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Teaching the Inevitable: Embracing a Pedagogy of Failure

ABSTRACT

Failure is often taken as a given in higher education, as an inevitable part of learning new things. Yet, it remains a part of learning that students tend to fear, and faculty tend to neglect. As faculty, we do not always strategize with or leverage our students' struggles and failures for improved learning. Instead, we hope that students learn from their mistakes and study harder or try harder the next time, because moving on with material in class is necessary to meet learning objectives. In this article, we outline several strategies for using failure advantageously for promoting student growth and learning, and to minimize the stigma of struggle in academia. We make concrete suggestions and outline strategies and resources for faculty to incorporate a "pedagogy of failure" into their work with students and we describe structural barriers to using failure strategically in higher education.

KEYWORDS

failure, stigma, traditionally underrepresented students, anxiety, alternative grading schema

INTRODUCTION

Some of the most widespread platitudes about learning are about failure, such as "failing is how we grow" or "failure is a part of life." In our own lived experiences of coursework, teaching, and learning, such bromides about the inevitability and helpfulness of failure are often shared to comfort students who recently failed an assignment, or to comfort ourselves as faculty when we receive a rejection of an article or a grant. Yet, we rarely live—or teach—by these platitudes. In our own undergraduate classrooms, we provide feedback and describe strategies for avoiding failure on any given assignment. The occurrence of failure, or not meeting an expected or self-determined goal or standard, is taken as given in academia, but as faculty, we do not often think explicitly about how to leverage the usefulness of failure for improving student learning. Instead, we may simply expect, or hope, that students take the platitudes to heart and "learn from their mistakes." Or, faculty may dismiss the meaning of failure for students, by trying to convince them that failure does not matter in the long run of their school and work careers.

Still, such faculty responses may seem dismissive to students who feel immense pressure to perform. A report by the Center for Collegiate Mental Health (2016) indicates that anxiety is the primary reason students seek out mental health clinics during college, often because of performance concerns. Indeed, in some cases the fear of failure may be debilitating enough to warrant its own diagnosis called *atychiphobia*. In this article, we suggest there may be a disconnect between the messages that students hear from faculty about failure and the messages sent by the way many assignments and college classrooms are set up, which often only reward students for "getting it right" the first time. We

focus primarily on undergraduate teaching and learning because that is our area of expertise, but many of the strategies could apply to graduate students or other learners.

The concealment of failures in academic settings, or simply framing these failures as obstacles to overcome, are both a problematic cause and consequence of social and professional judgment in higher education. The changing landscape of higher education due to the Covid-19 pandemic, which caused the abrupt shift to remote learning in spring 2020, makes it even more imperative for faculty to have cogent strategies for making sure that students are not left behind. Many of the strategies we describe could be used in a remote learning environment and may also help address the worsened disparities in educational preparation at the secondary level because of the Covid-19 pandemic. Creating space in any course for students to take intellectual risks without risking their grades is an essential aspect of inclusive excellence, a student-focused philosophy of pedagogy and resource which emphasizes enhancements in learning for all students regardless of preparation or background (Consadine et al. 2017).

In this article, we discuss overarching teaching philosophies, strategies for structuring and incorporating assignments, alternative grading schemes, and the structural challenges with the implementation of strategies that turn our words into actions and encourage a substantive embrace of failure. Throughout this article, we refer to “failure” as both not meeting an objective external criterion (e.g., a passing grade, a specific GPA required by graduate programs, outright rejection, etc.) and not meeting a subjective criterion (e.g., not doing as well as one had hoped or desired). Our goal is to make connections across the literature on student imposter syndrome (or the sense that one is a fraud), student success, and inclusive excellence, while primarily serving as a guide for faculty who would aim to develop a “pedagogy of failure” in their classrooms. We will also provide lessons learned on these strategies from our own classrooms.

Fear of failure

Fear of failure is widespread and prevents students from taking risks, starting or finishing tasks, getting involved in new activities, or challenging themselves (e.g., Steel 2007). Though perfectionism and impostor syndrome concerns are common, fear of failure can manifest itself clinically, significantly affecting students’ mental and physical health and, ironically, their academic performance (Einbinder 2014). For example, stress has been linked with impostor syndrome among first-generation students which has serious mental health implications (Holden et al. 2021). Given that higher education often rewards competition, correct answers, and achievement, many students have come to see failures as shameful events that reflect poorly on character, aptitude, and potential (Bong and Skaalvik 2003; Steel 2007). When students see failure as a reflection of their self-worth, they avoid it as much as possible (Covington 1984). Perceptions of one’s abilities are self-fulfilling and self-reinforcing, and can therefore have a major impact on learning, success in school, and future career outcomes (Bong and Skaalvik 2003; Brown, Roediger, and McDaniel 2014). Indeed, shifting to a view of failure as a “badge of effort” may improve learning outcomes (Brown, Roediger, and McDaniel 2014).

