

SPECIAL ISSUE ARTICLE

Museum Educators Perspective of Failure: A Collective Frame Analysis

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ABSTRACT

Museums offer a unique role and safe space in shaping how youth view and react to experiences with failure. The purpose of this study was to add to the conversation around failure in out-of-school learning, particularly from the perspective of educators within museum settings that implement STEAM-related making exhibits, workshops, and/or camps for youth. We analyzed approximately 9 h of video data from two sources: video recordings of virtual group meetings with 14 museum educators from six partnering institutions, and video recordings from five of the individual partnering sites discussing failure as a concept within their organization and programming. In this article, we demonstrate how the framings of failure by museum educators are bounded, and transformed, by un/seen external forces that ultimately impact the professional practices of educators in their organizations. We contend that the significance of this study lies in how perspectives around failure are produced and how they influence educators' professional practice, specifically in how failure is framed and communicated within STEAM-related learning opportunities in museum settings.

Failure is a human experience that permeates every aspect of our lives, from communication in love letters (Rosenblatt 2020) to cultural contexts and policies on aging (Humboldt 2020) to banking management (Carretta, Schwizer, and Fattobene 2020) to teaching and learning a foreign language (Angelucci and Pozzo 2020). It is an experience embedded within implicit and explicit rules and norms defined and negotiated by individuals, organizations, and cultural contexts (Vanderheiden and Mayer 2020). Furthermore, it is a human experience felt and perceived differently by individuals. Individual reactions to failure may depend on where it occurred (e.g., school or museum), their role in its occurrence (e.g., educator or student), their social identities, and/or their age (Kominsky et al. 2021; Simpson et al. 2018). Consider the following example from a museum educator as part of our larger study on experiences with failure: "I think my personal struggles with having a learning disability and having anxiety and walking through systems that are set up for 'normal people' has been a real

challenge for me. It has led me to failing a lot in life." In this example, failure is framed within one's experience of having a learning disability, and how the systems they are a part of did not work for them. Educators experience and view failure in their professional role(s) differently, as well as react differently to students' actual and perceived failures (Maltese, Simpson, and Anderson 2018; Simpson, Anderson, and Maltese 2019). For example, where one educator may take ownership of and make changes to a child's prototype, another may troubleshoot the various reasons that the prototype does not work alongside the child.

Similarly, one may surmise that children's failures in educational contexts are described and experienced differently based on each child's prior experiences with failures, cultural and familial norms and expectations, age and maturity, competency beliefs, and how educators frame the activity as open-ended or guided. Additionally, children's perspectives and experiences

with failure in educational contexts are shaped and defined by those around them (e.g., peers, parents, and educators), as well as the norms and culture of the educational environment. Research does suggest that children's perspectives of failure shape their subsequent actions (e.g., persistence, quitting) and emotions (Manalo and Kapur 2019). As such, children's experiences of failure in educational contexts in western societies seem to be situated along a spectrum: failure is not an option (e.g., Carusi 2019) to failure is a learning opportunity (e.g., Bevan 2017; Simpson et al. 2018).

The purpose of this study was to add to the ongoing conversation around failure in educational contexts, particularly from the perspective of educators within museum settings that implement science, technology, engineering, art, and/or mathematics (STEAM)-related making activities, workshops, and/or camps for children. The focus on STEAM-related making activities were based on prior research in which professionals that worked across STEM fields frequently discussed how analysis of failures was an essential part of the learning process in STEM and that it is a key part in the cycle of innovation that drives science and technology forward (Simpson and Maltese 2017). Museum settings are vital learning environments in supporting youth in this process, and informal educators' perspectives of failure influence how they respond to youths' failure moments (Simpson et al. 2023; Zarrinabadi and Afsharmehr 2022). As such, we address the following research question: *How does an online community of museum educators frame failure?* In this article, we demonstrate how museum educators' framing of failure are bounded and transformed by un/seen external forces (e.g., implicit rules and norms, visitors' perspectives of failure) that ultimately impact the professional practices of educators in their organizations. We contend that the significance of this study lies in how perspectives around failure are collectively produced and how this influences an educator's professional practice, specifically in how failure is framed and communicated with other educators, as well as to children within STEAM-related activities in a museum setting.

