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ABSTRACT

Despite attempts to diversify the informal science education workforce, institutions like museums, zoos, and aquariums continue to be places of privilege where few can afford to make education a life-long career. This exploratory study examined informal science educators' perspectives on workforce equity, diversity, and professionalization. Through a nationwide survey and selective interviews, educators (n = 132) were asked about their career motivations and personal and professional challenges faced before and during the COVID-19 pandemic. Results show that 59% of informal science educators surveyed were considering academic or career changes, citing workplace practices and cultures that perpetuate overwork and underpay and that have contributed to the marginalization of educators who have been historically excluded from working in the field. Our goal is to amplify educators' voices and encourage reflection on how museums and other institutions have upheld oppressive structures that prevent goals of equity, diversity, and inclusion from being holistically achieved.

KEYWORDS:

Informal science educators
social justice
pay equity
workforce diversity

At the height of the Great Recession in 2008, Tina Nolan, former editor of the *Journal of Museum Education*, painted a picture of museum educators in a state of crisis.[1] Museums were taking financial hits as a result of the economic downturn, and educators were losing their jobs in numbers far greater than any other group of museum staff. Now, over a decade later and in the midst of the COVID-19 pandemic, museums are once again experiencing unprecedented

closures and staff reductions, all while grappling with the additional role of confronting systemic racism and white supremacy. Exacerbated by the intersection of these dual pandemics, issues of educator professionalization, valuation, and equity are returning to the spotlight as major concerns in the field.

Investigations into the compensation and recognition of informal educators have been part of museum and education discourse for decades.[2] Many researchers and scholars have argued that the informal education field lacks an overall professionalization of the practice, citing issues of insufficient academic preparation and lack of competency, inconsistencies in job responsibilities and scope of work, and varying public perception of the field as the reasons why educators have struggled to succeed professionally and financially in their institutions. To the contrary, we attest those arguments place unfair and misdirected blame on educators while failing to address the ways in which the institutions themselves contribute to the cycle of devaluation.

To amplify educators' voices during this time of destabilization, we conducted a survey and semi-structured interviews with informal educators at museums, zoos, aquariums, botanical gardens, and science centers across the United States. Many who responded to our survey reported job dissatisfaction and a desire to leave the field. Frequently cited was the failure of institutions to address the systems and structures that have devalued the education profession and upheld long-standing issues of classism, sexism, and racism. For these predominantly White educators, the COVID-19 crisis and social justice movements like Black Lives Matter have helped them to better see and understand how their privilege allows them to sustain a career in a field with chronically low pay. Our research and the work of others show that informal science educators are highly credentialed, competent, and effective members of their institutions,[3] but they continue to face increased demands for accreditation and job experience while opportunities for advancement, rates of compensation, and working conditions continue to decline. Dubbed the "broken pipeline" by researcher and educator Kris Morrissey and independent museum professional Grayson Dirk,[4] this discrepancy has perpetuated workforce inequity and imposes further barriers to educators from historically underrepresented groups.

Study context and methodology

This study included an explanatory sequential mixed-methods

investigation focused on exploring informal science educators' career pathways, motivations, and perceptions. We have further situated this work in a critical examination of the historical movements, forces, and policies that have influenced the museum educator profession and left educators increasingly vulnerable to social, political, and economic upheaval. Data collection included a survey and optional follow-up interview. We distributed the survey through multiple informal science education listservs.[5] The response rate was not able to be measured due to the anonymity of the survey and because the number of members on each listserv were unknown to us. Participants were required to be over the age of 18, residents of the United States, and working as an educator at an informal science institution. The survey was restricted to paid employees, not volunteers. However, we encouraged educators who were recently furloughed or had lost their positions due to the COVID-19 pandemic to respond. The survey was administered in October 2020, six months after the United States experienced the onset of the nationwide lockdown and museum closures. At the time of the survey, many institutions were beginning to reopen at limited capacities.