The effects and consequences of failure are not evenly felt across the student population. Ensuring equality of access to higher education across all students necessitates a closer look at the disparities in student experiences of failure. First-generation and traditionally and temporarily underrepresented students are especially likely to experience isolating and detrimental concerns about their academic aptitude, which may lead to increased anxiety, perfectionism, or disengagement (Harrison et al. 2006; Schmader, Major, and Gramzow 2001). This occurs because traditionally and

contemporarily underrepresented students face discrimination by their faculty, peers, and non-faculty staff: for example, in the form of higher barriers to accessing accommodations for learning disabilities (McDonald, Keys, and Balcazar 2007). Traditionally and contemporarily underrepresented students are less likely to be retained, meaning they are more likely to fail at earning a degree, which makes it especially important to combat imposter feelings for students who are members of minoritized groups (Ramsey and Brown 2018; Seidman 2007). Breaking the self-reinforcing cycles of failure and negative perceptions of self-worth for students underrepresented in higher education is an important goal to not only improve retention (Seidman 2007), but also graduation rates and outcomes post-college.

STRATEGIES

In this section, we outline eight strategies for incorporating failure into teaching, course activities, and mentoring. Figure 1 summarizes the strategies on the next page.

Strategies for incorporating failure pedagogy

Share your own failures

Students may idolize educators as models who “have made it.” In our own classrooms, we have noted that, given the degrees required to enter college teaching, students may erroneously assume that their instructors are either unfamiliar with failure, or, by virtue of being in the position they inhabit, cannot have experienced significant failures and setbacks. Not only is this usually inaccurate, it also puts instructors on a pedestal that might make students feel shame, fear of rejection, or inadequacy if they “don’t get it right.” In short: The way our students view us may prevent them from trying new ideas, speaking up, or coming to office hours. One way to address this is to speak openly with our students about our own paths, which will usually involve a significant number of setbacks, disappointments, rejections, and perhaps even career changes.

For example, we may share with students the number of graduate programs we did not get accepted to, the number of applications for academic jobs we had to send before being invited on (a much smaller number of) job interviews and, ultimately, receiving a job offer after other rejections. We may tell our students that, to this day, we experience what may feel like failure and rejection in the form of unsuccessful grant applications, manuscript submissions, or even challenging teaching evaluations. In our lived experience, students respond to such revelations with a degree of surprise and relief as unsuccessful applications and setbacks are normalized. In the absence of sharing such stories, we may inadvertently contribute to survivor bias, which happens when a focus on successful outcomes skews perceptions, as unsuccessful cases are ignored during sampling (Shermer 2014).

Sharing one’s own failure can happen in a setting like office hours or advising appointments, or it might be openly in a classroom by sharing that we, too, struggle(d) with aspects of our field; that we once failed a class or that we just received a rejection letter which is still lingering as we begin class. Discussing these failures with students directly is a specific strategy for preventing and addressing impostor syndrome, which often manifests as a fear of failure among students (Felder 1988). Other strategies are to help students understand a long view of grades and class performance, making it clear that a single exam or paper is not going to dictate their future (Felder 1988; Maji 2021). Grade-related stress is exacerbated by the competitiveness of admission to certain graduate or professional programs, and by the precarity in the labor market, but there are typically options for retakes, including of the GRE

and the MCAT exam for medical school admissions. Grades might slow a student down in their future endeavors, but ideally should not prevent their progress in the long run.

Figure 1: Strategies for incorporating failure pedagogy



One particularly bold and poignant example of directly sharing failures is Johannes Haushofer (n.d.), who has shared his “CV of Failures” publicly on his Princeton University webpage. In it, he lists the programs he did not get into, the grants he did not receive, and the journals that rejected his submissions. Melanie Stefan first suggested this approach in a 2010 article in the journal *Nature*, reminding us that failure is an important part of the scientific endeavor itself—surely, an important lesson for the many budding scientists we have in our classroom. Indeed, encouragement and coverage of such “shadow CVs” has become more widespread, as several academics have heeded Stefan’s advice (e.g., Looser 2015). Faculty teaching classes in the sciences or social sciences may consider assigning Stefan’s article and dedicating some class time to discussing failure, resiliency, and perseverance as part and parcel of the scientific method. In that way, failure is reframed not as the end of a road or a personal shortcoming, but as a common experience and an opportunity to redirect one’s efforts.