1.1 | Framing Failure

As exemplified in the following quote by a museum educator participant in this study, there is not one meaning or definition for the word failure. "The word failure is such a tricky thing as it means 1000 different things" (Alexander).¹ Prior research has highlighted varying perspectives of failure (Simpson et al. 2018, 2020; Vanderheiden and Mayer 2020). Failure within educational contexts may be framed as not performing proficiently based on external, personal, and/or organizational expectations defined and/or mandated by those in power, such as federal institutions, administration, and executive boards of directors. Other educational contexts (e.g., making spaces, arts studios), on the other hand, frame failure as an essential component of learning (Litts and Ramirez 2014; Smith and Henriksen 2016) and provide opportunities to broaden children's receptiveness to new and different ideas from others (Burleson 2005). Furthermore, failure has been framed as integral to creative processes and iterations (Creely, Henderson, and Henriksen 2019; Pugh et al. 2020).

While research on failure in out-of-school learning spaces is scant, results from related spaces that youth spend time (e.g., school, media, peer groups) offer insights into the messages they receive. For educators in classroom settings, there is a tendency to avoid situations in which students may experience failure (Lottero-Perdue and Parry 2014, 2017), as it may be a reflection of their inadequate pedagogical approaches (Lutovac and Flores 2021) and/or lead to learners thinking negatively about themselves and experiencing negative emotional feelings (Bhanji, Kim, and Delgado 2016; Lottero-Perdue and Parry 2014; Maltese, Simpson, and Anderson 2018). However, research has highlighted various approaches for educators to utilize to mitigate and/or support students psychological and behavioral reactions when working through failures (Torres et al. 2018). Examples of pedagogical failure moves included asking questions toward reflecting on the failure, possibility thinking, celebrating failures, nurturing a growth mindset, and creating an environment that is safe to take risks and fail (Creely, Henderson, and Henriksen 2019; Maltese, Simpson, and Anderson 2018; Smith and Henriksen 2016).

It is also likely that media coverage on failure in education has the potential to affect and frame individuals thoughts, opinions, emotions, and attitudes on the topic (e.g., Kühne and Schemer 2015; Price, Tewksbury, and Powers 1997). From our own informed observations of various educational media outlets in English-language publications (e.g., blogs, magazines, newspapers), failure is framed in at least five ways. First, failure is framed as a form of punishment and situated within our current educational system, particularly within the United States. School was described as a factory where students are trained to be docile learners and punished for not playing by the rules. As an example, Einstein himself was punished for "skipping classes to spend more time in the lab and neglecting to show proper deference to his professors" (Lagerstrom 2015). Second, failure was framed as imperfectionism. From the perspective of Bowers (2017), imperfectionism is not being willing to "do what is difficult to achieve what is right" (6:13). This can also be exemplified in today's society, where we often seek to avoid having children experience struggle and everyone receives an award for participation. There are no losers or underachievers; thus, occurrences with failure are not necessarily avoided, but not experienced at all.

Third, failure in media outlets is framed as "I can't do this," as individuals are constrained and bounded by their mental handcuffs (e.g., Milloy 2018). As such, persons often choose not to try something because the potential for failure and experiences with negative emotions (e.g., frustration, ridicule) outweighs the experience, requirement, and/or self-identified goal. Individuals do not wish to have their ideas and conclusions challenged, nor have personal frailties exposed (Harford 2011). Fourth, failure in educational media is framed as unwillingness to change. This is exemplified in this quote from educator and social activist Geoffrey Canada (2013, 4:01).

So technology has changed. Things have changed. Yet not in education. Why? Why is it that when we had rotary phones, when we were having folks being crippled by polio, that we were teaching the same way that we're doing now?

Finally, failure was framed as a stepping stone or starting point toward failing one's way to success (Evans 2012). As noted by Laufenberg (2010), a high school educator, “[L]earning has to include an amount of failure, because failure is instructional in the process” (8:14). Within this frame, consequences of failure were expressed positively, such as gaining a sense of humility, building empathy, and working harder (TeachThought Staff Writers n.d.).

1.2 | Theoretical Grounding

Our scholarship for this research is grounded in Goffman's (1974) frames. Framing is defined as a set of assumptions an individual holds about a situation they are in, shaping what they pay attention to and guiding their actions. Creed, Langstraat, and Scully (2002) described this as a window frame in which our perspective of the world or a situation is often limited to a small part of the larger, complex world or situation. Historically, frame analysis has been employed for research on policy, media, and social movements (e.g., Fletcher 2009; Snow and Benford 1988; Wasike 2017). Yet, Creed, Langstraat, and Scully (2002) argued for the use of frame analysis for organizational research, particularly in illustrating the linkages between cultural and social environments and organizations. Educators in a museum setting may frame the same moment or word differently based on social, affective, and epistemological aspects of a situation (Bannister 2015). For example, educators at one site may view a youth's project that is unfinished due to time constraints as a failure, while other educators at that site view similar outcomes as a success because it was a learning experience. Frames are constructed and negotiated by members of the community to develop a “shared understanding of some problematic condition or situation they define as in need of change” (Benford and Snow 2000, 615). In this study, this problematic situation is perceptions of failure within their museum settings, as well as how educators respond to “failure.” As such, through dialog with one another around this particular problem, the problem itself may shift and transform through framing (Fischer 2003).

