Oregon State University
STEM Research Center

ISL Framework Project:

Baseline Survey Findings

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Executive Summary

The Informal STEM Learning (ISL) project[1] research team from the STEM Research Center at Oregon State University, in collaboration with project partners, conducted a baseline survey with members of the informal STEM learning community. The main goals of the ISL Baseline Survey were to

1. Understand the current lived experiences of ISL professionals and determine factors around professional learning that might enhance belonging to institutions and the field of ISL, and success individual's careers in ISL; and
2. Gain insights into current awareness and knowledge of the Framework and perceived needs in the community to make the Framework useful and usable for a variety of purposes.

Findings from the baseline survey complement data from listening sessions and transference panels. Collectively, the project team can use baseline survey findings to inform the development of resources for the Framework, including how to best socialize the Framework into the ISL community. The survey was based on a similar survey to the ISL community conducted by the Center for the Advancement of Informal STEM Learning (CAISE), further co-developed by all project partners, and disseminated from contact lists from the Association of Science and Technology Centers (ASTC). 732 respondents started the survey, and 630 completed at least one scale of survey items. This summary shares high-level findings from our initial analysis of the survey data of those 630 respondents to the survey.

Sample Characteristics and Demographics of the ISL Field

1. *The sample trended heavily towards white, highly educated cis-gender, heterosexual women*, similar to the sample of the earlier CAISE survey. White women comprised 53% of our sample (and 60% of the case CAISE survey sample). They formed by far the largest identity group in the intersectional overlap between racial/ethnic and gender identities. While each of the two surveys is not likely fully representative of the *field* itself, they confirm a common observation about the demographic structure of the community. More specifically, almost three-quarter (73%) of respondents identified as white, two-thirds (68%) as cis-gender women, more than half (54%) are holding graduate degrees, and more than half of respondents have more than 10-years tenure in the field.
2. *The sample reports earnings that are below Census expectation*: A little more than half (54%) report annual incomes between $25,000-$75,000, which is far lower than expected given degree attainment and work experiences, confirming broader narratives in the field about compensation levels compared to other professional fields.
3. *The ISL field is welcoming to non-majority groups in some regards*. Around 18% of sample respondents indicated that they are lesbian, gay, bisexual, or agender, which is higher than recent polls of LGBTQA representation (7%; Gallup, 2022). Three-quarters (76%) reported not having a disability. These numbers suggest an

over-representation of LGBQA and persons with disabilities in the field, which might stem from ISL spaces being more welcoming than other economic sectors.

4. *Not surprisingly (given the distribution of the survey), most respondents (89%) work at STEM-focused organizations*, including those whose only mission is science (40%) or those with a variety of missions, of which one is STEM (41%).
5. *Work in ISL can be complex and multi-faceted:* More than half of respondents (57%) perform two or more roles in their organization.

Key Findings for Lived Experiences in ISL and Awareness of the Framework

1. *Most respondents had not planned for a career in ISL.* The data suggests that many might have ended up in an ISL job or career by happenstance, rather than seeking out a (planned) career in ISL. For instance, 60% did not initially plan to work at their current type of organization; moreover, more than half indicated uncertainty about their intent to stay in ISL: 54% are either thinking about transferring to another field or retiring. These findings suggest a high level of transience for the ISL field, and, conversely, suggest that ISL might not be perceived as a coherent field or domain for a career by many.
2. *Survey respondents were satisfied with working in the ISL field and felt a relatively strong sense of belonging at their organization*. However, respondents did not feel as strongly about a sense of belonging in the broader ISL field as they did to their organization. Reported satisfaction working in the ISL field, self-efficacy, feeling a sense of belonging in their position, organization and the ISL field, understanding expectations, and seeing mentorship and professional development for oneself trended higher for respondents with higher income, who identified as cis-gender, heterosexual and able-bodied.
3. *There was high self-efficacy among respondents*, suggesting they felt competent in their positions and in their professional practices. While survey respondents felt that they were able to translate best practices from other fields, they were less clear about best practices specifically in the ISL field, both in terms of what those might be and how to apply them in their sphere of influence. Nonetheless, many respondents did not feel as though they needed specialized training to be successful in their roles.
4. *Respondents reported limited access to professional learning opportunities and informal and formal professional mentoring*, and many noted that professional expectations in the ISL field were only somewhat transparent.
5. *Familiarity with the ISL Framework was mixed*. Slightly more than half (51%) of survey respondents noted that they were unaware of the ISL Framework while just less than half were either aware of or had at least heard of the framework. This should not surprise since efforts to socialize the Framework in the community have been limited. Findings overall suggest that the Framework could provide clarity and transparency, especially for those who moved into the ISL field "serendipitously" and who lack foundational training in some of the fundamentals of ISL. The Framework could serve as a tool for keeping professionals who want to improve in their role or move to nearby professions in the field, so long as sufficient opportunities for support go along with increased transparency.