In addition to collecting descriptive statistics, the survey included multiple-choice questions, Likert scenarios (questions where respondents are asked to rank a statement on a scale of 1–7, often with responses such as Strongly Agree to Strongly Disagree), and open-ended questions. We designed the open-ended questions to give participants the opportunity to expand on the multiple choice and Likert responses supplied in the survey. The research team open coded the responses which resulted in the identification of unique themes related to the parent questions including perceptions of *challenges, support, value, compensation, job security, and workforce equity*. The interview portion of the study was optional and based on emergent trends found in the responses from the survey. We identified surveys that were representative of themes explored in this current paper for potential interviews and included those who indicated currently seeking an academic or career change ($n = 77$). From this subset, we randomly selected five participants to take part in follow-up interviews. During the interviews, we encouraged the participants to further explore their initial responses in order to provide insight and context to the quantitative results. The interviews took approximately 40 minutes and were conducted using a remote video platform that also recorded the interview. Audio recordings were transcribed for analysis. The research team coded the transcripts according to the emergent themes from the survey responses.

Who are informal science educators?

The survey included a variety of questions designed to capture descriptive statistics including demographics (e.g. age, gender, race, or ethnicity; see Table 1), participants' academic degrees and certifications (see Table 2), and their current job (e.g. job type, typical duties, benefits, salary information). The vast majority of respondents were women, non-Hispanic White, and between the ages of 25 and 44. When asked about their highest level of schooling, 100% reported having a college education, holding a 4-year degree or above as their highest level of degree attainment. Degree awards were concentrated in science disciplines, science education, or other education disciplines such as elementary education or museum education.

The majority of survey-takers (67%, $n = 89$) identified as entry to mid-level employees with some supervisory duties that ranged from supervising a few interns to managing other full-time employees. Of the remaining respondents, 16% ($n = 21$) were non-supervisory or temporary employees, while 17% ($n = 22$) were a department manager or institution director. When asked what tasks best describe the majority of their work, over half (57%, $n = 76$) reported planning or executing programs for targeted audiences or populations, 32% ($n = 42$) focused on management or administration, and 8% ($n = 10$) said they mainly worked directly with the public or general audiences. Many of the employees

Table 1. Demographics of respondents by gender, age, and race or ethnicity.

	Frequency ($n = 132$)	Percent
Gender		
Female	108	81.8
Male	20	15.2
Non-binary	2	1.5
Did not disclose	2	1.5
Age		
18–24	3	2.3
25–34	54	41.0
35–44	39	30.0
45–54	24	18.2
55–64	10	7.6
65–74	2	1.5
Race/Ethnicity		
Non-Hispanic White	119	90.2
Hispanic or Latinx	2	1.5
Black or African American	1	0.8
Asian	2	1.5
Native Hawaiian or Pacific Islander	1	0.8
Bi-racial or multi-racial	4	3.0
Did not disclose	3	2.3

Table 2. Highest degree completed and areas of degree concentration.

	Frequency (n = 132)	Percent
Degree		
4-year degree	59	44.6
Master's degree	68	51.5
Doctorate	5	3.8
Discipline		
Science	62	46.9
Science Education	30	22.7
General education discipline	25	18.9
Other discipline	15	11.3

who identified themselves as supervisors reported job duties that included planning and executing programming and working directly with the public, suggesting that many educators have extensive job responsibilities.

A limitation of the sampling methodology in this study may be that the survey respondents are representative of educators who are connected to established professional net- works rather than the population of educators as a whole. However, the demographic data for this study appear to be aligned with earlier reports from other large-scale institutional surveys. The 2017 National Museum Salary Survey reported that museum educators were predominantly women (83%, n = 304) with 4-year (32%, n = 112) or master's degrees (62%, n = 215).[6] The 2017 survey categorized educators into two groups based on supervisory duties and job responsibilities, which align with the majority of responses of our survey. One limitation of the national study is combined reporting across a variety of institutions including art museums, history museums, science museums and centers, and zoos, botanical gardens, and aquariums. Additionally, that survey did not include demo- graphic data related to age, race, ethnicity, or gender identity beyond male or female. The demographics in this study also align with our recent study of museum educators' levels of self-efficacy.[7] Of the participants in that study (n = 400), 81% (n = 322) identified as female, 91% (n = 365) identified as White, and more than 99% had at least some college education with 48% (n = 193) having a four-year degree and 46% (n = 183) holding a graduate degree. Our earlier study had a higher number of science degrees (68%, n = 273), but a similar number of education degrees (26%, n = 106).