2 | Methods

This study was conducted with partners from six museum sites (14 participant-collaborators) across the United States as part of a larger study with a focus on developing a professional development model for shifting language around and pedagogical approaches to failure in youth programs and camps that involved making, innovation, and/or design challenges. Prior to this study, these six museums focused on failure and iteration within their STEAM opportunities for youth. In addition, they each centered on developing a maker mindset or failure-supportive culture among their staff, but as part of this project, they were willing to go deeper in how they embrace and encourage failure within the culture of their museum. We will refer to participant-collaborators as collaborators.

2.1 | Collaborators

The institutions represented in this project include small and large museums with focuses spanning the arts, natural sciences, innovation, and technology. These partnering sites represent six

states located in both urban and rural settings. Collaborators are also diverse in age, level of experience, race and ethnicity, gender, and content expertise. See Table 1 for our collaborator's self-identified demographic information.

2.2 | Data Source

Data for this study are from two sources: (1) video recordings of virtual group meetings and (2) video recordings from individual partnering sites discussing failure as a concept within their organization and programming. First, this study included video recordings from eight virtual meetings between authors and the 14 collaborators from December 2020 to November 2021, yielding approximately 5 h of video data. Example prompts developed by the authors to guide the discussion around failure can be organized within three categories: (a) open-ended prompts such as, where do you see failure show up in your work? What does the word failure mean to you? What does the word failure mean to your visitors? What is our [group's] working definition of failure?; (b) making prompts such as, use materials in your environment to make one or more faces to represent the emotions you want to evoke from visitors while participating in your making activities; and (c) purposeful reaction prompts such as, respond to the following quote from an interview with an informal educator in a prior study. “I want to let the students fail and go there with them, and then move through that struggle with them to this other thing, and not be afraid of it myself as an educator. Like, ‘Ooh, if they're failing, I'm failing.’”

Second, each partnering site was requested to address the following questions with their educational team, which ranged from 3 to 15 educators: (a) What is your definition of failure as an organization? (b) Where do you encounter failure in your work with kids? and (c) How do you handle failure moments with kids? Five of the six partnering sites submitted their discussion addressing the prompts. These discussions were facilitated by the collaborators and were facilitated in-person or virtually depending on their organization's COVID-19 policies. These videos ranged from 11:49 (mins:s) to 55:28 in length. In total, we analyzed 3 h and 38 min of total video data.

2.3 | Data Analysis

Data were analyzed using an adapted signature matrix (Gamson and Lasch 1983) to frame how failure manifested in the collaborators' professional lives, as well as within media outlets. Evidence of framing occurred through verbal acts of communication (Hammer et al. 2005). Frames were developed through seven signature devices described by Gamson and Lasch (1983) as devices within which to view (or analyze) the issue or problem: metaphors, exemplars, depictions, catch-phrases, roots, consequences, and appeals to principle (see Table 2). Collectively, these devices supported exploring the essence of failure within a particular text or transcript (Creed, Langstraat, and Scully 2002).

We present the following transcript from a collaborator during our first virtual group meeting to demonstrate the coding

TABLE 1 | Collaborators' demographic information.

| Pseudonym | Years at org. | Position | Age | Gender | Race or ethnicity |
|------------|---------------|---|-----|------------|-------------------------------|
| Diana | 0.5 | K-5 instructional coach | 40 | Female | Hispanic |
| Eleanor | 1 | Camps and afterschool manager | 29 | Female | White |
| Kelly | 3 | Education initiatives and impact specialist | 38 | Woman | White |
| Adalaide | 5 | Studio programs associate | 34 | Cis-woman | Caucasian |
| Aurora | 6.5 | Education programs manager | 33 | Female | Caucasian |
| Myra | 6.5 | Tinkering manager | 31 | Female | White |
| Paulina | 8 | Senior director of inclusive research and development | 36 | Woman | Asian American (Thai) |
| Marguerite | 8 | Director of education | 41 | Female | White |
| Linda | 10.5 | Gallery programs manager | 36 | Female | White |
| Kelly | 13 | Senior director of interactive learning | 38 | Female | White |
| Alexander | 14 | Makerspace-centered programs manager | 40 | Male | Greek-German-African American |
| Jason | 16 | Director of education | 40 | Male | White |
| Marcel | 20.5 | Education programs manager | 46 | Male | White American |
| Sarah | 33 | Head of student and teacher learning | 66 | Cis-female | White |