That said, some faculty, especially those in tenuous positions, but also those already in danger of not being perceived as professional (such as younger faculty members, women, or faculty of color), may be hesitant to be vulnerable with their students by sharing their own setbacks in any capacity (e.g., Lott 1985; Muhs et al. 2012). More generally, instructors may worry that personal disclosures can be risky for being perceived as crossing professional boundaries. Concerns about being perceived as less competent, weak, inadequate, or inappropriately personal because of sharing personal setbacks are well-founded, especially for younger faculty, female faculty, international faculty, or faculty of color who already face significant bias in student evaluations (e.g., Baldwin and Blattner 2003). On the other hand, instructor self-disclosure can enhance student motivation and foster learning, if the shared information is perceived to be relevant. Other research suggests that sharing some life experiences can humanize professors to students, make professors seem more approachable, and can foster a sense of connection between students and professors (Hosek and Presley 2018).

Initial positive perceptions of the instructor may make it more likely that sharing failures will be seen as humanizing, whereas initial negative perceptions may result in the opposite (Aronson, Willerman, and Floyd 1966). Still, people who openly share their vulnerabilities are very often perceived favorably and generously (Brooks, Gino, and Schweitzer 2015; Brown 2012; Bruk, Scholl, and Bless 2018). Though the existing data do not speak to perceptions of self-disclosure by marginalized individuals, some research suggests that instructors may deliberately choose to self-disclose to aid awareness, visibility, and dialogue, and to model openness in the classroom (Holman, Pacey, and Courts 2022). In the end, the very definition of vulnerability implies that we can never be sure how our failures will be perceived, but those who have the institutional security and privilege to share their failures openly may shape how students think about setbacks and challenges.

Even beyond sharing personal failures, there are other ways to bring demonstration of failure into the classroom. Faculty may opt to incorporate open discussions of failures and setbacks by more famous figures, such as Steve Jobs’ graduation speech at Stanford University in 2005 or Denzel Washington’s commencement address to the University of Pennsylvania class of 2011 (both are widely available online, e.g., through YouTube), or by hearing about famous scientists who struggled, like Albert Einstein (Lin-Siegler et al. 2016). Alternatively, instructors can purposely fail in the classroom without disclosing personal failures. For example, Sinnott (2022) describes how a typical classroom demonstration on searching the academic literature was reworked to have the instructor intentionally fail, and how they then have the students work together to help them navigate that failure. Two of the authors (LBW and ABF) do an activity where they give a purposefully poorly done presentation and ask

for student feedback on everything that went wrong. The exercise serves as an opportunity to laugh, realize that everyone struggles to a degree with formal presentations, as well as gain some helpful tips for presenting.

Another approach may be for entire classes, departments, or institutions to consider an end-of-semester or end-of-year “Festival of Failures” or a “Failure Con” (akin to the *FailCon* conference for startup founders to share failed ideas and approaches; <http://thefailcon.com>) in which faculty and students alike may share “failed” research projects, rejections, or setbacks. Alternatively, departments or institutions may hold “failure cafés” at regular intervals—casual get-togethers where students and faculty can share recent setbacks and failures or openly discuss their fears of failure in an informal setting. Not only do these kinds of forums remove the focus on any one person’s failures, but they also send a strong signal that failure is normative and a shared human experience—not everything we attempt can or will be successful. Instructors becoming more approachable and authentic with students can also go a long way to improve student learning, as outlined eloquently by Bowen and Watson in the 2016 book, *Teaching Naked Techniques: A Practical Guide to Designing Better Classes*.

Teach students about the impostor syndrome and how to address it

The impostor syndrome (or impostor phenomenon; Clance and Imes 1976) is the pervasive fear of being discovered as an intellectual fraud. Such feelings of academic phoniness are especially common among high-achieving individuals (Clance and Imes 1976; Seritan and Mehta 2016), many of whom will find themselves on college campuses surrounded by other high-achieving students. As students are introduced and matriculated into their new academic communities, they are often confronted with their new peers’ unusual talents, achievements, and previous experiences, all of which can amplify impostor feelings at a particularly vulnerable time. Impostor feelings have serious consequences, affecting students’ sense of belonging and mental health. Impostor feelings also are associated with depression and anxiety (Chrisman et al. 1995) and this is especially the case for students of color (Austin et al. 2009; Cokley et al. 2013) because they are already aware of stereotypes about their groups’ intelligence and must navigate these feelings in addition to other, race-related stressors owed to chronic exposure to racism and microaggressions (Goodman and West-Olatunji 2010; Smedley, Myers, and Harrell 1993). In addition to being a significant source of stress for students, mental health struggles, like anxiety, depression, and related feelings of loneliness and isolation, predict college attrition (O’Keeffe 2013).