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Study Overview

The Informal STEM Learning Professional Competency Framework project (ISL Framework), a partnership between the Association of Science and Technology Centers (ASTC), the Center for Research and Evaluation at COSI (CRE), and the STEM Research Center at Oregon State University (SRC), conducted a baseline survey ("ISL Framework Baseline Survey") with members of the informal science learning (ISL) field. The goals of the ISL Framework Baseline Survey were to: 1) explore variables that the project team identified as related to the potential usefulness of the framework, 2) determine who is aware of the ISL Professional Competency Framework, and 3) identify where there are barriers to belonging and striving in ISL, and where these barriers might be based on limited transparency for expectations on how to be a professional in the field of ISL. Findings from the baseline survey complement insights gained from listening sessions conducted by CRE with groups of professionals who work at science centers, natural history museums and children's museums, to understand how the framework resonated (or not) with ISL professionals and to hear what suggestions they have for implementation supports, and focus group-style conversations with members of ISL fields adjacent to science centers, natural history museums and children's museums (such as zoos and aquariums) which explored how the original ISL Framework that was developed in the context of museums and science centers might apply to other, nearby ISL settings; these so-called "transference panels" were also conducted by the CRE team. Collectively, the findings from all three methods will be used by the project team to inform the development of resources and supports that aim at improving the use of the Framework.

Survey Methods

Survey development and data collection

The OSU research team used an iterative process to develop the survey, with input from the broader project team. The underlying questionnaire was based on items (e.g., organizational role and type) and scales (e.g., self-efficacy, sense of belonging scales) developed as part of a survey that informed the summative evaluation of the Center for the Advancement of Informal Science Education (CAISE) (Carroll et al., 2023).

The final questionnaire was implemented using the online survey platform Qualtrics and distributed by the ASTC communications team through the project website, an ASTC newsletter and ASTC social media outlets. The survey was open from August-October 2023. The open sampling procedure makes it impossible to estimate a response rate and the sampling bias, (i.e., the degree to which the sample represents the community).

In total, 732 participants responded to at least one survey question. The findings reported here are focused on participants who completed at least one survey scale (n = 630[2]). This report shares findings from our analysis of these data and is organized by each of the key findings.

[2] The data presented below reflect the participants who completed at least one scale (n = 630). Sample size is only provided when reporting data of various sub-groups.

Data analysis

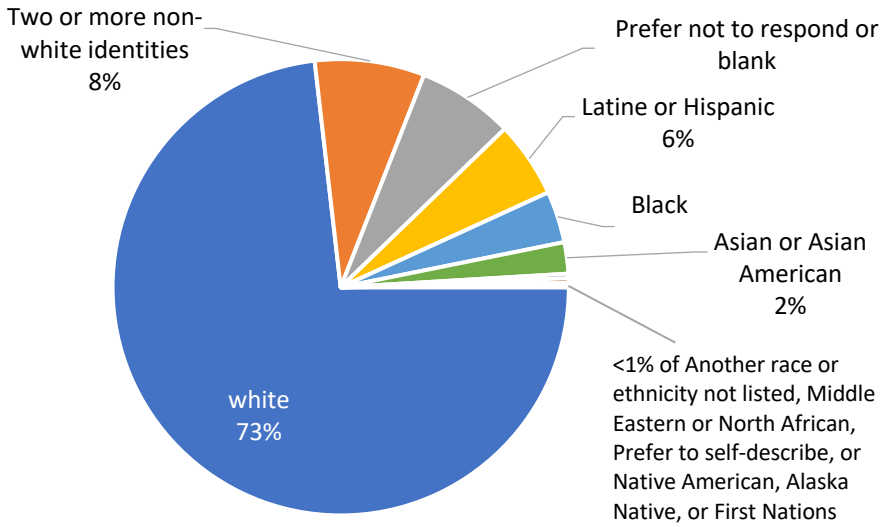
The data were exported from the Qualtrics survey platform to Microsoft Excel for data cleaning and then imported to the quantitative analysis software SPSS for statistical analysis. We tested newly created and established psychometric scales (survey scales) that were edited to fit the survey needs for reliability and dimensionality. To conduct inferential statistics, we aggregated highly detailed categorical data (for instance on gender or race/ethnicity) into broader categories. We note where this was done and report detailed descriptive statistics to allow the reader a full appreciation of the diversity of the resulting sample.