TABLE 2 | Framing failure signature matrix.

| Signature device | Definition |
|----------------------|--|
| Metaphor(s) | Imagined events; analogies and symbols; also includes similes; not actual depiction of scenario, something to relate failure to—"failure is like..." |
| Exemplar | Real-life example from collaborators' experience; specific descriptions of real events or in relation to real events, not hypothetical |
| Catchphrase(s) | Single theme statement, tag-line, title, or slogan that is intended to suggest a general frame; attempted summary statements about failure |
| Depiction(s) | Personification; personal attributes to failure; emotions and adjectives to describe failure; personal reaction to failure |
| Roots | Characteristic analysis of the causal dynamics underlying the views of and experiences with failure in this instance; the causes of the failure |
| Consequences | Characteristic analysis of the consequences that flow from the failure in this instance; the results of the failure |
| Appeals to principle | Overarching goal, objective, or platform one is trying to achieve; an end point of something to reach |

process. We utilized different colors to represent the seven different signature devices. In the transcript below, we entered a number to identify where the first author coded a phrase, followed by the signature matrix device.

Failure really (1) shows up for me very strongly [depiction] when I'm working with kids. And as they get older, I watched them (2) develop a fear of it that sometimes [consequences], especially around art making, will really (3) prevent them from feeling confident in being able to try new things [consequences]. It's kind of like a (4) perfectionist

thinking that little [root], little tiny kids really don't have much of, you know, they don't take much of a buy-in. But then as they get older, I start to see this like, you give a kid a blank piece of paper and (5) they just like freak out [consequences], and (6) adults especially who aren't familiar with art a making [root] like this (7) fear of failure [catchphrase] so that that's really (8) like a strong beacon [metaphor] that I see a lot when working with kiddos especially.

Using the signature matrix, the first two authors analyzed each transcript individually. They met eight times throughout the

analysis to discuss and combine their codes of the seven signature devices into at least one signature matrix. The intent was not to establish interrater reliability, but to acknowledge different perspectives of how failure was framed as evidenced in the data (Creed, Langstraat, and Scully 2002). In other words, we employed investigator triangulation in that the first two authors with different backgrounds and perspectives of failure within making activities examined and discussed the same texts throughout the analysis (Denzin 1984). This process led to 19 individual signature matrices. It was not uncommon for one video to have more than one signature matrix due to competing and divided perceptions (Creed, Langstraat, and Scully 2002; Kwan 2009). We then looked across individual signature matrices to consider and combine similar signature matrices, as well as potential shifts in how failure was framed. As an example of the former, there were two instances where collaborators framed failure as a process—March 12 and November 19. These two signature matrices were combined to capture a more holistic framing of failure as a process toward meeting some goal or expectation.

3 | Results

In the results, different frames are presented to create a storyline as opposed to a timeline or frequency of frames (Koon, Hawkins, and Mayhew 2016). Representative quotes are included throughout to substantiate the different failure frames. We also included the signature device as described in Table 1 throughout the results to identify collaborators' framing of failure.

3.1 | Failure as an Invisible Hand

Collaborators acknowledged the pervasive presence of failure in our society through “hidden” structures that are at play [*root*]; an invisible force or hand [*metaphor*] characterized as holding us imprisoned and confined [*depiction*]. However, as museum educators, they may not be aware of the historical, cultural, and societal structures in place and in play within their organizations [*root*]. As stated by Jason,

...the inherent bias that we might bring to our experience, intentional or not, about what we expect of that student, or the scaffolding that we provide based on our first impressions, [is] often visual of that student. Obviously, we are trying to treat each student as an individual, but there's things that we're often not even aware of that influence what we're doing—responses to failure included.

The invisible, yet felt presence of failure was noted to frame and inform the collaborators' expectations of and approaches to how they support young students or not [*consequence*]. This framing of failure was even exemplified through their work alongside educators. As noted by Lia, “In talking with teachers during ...the last school year, [and hearing] just how the systems that are set up for them to work in... are designed to help them fail.” Collaborators did not set a manageable goal or share insights into how to address the hidden, yet ever-present issues around

failure inherent in this frame [*appeals to principle*]. There was a sense that the invisible hand was difficult to push back on, even if it was seen.