Based on our lived experiences, we suggest that a short intervention that introduces students to the impostor phenomenon can be an effective way to counteract some of these concerns. For example, faculty and staff may dedicate some time during orientation to introducing students to the concept of the impostor phenomenon, normalizing students’ experiences and allowing them to see that these concerns are quite common and not limited to academia or the student body. In fact, learning that what one feels has a name and is commonly experienced, including by celebrities, can help reduce stigma and can be empowering (Beck et al. 2014). This kind of validation is valuable, regardless of personal identities.

Students should further be taught evidence-based strategies to try when impostor feelings arise. Examples include self-compassion exercises¹ (e.g., speaking to oneself as one might to a friend in a similar situation) which can help students recover from failure more quickly (Neff, Hsieh, and DeJitterat 2005; Smeets et al. 2014) talking to mentors (Schwebel 2019), and reframing criticism or low grades as

common experiences (Walton and Cohen 2011). Indeed, it may be useful for instructors to remind students that they do not presume grades to be indicative of aptitude, as low grades may also be due to systemic barriers and discrimination against groups of students. One of us (LBW) also frequently structures a class discussion early in the semester around Schwartz's 2008 article "The Importance of Stupidity in Scientific Research" to normalize the experience of not knowing as something inherent to the scientific and scholarly activities. In his article, he relays that Nobel Prize winner Henry Taube could not figure a problem that Schwartz was having with his own research, illustrating how common failure is, even among the highest achieving academics.

Teach students about developing a growth mindset and developing growth mindset cultures in our classrooms

A third specific strategy for encouraging a different approach to failure and setbacks is to teach students about growth vs. fixed mindsets (Dweck 2006). Students who hold a fixed mindset believe that intelligence and abilities are fixed, inborn traits whereas a growth mindset suggests that skills are malleable, and that mastery is primarily a function of practice. Recent research has shown that even short interventions (e.g., some that introduce students to articles on brain plasticity and then write a short piece of advice to new incoming students) can improve academic outcomes and retention, especially for traditionally and contemporarily underrepresented students (Broda et al. 2018; Paunesku et al. 2015).

To encourage growth mindsets in class, one strategy is to focus students on "yet," meaning that students should practice saying regularly that they haven't learned something or done something yet (Dweck 2006; 2014a). An additional strategy would be to incorporate material about growth mindset into the course, such as from the Growth Mindset Toolkit, available through Transforming Education which is a 501c(3) organization based in Boston, MA.² Sarah Grace, a teaching and learning specialist at the University of Arizona, provides slides for faculty to use for lesson plans on growth mindset, which are available in the Strategy Toolkit for Instructors (Academic Affairs 2020). Another resource for direct use in the classroom is a 30-minute module developed by Project for Education Research that Scales, which focuses on helping students address fears about their abilities and prevent those fears from becoming self-fulfilling prophecies (PERTS 2020). Discussion about growth mindset can also be incorporated into course discussions about imposter syndrome.

When engaging in the specific strategies described above, it is important to guide students away from problematic and false interpretations of what a growth mindset is (Briceño 2015). For example, claims that a growth mindset simply encompasses grit or resilience are problematic because these ideas place the responsibility for learning solely on the student, despite the potentially difficult circumstances they face when learning, such as lack of quiet time to study, lack of space, food insecurity, or household duties that take priority (Briceño 2012). Importantly, research suggests that it is not only student beliefs that matter, but that STEM (science, technology, engineering, mathematics) faculty mindsets may have ripple effects on students' performance and motivation (Canning et al. 2019; Dweck 2014b). Faculty with a growth mindset about their own performance and abilities are more likely to engage with professional development and can model the application and response to constructive criticism for their students (Gero 2013). Thus, interventions focused on educators may be equally important to consider in the context of professional development.