Workforce demographics for informal educators in humanities-focused institutions have been under increasing scrutiny. A 2018 survey commissioned by the Andrew W. Mellon Foundation described staff in education positions in art museums as 84% non-Hispanic White and 77% female.[8] However, little

documentation or research exists on the diversity of informal science educators. Observing degree attainment within our survey sample may aid in exploring alignment to the larger population. According to the museum salary survey, the typical qualification for informal educators includes an advanced degree in an area related to the disciplinary focus of the institution. As the educators from this survey frequently held degrees in science (47%, *n* = 62) and education (42%, *n* = 52), it may be reasonably extrapolated that this trend would be seen across institutions broadly. According to the National Science Foundation, a majority of college students enrolled in STEM programs are White and non-Hispanic.[9] Women were reported to earn about half of all bachelor's degrees and 44% of master's degrees in science and engineering. Individuals from historically underrepresented groups received 22% of bachelor's degrees and 9% of master's degrees in these disciplines. Additionally, the U.S. Department of Education reports women accounted for 82% of bachelor's and 78% of master's degrees conferred in education in 2018.[10] Of these, 25% of bachelor's degrees and 31% of master's degrees were awarded to women of color. Considering these statistics, that our sample of informal science educators is pre- dominantly women (82%, *n* = 108) does appear to align with the larger population of education graduates with respect to gender. However, the predominance of non-Hispanic White (90%, *n* = 119) educators in this study may be indicative of a non-representative sample or point to a larger issue of diversity within informal science institutions.

The emotional, financial, and institutional stress of intersecting pandemics

In our survey, participants were asked to reflect on their perceptions of their work experiences before and after the onset of the COVID-19 pandemic. Questions included "how challenging did/do you find your work?", "how supportive was/is your work environment?", "how personally rewarding was/is the work that you do?" Additionally, the survey included questions that probed educators' perceptions of their job expectations and compensation, including whether or not they felt their job was financially viable, provided adequate benefits, and could be a lifelong career. Participants were asked if they anticipated a future career change or pursuing more academic credentials either in general or as a result of the COVID-19 pandemic.

Perceptions of challenges, support, and value before and after the COVID-19 pandemic

When asked about their work environments before the pandemic, most educators reported that they found the work moderately to very challenging (88%, *n* = 117), that their work environments were moderately to very supportive (75%, *n* = 100), and that they found the work very to extremely rewarding (95%, *n* = 126). After the onset of the pandemic, most participants reported that their work became somewhat (57%) more difficult and with 20% (*n* = 26) indicating that they found the work environment to be extremely challenging. Less than 30% (*n* = 38) of the respondents found their job very or extremely rewarding post pandemic compared to 95% pre-pandemic. Caution must be exercised in interpreting these results, as educators' career perceptions were not measured pre-pandemic and therefore respondents might be qualifying perceptions of past experiences by comparing them to current ones.

Fifty-two participants chose to include information or clarification of their career perceptions after the onset of the COVID-19 pandemic in an open-ended essay box. Their responses touched on several themes related to job dissatisfaction: experiencing furloughs or terminations themselves or of colleagues, personal financial losses, the challenges with online instruction, reduced budgets, frustration with institutional decision- making and lack of future-focused initiatives, personal lack of motivation and creativity, concerns for personal safety, feelings of isolation, dealing with angry or frustrated visitors, and unsteady job prospects.