3.2 | Failure as Finite and Fearful

This frame is considered from the perspective of the “typical” child that enters their making spaces; namely, a child who often views failure as something to avoid. Two metaphors described this frame—one for finite and one for fearful. The first *metaphor* was described as standing at a crossroads where a child can say “that's it, I'm done. And I'm never gonna do this again. Or I'm just gonna take a break or ask for some help” (Marguerite). For the typical child, they more often choose the dead-end road of failure as an endpoint. The second *metaphor* is similar to the feelings of a child who believes that a mythical creature is hiding under their bed or in the closet. This creature frightens children and is often depicted as a child's worst nightmare. In our context, failure was lurking in any making activity or program. It is a “living” creature that children would rather avoid than embrace. As an example, Alexander described a middle school student who feared the creative process to the point of restricting their own solutions and possibilities. Starting from the student's perspective, Alexander stated, “I have to make something like important and real. I can't just make something dumb’. So I think kids will often kind of set themselves up for failure, kind of unintentionally, by artificially restricting what they think they can do.”

Collaborators noted several reasons or sources for framing failure as finite and fearful: the learner, materials, peers, teachers, context, ambitious goals, unanticipated obstacles, and a culture of perfectionism.

[T]hey [failures] can also come from any source. It can come from the learner. It can come from the materials. It can come from a peer. It could come from something that we as teachers had said or did. ... There's often an emotional context that maybe as a teacher, I'm not going to read or pick up on right away. Or often in a social context that I might not be aware is working within peer groups. And so I think it can be very easy, as a teacher, to sort of underestimate the failures, or sometimes the scopes of failures and where they might occur.

(Marcel)

Helen stated time as another reason. “I think kids often consider it a failure if they don't finish; if they run out of time.” These reasons can be considered as both internal (e.g., learner) and external (e.g., material) sources that frame failure differently based on the “eye of the beholder” (Marcel), who is not necessarily the one experiencing the failure, but the educator observing the “failure” from their viewpoint. The *consequences* of failure from this perspective included a learner's low sense of self (e.g., confidence) and/or lack of persistence (e.g., don't care, avoid risk taking). For instance, Alexander made the following observation: “I see our campers encounter failure as like, a reflection of their personhood and their ability.”

3.3 | Failure as Behind a Professional Façade and Failure as Not in Our Vocabulary

The framing of Failure as Finite and Fearful seemed to influence and shape collaborator's feelings and practices as educators in their organization. This was captured in two frames—Failure as Behind a Professional Façade and Failure as not in our Vocabulary. The first was likened to hiding in plain sight, where failure is more than likely invisible to others but felt and experienced from within (i.e., façade). Consider the following quote from Kelly:

I've spent a lot of time on the floor interacting with guests. And I would say when something doesn't go the way I think it's going to go or the way it should go, I'm much better at keeping my cool when I'm in front of guests or students. I try to model what the appropriate way to act is. Although inside I'm definitely thinking, "oh gosh," what am I supposed to do and who should I call? But most of the time, I don't really let that show to everyone who's in the vicinity.

As such, Kelly did not allow her feelings of failure to show, but stay hidden through modeling appropriate ways to act. Furthermore, the *root* was described as not meeting expectations and/or intentions of the activity. This leads to a physiological experience such as sweat beads and a burning sensation (see Figure 1), as well as feelings of doubt, disappointment, and shame in which they questioned, "Am I losing future visitors or future participants in this moment?," "Are they going to go home and tell their family?," "Did anybody see that?," and "What should I do next?" (Alexander & Paulina).

The second—Failure as Not in our Vocabulary—is a direct *consequence* of the word failure being viewed as something to avoid as the word indicates finality or a dead end (i.e., Failure as Finite and Fearful). As noted by Kelly, "We don't use the word a lot in our language... our staff are definitely very well trained to not use the word failure because it just feels like an endpoint instead of a point where you can keep moving." Failure was described as a "loaded term" (Linda) that has a sense of power and influence over those who enter their space, as well as their actions and reactions to failure in their organization [*root*]. While it is a term frequently avoided, it is often reframed as something to improve upon or make better. Consider these *catchphrases* that were commonly used in collaborator's discourse within this frame to denote other ways in which they name or recognize "failure"—"it's not failing, it's learning," "try, try, try again," and "fail forward." As such, these two frames—Failure as Behind a Professional Façade and Failure as not in our Vocabulary—highlight how educators do not feel comfortable naming and discussing experiences as failures, and often circumvent the word all together.