Strategies for incorporating failure into course structure and assignments

Faculty should use the following strategies and the included references to guide them through designing assignments and assessments and should aim to do so in whatever way they need for their discipline or field of study. Traditional models of assessment do not necessarily meet the needs of students. A recent book, *Innovative Assessment in Higher Education*, argues through a series of essays that moving toward more holistic assessments is needed if students are to be prepared for their careers (Bryan and Clegg 2019). Bryan and Clegg (2019) argue in Chapter 20 that “good assessment should then help students appreciate the challenge and shake off the fear of failure” (218). We concur that holistic assessment is an essential aspect of adopting a pedagogy of failure, and that many of the strategies described here may help. Overall, incorporating some or more of these recommendations will help create a learning environment in which students can thrive without the fear of failure. The references cited in this section provide helpful guidance and examples of the strategies, which faculty can adapt to their own needs. While we focus on broadly applicable strategies below, we also encourage readers to explore literature that is specific to incorporating these pedagogical techniques within their own disciplines.

Structure assignments so students can revise their work

Structuring assignments and course grading in ways that allow students to revise their work and re-submit for some type of re-grading may help encourage intellectual risk-taking and reduce anxieties about a grade based on a one-time performance (Henderson and Harper 2009). Some instructors may fear that such an approach may teach students to learn their errors, rather than learning from their errors—i.e., that students’ misunderstandings may become encoded in memory rather than the subsequent corrections of their mistakes. In fact, the opposite seems to be the case: allowing students to struggle (or to experience desirable difficulties) and providing corrective feedback has been found to foster more robust learning and retention (Brown, Roediger, and MacDaniel 2014). Allowing students to learn from previous mistakes and still incentivizing them to improve their work may also reduce fear of failure through the practice of failing at something. Incentivizing revision emphasizes that grades are not reflections of immutable abilities, but instead that improvement requires revisiting, revising, and reworking.

Through encouraging the revision of written work, instructors can emphasize that the skills of writing and editing are important to develop in and of themselves, not just for the sake of a single paper (MacArthur 2018). Faculty can implement this strategy by having scaffolded due dates for a paper, starting with an outline and building to a final draft, and then allowing a revision of the final draft. The paper assignment itself may not need to change at all; simply adding on additional due dates and the potential for revising and resubmitting is sufficient for implementing this strategy.

One potential challenge with promoting revisions as part of a course is the high cost to faculty time. Motivating students to revise their work, and not just edit their work, is difficult without having that activity built-in to their grade for the course. To deal with this crucial challenge, faculty can use rubrics, coded lists of writing issues to work on, peer evaluation, self-grading assignments, and self-reflection assignments to facilitate the re-grading process (Schinske and Tanner 2014). Audio feedback may also reduce strains on faculty time as spoken feedback is usually less time-consuming than written feedback (spoken word tends to be about three times faster in English than written word, e.g., Ruan et al. 2016). Moreover, spoken feedback may be better received by students (Cann 2014; Gould and Day

2013). A specific strategy for oral feedback is to use a VoiceThread app or other remote learning tool embedded within one's institutional learning management software. Students are often concerned about the perceived lack of feedback they receive on their work and including audio feedback may assuage this perception especially in terms of personalization (Voelkel and Mello 2014).

Another way to facilitate revision is to use collaborative or two-stage exams. Two-stage exams, where students first complete the exam on their own (usually this part constitutes the majority, e.g., 85 percent, of the exam grade) and then re-do it with a group of their peers (the minority, often 15 percent, of the exam grade), can incentivize valuable experience with re-thinking and re-visiting work (Knierim, Turner, and Davis 2015; Zipp 2007). Another benefit of two-stage exams is that students receive feedback immediately from their group instead of several days or weeks later solely from the instructor of the course (Gilley and Clarkson 2014). This can reduce anxieties with respect to getting grades back as well as promote active learning in an exam activity that is relatively low stakes compared to an exam completed only by an individual student. This strategy can be implemented without re-writing exams, and instead could be built-in to the existing assessment infrastructure for the course, even for courses taught remotely.

Assess work using alternative grading schemes

The implementation of traditional grading methods (i.e., grading schemes that use percentage points and reward correct answers without the possibility of revision or correction; see Schinske and Tanner [2014] for a review of the history of grading) can be detrimental to the learning environment (Danielewicz and Elbow 2009) and may primarily serve to motivate students to focus on avoiding bad grades rather than on learning (Pulfrey, Buchs, and Butera 2011). Other methods such as mastery-based grading (Armacost and Pet-Armacost 2003), standards-based grading (Buckmiller, Peters, and Kruse 2017), or contract grading (e.g., Hiller and Hietapelto 2001) may be more conducive to learning. Mastery and standards-based grading focuses on specific and well-defined objectives that can be re-assessed until the student meets the objective.