The flight of the educator

More than half of respondents (59%, *n* = 77) reported considering or actively exploring an academic (23%, *n* = 30) or career change (36%, *n* = 47) either in general or as a result of the COVID-19 pandemic. In their open-ended responses, survey participants often described the COVID-19 pandemic as a tipping point for long-standing issues that had made them previously consider the change. According to one respondent, "I always have my ear to the ground, pandemic or not. Upward mobility within my organization has been a long-standing frustration." Coding of the open-ended responses revealed that educators perceived several factors as influencing their decisions, including insufficient compensation, job insecurity, and competition for positions. Also rep- resented was dissatisfaction with how institutions were addressing these issues, the COVID-19 pandemic, and systemic racism. If the figures in this study are representative of future action and the population of educators nationally, the potential attrition rate of informal science educators (38%) is close to triple the

turnover rate of formal educators (13.8%),[11] and exceeds the pre-pandemic national quit rate of 27.9%.[12]

Insufficient compensation

Participants were asked to report their yearly income and to reflect on their satisfaction with their financial compensation in relation to their work and level of education. The median salary bracket for respondents was between $40,000-$49,000 per year, well below the national median income for individuals who hold 4-year (~$65,000 per year) or master's (~$78,000 per year) degrees.[13] According to one participant, "The informal science field is undervalued. Positions require a college degree, but they are not willing to pay compensation for that college degree. I have a master's degree and I am still not making 40K (after 6 years)." Only 22% (*n* = 29) of educators reported being moderately, very, or extremely satisfied with their compensation.

Respondents were further asked to agree or disagree with statements regarding their ability to support themselves or their households on their current salaries. Only 43% (*n* = 57) agreed that their jobs in informal science education have provided them with enough income to support themselves or their families. Of these respondents, half (49%, *n* = 28) only "somewhat agreed" with that statement. In their open-ended responses, several participants addressed their financial stress. According to one educator,

> I have been able to support myself for day-to-day life; however, my positions have never paid me enough to be able to support more than myself (e.g., a family) or to plan and save for the future. I will never be able to retire.

Alarmingly, 70% (*n* = 93) of respondents said they would be unable to sustain their career in informal education without additional support. Written responses referenced living "paycheck to paycheck" and relying on partners, roommates, parents, and generational wealth. One educator described how they have "made it work by living in shared housing and minimizing spending," but can still not afford to buy a home, "even as an education director with nearly 20 years of experience." Some educators directly pointed out how being able to engage in a career that takes so long to be sustainable is a form of economic privilege. One survey participant wrote, "it took 10-15 years in the field to reach a place where I am comfortable at the salary I have now. I am not sure everyone's life situation allows for that kind of slow pace to financial security."

Job security and competition for positions

Several respondents reported that their job trajectory contained "no real linear path," and that lateral moves between institutions often resulted in setting them backwards on the pay scale. In a follow-up interview, one participant described that of the cohort of graduates from her museum studies master's program, many were piecing together a 40-hour work week through holding a variety of part-time jobs at multiple informal education institutions. Another educator mentioned, "there is only one time in my 10+ year career in the field that I have not had multiple jobs to make ends meet. I've worked up to 5 part-time jobs at a time, all within the informal education world!" Both the survey respondents and interview participants describe the difficulty in obtaining full- time informal education positions. Despite being well-credentialed college graduates, respondents reported applying to numerous informal science education positions without success. One interviewee describes the process as a waiting game: "you basically are just waiting for someone to retire or leave and hope the museum decides to refill the position."

Respondents also described having to step back from their jobs in order to pursue additional degrees that they thought would help them be more competitive in seeking higher-level positions. In one open-ended response, an educator described this tension,

> I have stints of thinking that I will not be able to continue in this field without significant compensation changes, as I do not want to work two jobs for the rest of my life, and do not feel that I should have to. I am currently waiting to start a master's program and hope that the additional experience and qualification will help push my salary up enough that I will not need an additional job but will still have to evaluate if this career can give me what I need to support the life I want outside of work (i.e., buying a house, traveling, etc. on my own on one income).