3.4 | Failure as One Step in a Journey

Failure was also framed as an iterative process or one step in a journey toward meeting some goal or expectation. This frame was situated in contrast to Failure as Finite and Fearful, and discussed by collaborators as more of a desired frame within

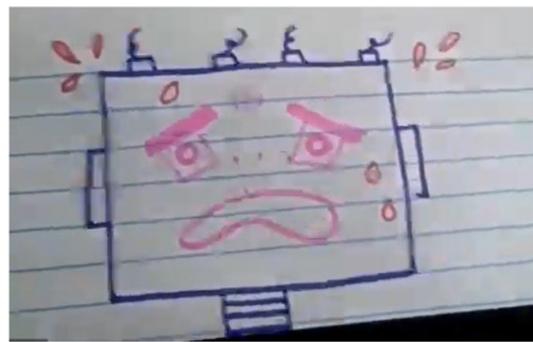


FIGURE 1 | Drawing of robot with sweat beads and worry lines (Aurora). [Color figure can be viewed at wileyonlinelibrary.com]

their organizations and work alongside kids. This perspective of failure was framed through oft-heard *catchphrases* such as "part of the process" or "a learning opportunity." This process was likened to a nomad traveling on a journey with side jaunts and stops for rest along the way [*metaphor*], which contrasts failure as an endpoint, as described earlier. As described by collaborators, iteration is rarely what children expect when engaged in a making activity. Their goal is toward a functional product, and they are often blindsided when failure occurs because they are not aware that the actions and choices they make are leading them down a path toward failure.

These failures come in different forms and multiple scales. As stated by Marguerite, "[T]here's different scales of failure. There's different settings in which the failure can happen or the context that it's happening in." Alexander built on this idea by noting how "kids bring a different set of assumptions and feelings and experiences [regarding failure] with them." As educators, the goal is to support students in their journey. Kelly described this as "grease the wheels," which implies helping children make an informed decision so that the process runs more smoothly in the immediate future. In thinking about ways to continue their desired framing of failure, collaborators felt a shift in language and meaning of failure is warranted, specifically a shift that would neutralize the loaded term within the broader society [*appeals to principle*]. This is captured in the following statement by Adalaide.

So right now, it has this really big, like capital 'F' failure, like big meaning behind it. And we view it a very certain way. But I think by redefining or codifying some of the definition that we have, can help neutralize that negativity. I view failure as a thing that happens. It doesn't necessarily have to be good or bad. Like trying to remove some of that judgmental language, I think, is helpful.

As such, educators acknowledged failure as a transformational process that can make us stronger as individuals change (or transform) through experiences with failure. This was described well by Adalaide.

I represented it [failure] with this piece of paper that I crumpled up. And then I folded it into a paper hat because that's the only origami I remember. But you

I can see all the lines where it was like crumpled up or whatever. But then it's still a hat.

In this quote, the crumpled up piece of paper was transformed into a hat (i.e., growth as a person). The visible lines on the hat are the scars and imperfections from prior failures that shape our lives and evolving perspective of failure. This *metaphor* highlights the evolving and transformational framing of failure as one step in a long journey.

3.5 | Failure as a Shared Experience

In this frame, failure was described as in conjunction or collaboration *with* youth as opposed to being viewed as separate entities where a child or an educator reacts to one another, as exemplified earlier in the collaborators' responses to Failure as Finite and Fearful (e.g., hiding their own failures as educators). As stated by Kathleen, "You get to take a risk with your students, and not feel like a failure when they're failing, but still moving through that space with them." One word to highlight in this statement is "get," in that as educators you have the privilege to experience risk taking and failure with youth. Aurora shared an example that *exemplifies* this frame.

I led a paper circuit lab last week. ... And I was struggling a few times. I shared my struggle moments while I was facilitating with them. ... Because I felt like they might have those same struggle moments. And they did. And we were able to talk through them together.

Within this frame, collaborators expressed how educators should model, both verbally and nonverbally, that it is okay to fail and it is okay to show vulnerability. However, there is an expectation and a norm of educators as being the ones in power, correct and all-knowing on a given topic or concept [root]. "I think that's something that is hard for a lot of educators because they do feel like they have to show being correct or being right, or that they do know everything" (Kelly). The *consequence* of such "showmanship" is accepting and maintaining the status quo of educators as an expert or a hero that is able to save the failure, which is in direct contrast to the essence of the transformational nature of failure. As collaborators, they expressed giving one another, as well as other educators in their organization, permission to fail. As stated by Linda, "I feel like giving teachers permission to fail is just as important as giving it [permission] to students."

