and note how they are set apart from those who instead have developed an irrational fear of failure.

Lastly, research showing how different age groups respond to the use of failure in learning would be useful. Discovering how to implement the learning strategies associated with failing forward at different age levels as well as the effectiveness associated with these different ages would be useful to early childhood, primary, secondary, and higher education teachers and professors as they look to encourage this mindset.

Conclusion

How do students benefit from guided failure in the academic environment? The ability for students to learn from their failure has been said to increase the possibility of learners gaining life-long learning traits. By teaching the value of failure and facilitating experiences that enable

students to witness its worth, educators may be more likely to instill a mindset in students that will be willing to participate in activities despite the likelihood of failure (Strum 1971), appreciate and enjoy learning and using problem solving skills (Cetin et. al, 2014; Tay et al., 2009; House, 2002), give greater effort to overcoming learning difficulties (Cetin et al., 2014; Clifford, 1988), and find pleasure in the mastery (Harter, 1974). Not only this, by learning how to use failure as a tool, students will also being less likely to develop the behaviors of learned helplessness (De Castella et al., 2013; Vandewalle, 1997; Fincham et al., 1989), decreased self-esteem (Cetin et al., 2014; Kocovski & Endler, 2007; Kuhl & Kraska, 1989), performance goal orientation (Cetin et al., 2014; VandeWalle, 1997), defensive pessimism (De Castella et al., 2013; Martin & Marsh, 2003; Martin et al., 2003), and self-handicapping (De Castella et al., 2013; Bartels & Herman, 2011; Zuckerman & Tsai, 2005; Martin & Marsh, 2003; Martin et al., 2001). Therefore, moving forward, educators should look to find opportunities within their current curriculum where they can take the chance to not only communicate on the important reality of failure, but also find a way to help their students experience the learning that lies within it.

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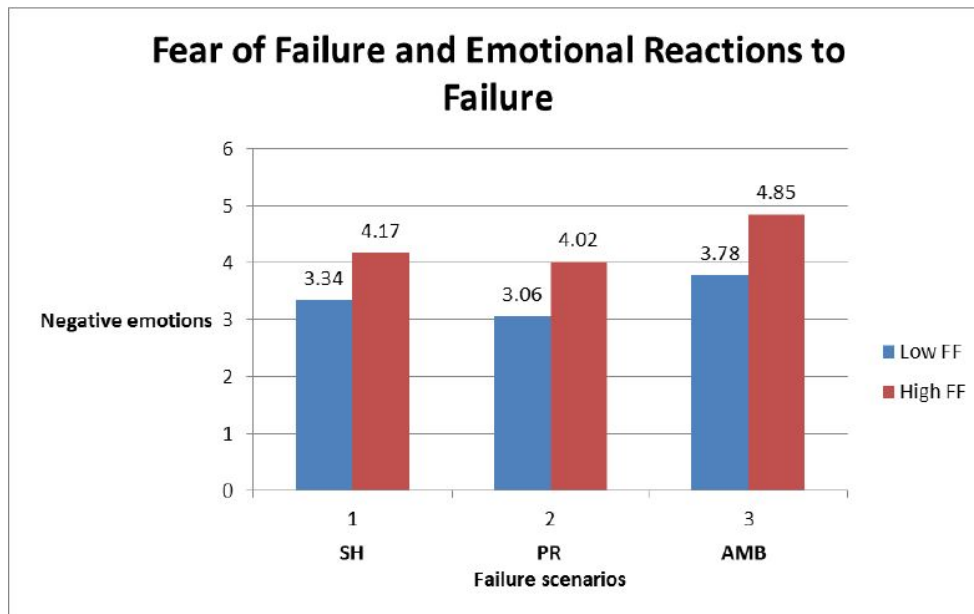   g-innovation-strategy

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Appendix A

Chart 1

Fear of Failure and Emotional Reactions to Failure

(Bartels and Herman, 2011)