Contract grading does not assume that all students from diverse backgrounds enter the class on equal footing or with equal preparation—nor does it assume that teachers are the sole arbiters of knowledge or authorities on assessment. Instead, contract grading prescribes a process for students to follow throughout the semester in which faculty and students share ownership of evaluation (e.g., Hiller and Hietapelto 2001). Contract grading recognizes that learning objectives can be met in a variety of ways and it gives students agency and choice over the types of assignments they wish to complete in order to demonstrate meeting specific learning objectives. If the process is not followed, such as missing an assignment or turning in an assignment that does not meet a predetermined set of criteria, student grades are reduced. Student grades can be improved if the quality of their work improves, but simply following the process, even if the quality of work does not improve, will ensure the student a particular grade. Grading contracts can be implemented in several ways—they may be individualized for each student, they may be negotiated with the students, or they may be unilateral and universal for all students in a course.

Grading contracts may also be partial in courses that are not process-based. For example, in a lecture-based course, a grading contract could guarantee a certain grade (such as a C) if the student did not miss more than two classes throughout the whole semester, turned in all assignments on time and completed, and earned at least 60 percent on each exam. This way, if students are coming to class and

turning in their work, they will pass the course even if their in-class exam performance is in the F-range or D-range. Even within the framework of grading contracts, instructors have significant flexibility in their implementation, which ensures the usefulness of the tool across fields and types of courses.

While the strategy of developing a grading contract in the first place involves a lot of thinking ahead on the part of the faculty, the implementation (depending on the type of grading contract)³ may be fairly simple, as a gradebook could just be a checklist until the final product is assessed at the end of the semester.

When students study in order to obtain a particular grade, versus in order to learn, fear of failure is increased and the achievement of learning objectives is made more challenging (Shor 2014). Grading contracts are a way for students to have more power in the evaluation of their work (Shor 2014), and this power may reduce student anxiety about grades.

A more substantial shift in grading schemes is presented by the idea of ungrading, or getting rid of traditional grading schemes altogether, given the substantial evidence that grades seem to primarily affect extrinsic motivation and feed students' shame and fear of punishment (Pulfrey, Buchs, and Butera 2011; Schinske and Tanner 2014). Once graded assignments are removed, the focus can shift to risk-taking, self-determined learning, and personal growth. In ungraded classes, students may focus on developing a semester-long portfolio, setting individualized learning plans and intentions, and working on honest self-evaluation, all of which allow for a more holistic assessment of the students' learning as a process, rather than an outcome (Blum 2017; Stommel 2018). Jesse Stommel has a particularly useful guide to "ungrading" on his website (Stommel 2018).

Include assignments that prioritize practice and process over evaluation

Encouraging practice through the design of assignments goes along with contract grading, which emphasizes process over the final product of a course of study. Students end up waiting until the last minute to work on major projects or assignments for a variety of reasons, including feeling overwhelmed, social obligations, low perceived task importance or external structure, low intrinsic motivation, and anxiety or apprehension about the task (Klingsieck et al. 2013). For example, apprehension about writing is negatively associated with self-esteem (Hassan 2001). Student anxiety builds over time as they figure out how to get the work done without admitting to their faculty that they waited so long to begin. Having frequent check-ins with low-stakes assignments is a way for this to be assuaged, and this strategy may be particularly useful for speakers and writers whose primary language is not the one used in the instructional environment (Demirel 2011; Hassan 2001). Demirel (2011) outlines a detailed example of a process approach to teaching writing, arguing that the scaffolded nature of the assignments is necessary for improved learning. After going through this process, 65 percent of students no longer felt anxious about their papers (Demirel 2011). Anxiety about writing may worsen writing performance, primarily because anxious feelings interfere with students' ability to write well and not because poor inherent ability to write causes anxiety (Kara 2013).

Depending on class structure, it may be possible to have various scaffolded low-stakes assignments go through a peer review in class before coming to the faculty for comment. Peer review can reduce student anxiety because the work is not graded and because student experiences with the assignment may be similar (Hassan 2001). These building block pieces of a major assignment need not have grades or points attached, but simply comments for improvement, which allows students to see where they might be going wrong before they go too far in that direction. If iterative drafts are complete

and meet basic assignment guidelines, the student is meeting the assignment goals, and this can be tracked with a grading contract or other methods. Grading contracts function particularly well in writing courses where the final product is a paper, but it can also work for other types of assignments.