3.6 | Failure as Defined by Those in Power

As questioned and framed by Adalaide, "What is the standard of excellence? Who is holding whom to this standard? How is our standard of failure grounded in white, Eurocentric ideas, norms, and understandings?" As a community, collaborators were beginning to view how failure in our institutions is built upon views of those in power [root]. This frame was compared to a trickle-down effect [metaphor] where failure is defined by those in power within a system, and this view of failure spreads

to the whole of the system. The *consequence* of failure within this system leads to feelings of self-doubt and inadequacies, and sometimes, continue to trickle down to affect other individuals. As stated by Lucia, "...there's like a million consequences, and sometimes their personal or self-critical consequences, and sometimes they affect other people." Similar to Failure as an Invisible Hand, there was a feeling that "our backs are up against a wall" (Sarah) and resilience is needed to overcome adversities and expectations established by those in power because "life is the way it is, you can't change things" (Linda). While there was a sense of defeatism in changing the whole system, Kathleen expressed that change is possible within individual classrooms. "The system in our classroom, like we can do what we can, but the idea of changing a whole system is like, for me, it's like, hundreds of years of work."

4 | Discussion

This study examined how an online community of museum educators framed their perspectives of failure. The results highlighted how collaborators' framing of failure is bounded by un/seen external influences that ultimately impact the professional practices of educators in their organizations. Specifically, findings from the signature matrix highlighted how the invisible hand of historical, cultural, and societal structures and perspectives of failure, as well as youths' view of failure as something to avoid, has led to museum educators not acknowledging but hiding their own professional failures and avoiding the use of the word failure when interacting with visitors during STEAM-related activities. These are not uncommon experiences, particularly as highlighted in research on educators in classroom settings (e.g., Lottero-Perdue and Parry 2017; Lutovac and Flores 2021).

This often leads to a tension that collaborators expressed as a desire to shift failure mindsets to one that is framed as both an iterative process and in collaboration *with* youth, similar to research that situates failure as a positive experience (e.g., Creely, Henderson, and Henriksen 2019). Furthermore, this study highlighted the transformational framing of failure by collaborators, namely Failure as a Shared Experience and Failure as Defined by those in Power. Yet, educational change and shifts in educators' thinking, actions, and behaviors are often slow to take form (e.g., Simpson and Feyerabend 2022). Collectively, the findings from this study are illustrated by frames in Figure 2 and support Creed, Langstraat, and Scully' (2002) argument that frame analysis in organizational research highlights the complex linkages between cultural and social environments.

We also noticed some similarities between how failure was framed by collaborators in this study and how failure was framed within educational media, which implies that another "invisible" external factor may be shaping museum educator's perspective of failure but now recognized as such within our conversations (e.g., Kühne and Schemer 2015). For example, Failure as Finite and Fearful (collaborators) and Failure as "I can't do this" (media), highlight failure as something to avoid. As stated by Evans (2012), "You can't fail if you don't play the game, and it is better to be in the game than on the sidelines." In this quote, being on the sidelines is a way



FIGURE 2 | Visual representation of the failure frames. [Color figure can be viewed at wileyonlinelibrary.com]

to avoid experiencing failure. Future research can examine how media outlets inform museum educators' production of professional knowledge and professional practices around failure.

4.1 | Implications for Practice

We contend that the significance of this study lies in how knowledge and perspectives around failure are produced (e.g., media) and how this influences educators' professional practice within STEAM-related activities in a museum setting (e.g., avoid using the word failure). As stated by Manalo and Kapur (2019), educators have a responsibility to shift students' and teachers' understandings of failure as one that is more positive and productive. As such, this study highlights how engaging in ongoing conversations around failure has the potential to challenge where our perspective of failure is grounded. Whose voice and perspective are involved in the production and communication of failure within an organization, an educational team, an exhibit, and/or a STEAM-related activity? One partnering site, in particular, unpacked this question by engaging in open dialogue with their informal educators. As a team, they discussed the following questions: (a) How do our identities, backgrounds, and contexts affect our ideas of failure?, (b) How are our personal and professional perspectives of failure grounded in media, generational, familial, cultural, and systematic ideas?, (c) How does this influence our approaches to kids' failures in your instructional experience?, (d) How does failure live in our bodies?, and (e) What are some things at the root of kids' failure experiences? As such, there is a sense that we, as informal educators, must first challenge the status quo before changing the culture of failure in educational spaces and STEAM-related activities. Therefore, we encourage organizations to ask similar questions as those listed earlier to provoke reflection and conversations around how to begin disrupting the failure culture in organizations.