According to several participants, the need for additional degrees or career shifts was felt even more acutely during the pandemic: "I am accepting the reality that opportunities for a stable and supportive career as an informal educator are rare to begin with and will be less available moving forward due to COVID impacts." Troublingly, when we compared degree achievement with compensation, we found the distribution of masters and 4-year degrees were similarly proportioned across all salary bands, suggesting that holding a master's degree did not guarantee a higher salary.

Exploited and underappreciated

Many of the educators who participated in this study reported feeling “extremely exploited” as education staff and that their labor was being taken for granted. According to an interview participant, “no one goes in thinking they’re going to get rich. However, all of us would like to be compensated more for our work. We have incredible amounts of knowledge and expertise that, unfortunately, society values less than for-profit careers.” Another survey participant reflected, “there seems to be an implicit ‘Mission Dividend’ associated with work in this sector. That is, we pay less for qualified people than other jobs in other sectors that would compete with them.”

When provided room to add clarification to their responses about personal satisfaction and institutional support, many referred to the service-driven mission of their organizations and the dichotomy of working for low pay but in the service of the greater good. As one educator reflected, “I feel as though this field is filled with passionate people who love the rewarding work that they do and therefore are willing to have a lower compensation than if they worked in another industry.” The participant goes on to say, “I think that museum administration can take advantage of this, thinking that because workers are passionate about what they do that it is okay to pay them less.” Another participant provided a direct example of this saying, “A higher individual at my institution said being an informal educator is ‘a calling’ and as such those called to do it should expect not to be paid very much.” According to several participants, the expectation that a job’s intrinsic value serves as a form of fair compensation is “inequitable,” and one that “furthers male/white supremacy” by implying the public service work of female educators is less profitable or important than research or curation, institutional positions historically held by men.

Informal education as a pink-collar profession

The institutional practices and expectations associated with an “education as a public- service mission” are heavily laden with sexism.[14] One survey respondent argued that because the field is predominantly made up of women, informal education suffers from being a “pink-collar profession” where compensation has been historically lower than in fields dominated by men.[15] Research has shown that when women increase in representation within a given profession, compensation levels decrease for the field as a whole.[16] Additionally, as service occupations like teaching or nursing become “feminized,” they also become laden with historical gender biases. In a 2018 article addressing the pink-collar phenomenon in art museums, Elisabeth Callihan of the Minneapolis Institute of Art and Kaywin Feldman, Director of the

National Gallery of Art, described how, according to Dana Kletcha, a professor of art museum education, the feminization of informal education creates a "silent hierarchy" where educators, the "caretakers of people," are perceived as lesser to curators, a profession that is historically ascribed to intellectual pursuits and therefore gendered as male.[17] Callihan and Feldman go on to discuss the financial manifestations of this hierarchy, noting that on average art museum educators are compensated around 20% less than curators of similar rank.[18] Along with the gender gap in compensation, there are also notable gender gaps in leader- ship, particularly at large institutions, where director and museum board positions tend to be held almost entirely by men.[19]

In addition to the glass ceiling that drives low wages across informal education, service-centered labor creates a culture that positions the work of the educator as a "labor of love." Described as the "museum sacrifice measure" by Elizabeth Merritt, Vice President for Strategic Foresight for the American Alliance of Museums, the expectations associated with a service-driven mission inherently exploit intrinsically motivated educators, allowing museums to offer, and educators to accept, low wages in exchange for the chance to contribute to the institution's public service ambitions.[20] This has serious implications for women in the field and even more so for women of color and gender minorities, who are significantly underrepresented in informal education and have historically faced additional professional and financial instability.[21] Despite an increase in the number of young people seeking and obtaining careers in informal education, the 2018 Andrew W. Mellon Foundation report shows that the percentages of art museum staff from underrepresented communities have been holding even across age cohorts for those born between the 1960s and 1990s.