Some faculty may rightly worry that more frequent grading will overtax their time. However, breaking up the pieces of a paper or project may help students and faculty focus their efforts on one piece of work at a time, reducing not only student anxiety by spreading out points earned across more assessments, but also reducing faculty management of that anxiety. This strategy can work in graduate settings as well (Sallee, Hallett, and Tierney 2011). Knowing that they are being evaluated on small pieces at once, instead of one big piece at the end of the semester, may allow students to sink into the material more deeply and without worrying that they will have to fit everything in at the end of the semester to pass. Frequent feedback on low-stakes assignments will also allow students to have more check-ins with their faculty, allowing more opportunities for mentorship and reassurance.

Use more varied assignment types

Instead of submitting all written papers, instructors may shift to more open-ended, creative un-essay assignments, allowing students to submit artwork, podcasts (Bartle, Longnecker, and Pegrum 2010; Sullivan 2015), short videos, or an oral presentation, among other options. The purpose of this flexibility in assignment type is to facilitate intrinsic motivation and engagement with the material. Students are able to try other mediums to demonstrate their learning in a course and allowing other mediums for submission may encourage cross-departmental collaborations. For example, faculty in mathematics have successfully used artwork as final assessments for calculus classes, a strategy that was motivated by the desire to reduce student anxiety around doing math (Wu and Li 2017; 2018). Likewise, faculty in computer science have received card games, children's books, and other creative assignments that students experienced as challenging, but welcome changes from more traditional assignments (Aycock et al. 2019). Science and mathematics courses may be less likely to encourage creativity in final assessments, but doing so can improve student learning and engagement with the material (Larkin 2015). Indeed, students may not be completely accepting or receptive of creative projects for their coursework, perhaps especially in graduate school, but student self-reflections have demonstrated the value of varied types of assessments (Reynolds, Stephens, and West 2013). Two of us (LBW and LEE) have successfully deployed un-essays in our upper-level biology and psychology courses and we have received consistent positive feedback on student evaluations. Students reported enjoying the freedom to choose a final project different from a traditional paper, feeling challenged to explore types of expression they may have never chosen (e.g., photo essays, games, or artwork), and being more engaged and motivated to work on their projects. As instructors, we have noted the added benefit of learning more about our students' many and varied skills, and have found evaluation of these truly diverse and often phenomenally creative projects much more rewarding than reading numerous versions of the same essay.

Meet with students one-on-one after the first exam or paper to talk about their study strategies, goals, and challenges

Meeting with students one-on-one as much as possible is an opportunity to communicate to students that their instructor sees them holistically and does not make assumptions about their character from their grades. Research supports the idea that perceiving an educator as caring can facilitate intrinsic

motivation (Ryan and Deci 2000). Talking openly and with care about a student's failed first exam or paper can help them see a pathway to succeed by the end of the semester, through understanding students' struggles and obstacles, through making concrete plans, and by feeling supported by their faculty (Schwebel 2019). Just as with other strategies described in this article, meeting with students one-on-one does take time and may be easier for faculty in certain positions or institutions than in others. Faculty should use their own judgment about which students to prioritize meeting with. Ideally, the number of students who need a meeting after a failed exam or paper is manageable, and building this expectation into the syllabus can help with time management. For example, a syllabus policy could state that meeting one-on-one with the instructor, a tutor, or the teaching assistant (if available) after a failed exam or paper is part of the participation or professionalism grade in the course. This way, the weight of other aspects of the course is not lowered and the students know that they are not being singled out for meetings. Using automated office-hours sign-ups or asking students to unpack what happened with the failed assignment beforehand can shorten and focus these meetings productively.

A related approach may be to have students complete an "exam autopsy"—essentially, this is an instructor-prepared worksheet⁴ that prompts students to revisit each missed question and indicate the reason for missing it (e.g., did not carefully read question, material was unfamiliar, ran out of time, etc.). Instructors and students can identify patterns of missed questions and strategize about adjustments to studying and test-taking moving forward. One very helpful resource comes from Richard Felder at North Carolina State University, in which he provides students with a test preparation checklist to go through their recent test performance and possible behavior and study changes logically (Felder 1999). Other faculty could adopt this strategy as a post-exam debrief; tailoring the checklist items for their courses and fields and discussing various ways in which students could prepare differently for the next exam or for test corrections. Variations of this may entail students to correct their answers and earn some percentage of points back for appropriate test corrections, further incentivizing students to revisit their work and learn from earlier mistakes.