This study also highlighted how collaborators struggled to have a solution for how to disrupt notions of failure within their organizations (e.g., Failure as an Invisible Hand). Therefore, we recommend the utilization of continuous professional development and reflection with a particular focus on using video recordings and/or observations of educator's interactions with visitors to challenge perspectives and practices specific to failure (Simpson et al. 2023). Prior research has highlighted the value of videos as a form of professional learning, both individually

and as a community. Benefits include challenging personal assumptions (Bevan and Xanthoudaki 2008), reflecting deeply on negatively perceived events (Beisiegel, Mitchell, and Hill 2018; Seidel et al. 2011), and developing the knowledge and noticing skills regarding how to support students in the moment (Borko et al. 2011; Grabman et al. 2019).

Finally, we contend that the utilization of the signature matrix as a methodological tool will continue to uncover the nuances of failure in collaborators' roles as museum educators, such as how perspectives of failure are framed and filtered through generational and/or systematic perspectives (Vanderheiden and Mayer 2020). As such, we intend to continue analyzing our conversations around failure in our virtual meetings, as well as include additional data sources such as discussion group posts around shared readings, quotes, poetry, art, and images about failure. In addition, as aligned with the argument of Creed, Langstraat, and Scully (2002), the signature matrix can be utilized in other ways within informal settings (e.g., manifestations of white supremacy, Fifi and Heller 2019) as the matrix uncovers how we frame "loaded" concepts and terms through our spoken language, highlights conflicts and connections of individual and collective framings, and has the potential to examine shifts in our language (or not) and framing of a concept over a length of time.

4.2 | Limitations and Future Research

The findings of this study provide insights into how museum educators frame failure within their professional roles in making activities with youth. However, these findings are limited to 14 collaborators within six museums that engage visitors in making activities. We contend that ongoing discussion among collaborators shaped the various failure frames highlighted earlier, whereas it is likely that a different mix of collaborators would have led to different results. We recommend that similar research be replicated and conducted with individuals from other museums sites, as well as other organizations that offer making activities for youth, as a way to consider the pervasive nature of failure that is framing the work of informal educators. Cross-cultural studies would also be useful in understanding how culture shapes informal educators' views of failure in their professional roles. Similarly, we acknowledge how the prompts framed the discussions among collaborators. As noted earlier, our facilitation of failure were at times more open-ended and

other times more purposeful in terms of eliciting strong reactions and emotions to failure. A future study can examine how the facilitation moves within ongoing professional development shape and influence how knowledge production and communication around failure in STEAM-related activities is developed and/or challenged (or not). A question to consider might be: In what ways do failure facilitation moves consider traditions of oppression and opportunities of equity (or not)?

5 | Conclusion

Collaboration among museum educators can motivate reflective thinking, leading to awareness and acknowledgement of the impacts of failure in professional practices and in turn allow for modeling reactions to and behaviors toward failure when they occur for others to learn from as well, whether they are colleagues, business and/or educational partners, or visitors (Vedder-Weiss et al. 2018). Our findings support this as our collaborators, as an online collective, produced different frames of failure (e.g., Failure as an Invisible Hand, Failure as Finite and Fearful) that shaped their professional practices when working with children in STEAM-related making activities (e.g., Failure as not in our Vocabulary). This adds to the ongoing conversation around failure in educational contexts, particularly from the perspective of educators within museum settings. We acknowledge that museums serve a wider audience than classroom settings, and therefore experience and frame failure in broader ways (Mayer 2005). For example, as a business, museums have to consider how to attract and retain visitors in order to receive the economic support necessary to continue to exist and provide a service to the community (Hume 2011; Pulh, Mencarelli, and Chaney 2019; Zeylikman et al. 2020). This was a tension for museum educators in this study as it positioned failure as “what-is” (e.g., something to avoid) as opposed to “what-it-could-be” (e.g., one step on a journey toward success). As such, our results hold promise for working alongside other members of the museum community in questioning and shifting educator’s perspectives and professional practices within STEAM-related activities.

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Ethics Statement

The study was approved by the appropriate institutional research ethics committee (Binghamton University Institutional Review Board; Approval No. STUDY00002698). We certify that the study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. Informed consent were obtained from all individual participants included in the study.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Endnotes

¹ Participant created pseudonyms are used throughout the article.

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