Looking forward

In her 2006 study of museum educator identities, researcher and consultant Elsa Bailey described a committed group of staff who were passionate about upholding museums' service-education missions, but battled low rates of pay, highly variable schedules, heavy workloads, and unpredictable institutional climates.[22] According to our study, little has changed over the last 15 years in the way educators perceive themselves, their goals, and the challenges of working in informal education environments.

The responses to this survey describe hard-working individuals who are dedicated to public education and striving to make the world a better place. But many of these educators can barely make

ends meet and fear they will never be able to make their chosen profession a lifelong career. Many who took part in this study argued that the intrinsic benefits of working in informal education make the risks and sacrifices of the job worth- while. But it is important to look at who these educators are and how working for low pay under inequitable constraints contributes to the marginalization of groups who have been historically excluded from working in informal education fields. The museum education profession continues to be one that is overwhelmingly female and White. Educa- tors with enough external financial support from parents, partners, or inherited wealth can afford to make a low-paying job a lifelong career, or to pause their careers to pursue and finance higher education degrees in the hopes that it will allow for advancement within the field. But only these select few can afford to take a job with such historically low pay, and thus informal education continues to be a place of privilege despite hiring schemes designed to diversify the museum workforce.

Underpaying informal educators is an institutional practice that reinforces sexism, classism, and racism, and directly contradicts the mission of the modern museum as a socially conscious organization. It is imperative that informal education staff represent the communities that they serve in order to be a welcoming place for visitors of diverse backgrounds. Museums that truly want to promote equity must acknowledge, and intentionally shift away from, the power structures that have created pay inequities and devalued the museum educator profession. We fundamentally believe that this change must come from those in positions of power in professional organizations and at high-impact institutions. Leadership must halt the perpetuation of exploitative labor practices by increasing transparency around pay equity and diversity and relinquishing the “labor of love” philosophy. It is only by fairly compensating, supporting, and recruiting all who wish to embark in this career that institutions can holistically achieve their purported goals of equity, diversity, and inclusion.

Notes

1. Nolan, “The Museum Educator Crisis,” 117–20.
2. E.g. Morrissey, Heimlich, and Schatz, “Redefining Professionalism for the Informal STEM Learning Field,” 1–14.
3. E.g. Tran, “The Work of Science Museum Educators,” 135–53.
4. Morrissey and Dirk, “Identity & Museum Practice,” 568.

5. Listservs used for study recruitment included the American Alliance of Museums, Association of Children's Museums, Association of Science and Technology Centers, and the Association of Zoos and Aquariums.
6. American Alliance of Museums, *2017 National Museum Salary Survey.*
7. Ennes, Jones, and Chesnutt, "Evaluation of Educator Self-Efficacy ," 330.
8. Schonfeld, Westermann, and Sweeney, *The Andrew W. Mellon Foundation*.
9. National Science Foundation, *Women, Minorities, and Persons with Disabilities.*
10. Snyder, De Brey, and Dillow, *Digest of Education Statistics 2018, NCES 2020-009.*
11. Garcia and Weiss, *U.S. Schools Struggle to Hire and Retain Teachers.*
12. Quits are defined by the Bureau of Labor Statistics as "generally voluntary separations initiated by the employee."
13. U.S. Bureau of Labor Statistics, "Learn More, Earn More."
14. Nie, "'Far Too Female': Museums as the New Pink-Collar Profession."
15. Levanon, England, and Allison, "Occupational Feminization and Pay," 865–91.
16. Ibid.
17. Kletchka, "Women's Work: The Gendered Discourses of Art Museum Education," 7 as described in Callihan and Feldman, "Presence and Power: Beyond Feminism in Museums," 182.
18. Callihan and Feldman, "Presence and Power: Beyond Feminism in Museums," 179–92.
19. Ibid.
20. Merritt. "The Museum Sacrifice Measure."
21. See note 18 above.
22. Bailey, "Researching Museum Educators' Perceptions," 175–97.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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