On the challenges of making changes towards a pedagogy of failure

There are two underlying considerations of the strategies described in this article. The first is that many of these strategies will complement each other, but each strategy can be utilized on its own as well. The second is that implementation of these strategies will inevitably depend on the nature of the instructor's position in the institution and the classroom. Faculty who have the support of a tenured or tenure-track system and faculty who have guidelines written in their tenure and promotion handbook that encourage innovative pedagogy and risk-taking in the classroom will be better positioned to use these strategies. For contingent faculty, graduate student instructors, anyone with more precarious positions, minoritized faculty, or adjunct teaching faculty, incorporating these strategies may be much more difficult, given some of the needed time investments in and out of the classroom. None of this is to say that these strategies aren't accessible to all faculty to some degree, but that the structures of higher education dictate that it will be easier for some than others. While individual faculty investment in this idea and time commitment to learning this philosophy is important, it is not a sustainable idea without the buy-in of college administrations, including but not limited to, reducing faculty workload, improving access to faculty development opportunities, and revising guidelines for promotion and tenure at individual institutions. Indeed, factors such as classroom design and opportunities for faculty to grade a

course as pass/fail play an important role in supporting a pedagogy of failure, and these items are typically the purview of administration.

Faculty dissatisfaction with workload is positively associated with the number of hours worked per week (Jacobs and Winslow 2004), and dissatisfied and overworked faculty may not be as willing or able to engage with new types of pedagogy. Institutions of higher education should value an emotionally engaged and time-consuming pedagogy of vulnerability. If they do, they can work to iteratively reduce the ever-increasing strains on faculty time or provide support for the work they find most valuable, for example by encouraging faculty to use strategies described in Bartlett et al. (2021). Indeed, alternative grading strategies have been described as important ways that faculty can achieve work-life balance (Jones 2020). Institutional priorities are reflected strongly in the guidelines for faculty tenure and promotion (Gardner and Veliz 2014). Particularly for interdisciplinary and collaborative work between faculty, guidelines should be clear to ensure that faculty can take risks with new ideas and strategies (Klein and Falk-Krzesinski 2017). Tenure and promotion guidelines should be revised to reassure faculty that risks taken in the classroom will not penalize them when being considered for tenure.

Faculty may not necessarily have the resources to restructure courses and assignments to a large degree without the external support of funding or time to develop changes to courses. Centers for teaching and learning can be supportive collaborators in this venture at a given institution, either through training sessions or assistance with course design or funding (Sorcinelli 2002). Sorcinelli (2002) argues that a best practice for centers for teaching and learning is for a given center to develop its nuanced identity out of each institution's unique culture. This culture begins with colleagues who can talk more openly to one another about matters of stress, failure, and imposter syndrome (Jaremka et al. 2020). For example, department meetings could become effective places for sharing recent disappointing setbacks as well as reasons to celebrate, if department culture were conducive to that. A major determinant of whether institutional support will come for a "pedagogy of vulnerability" is if faculty start asking for what they need to support their specific versions of a pedagogy of vulnerability.

CONCLUSION

Higher education institutions around the world have been grappling with how to maintain learning goals in the context of several global crises that have proven to be acute and chronic stressors for students and faculty alike. Even in the absence of such stressors, failure and setbacks are inevitable parts of human life. We argue that such assertions are reduced to empty phrases in the absence of concrete steps and structures encouraging risk-taking, creativity, and imperfection. Indeed, we suggest these are essential ingredients of learning and it behooves us to create learning spaces that invite and promote experimentation and, yes, making mistakes. We reason that embracing failure as inevitable throughout higher education will not only better prepare students for the realities of life, but also allow our students and faculty more flexibility to cope with the setbacks and struggles of both academic and non-academic life, including during emergencies and unexpected events like pandemics, the climate crisis, or civil conflict and war. Given that students and faculty everywhere will be looking for strategies to cope with inevitable failure and setbacks, we hope that this assembly of resources will prove useful for faculty and administrators who support faculty. Each of the strategies outlined and described in this article could benefit the field of higher education in general over the long-term. While it is certainly more challenging to productively incorporate failure into our pedagogy than to maintain the status quo, the process of doing so should prove worth it.

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NOTES

1. Dr. Kristin Neff provides free access to several self-compassion exercises and guided meditations on her website: <https://self-compassion.org>.
2. To see Sarah Grace's materials on Growth Mindset Toolkit, visit: <https://transformingeducation.org/resources/growth-mindset-toolkit/>.
3. For a range of more specific examples see Dr. Kate Navickas' overview of contract grading here: <https://cpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/3/6798/files/2020/09/FWS-Instructor-Resources-Grading-Contracts.pdf>.
4. Examples are available for free online from a wide range of Teaching and Learning Centers, e.g., Oregon State University's Academic Success Center: <https://success.oregonstate.edu/learning-corner/taking-tests>.

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