Sample Characteristics and Demographics of the ISL Field

The sample trended heavily towards white, cis-gender, heterosexual women

Most respondents of the ISL Framework Baseline Survey identified as white (73%, n = 461), confirming previous findings from the CAISE summative survey (with 84% of respondents identifying as white) that suggest that the museum and ISL field are not particularly diverse in terms of race/ethnicity (Fig. 1).

Fig. 1: Racial or Ethnic Identity of Survey Respondents



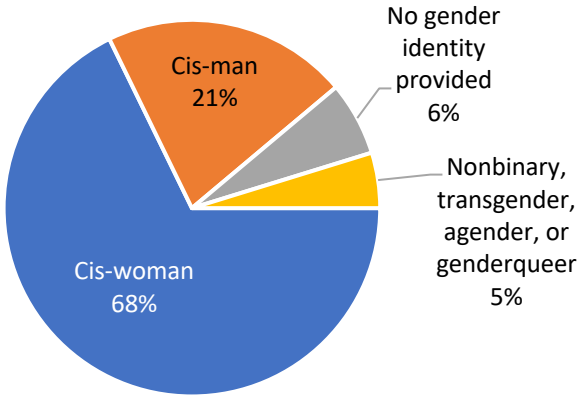
In general, our sample is far less diverse than the US population overall. We compared results of this study with 2023 US Census population estimates and found that the distribution of racial or ethnic identity in our study, after excluding those who did not provide their racial or ethnic identity (n = 43), was significantly different. Asian or Asian American were underrepresented by a factor of three (2% sample vs 6% in census), as were Black or African Americans (4% sample vs. 13% census), and Latiné or Hispanic people (6% sample vs 18% census). Respondents with multiple racial or ethnic identities (8% sample vs 3% census) and white respondents (73% sample vs 57% census) were overrepresented. The percent of respondents with Latiné/Hispanic or

Black/African American identities was comparable with our sample and that of the CAISE summative evaluation (Carroll et al., 2023), indicating that both surveys might have captured a real trend of underrepresentation.

Respondents who chose to self-describe a component of their racial or ethnic identity included identities such as African, Afro Latino, Indo Caribbean, Jewish, and Mestiza.

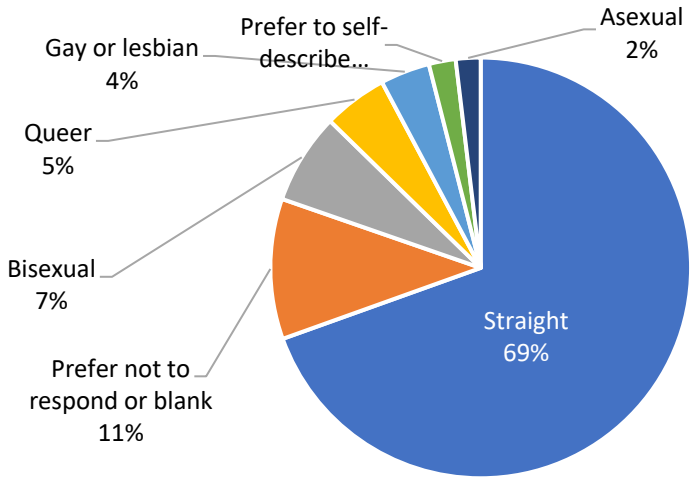
Two-thirds of respondents identified as cis-women (68% of total, $n = 427$), and about a fifth (21%, $n = 132$) identified as cis-men (Fig. 2). Non-binary, transgender, genderfluid and/or agender individuals comprised a small but considerable portion of the sample (5%, $n = 30$.). About 6% of the sample ($n = 40$) chose not to disclose their gender identity or did not answer the question. Our sample differed somewhat from the 2022 CAISE sample in that there were fewer men and more non-binary and trans/a/gender/queer individuals in our sample.

Fig. 2: Survey Respondents' Gender Identity



Just over two-thirds of respondents identified as straight (69%, $n = 438$), with 11% (n =68) who did not provide their sexual orientation. Overall, our sample suggests a high degree of diversity around sexual orientation in the ISL field. Almost a fifth expressed an identity other than heterosexual, an unusually high proportion given that national statistics suggest much smaller numbers of about 7% overall in the US population (Gallup, 2022). In our sample, about 7% ($n = 44$) identified as bisexual, 5% as queer (n = 31), 4% as gay or lesbian (n =24), and 2% as asexual (n =13).

Fig. 3: Survey Respondents' Sexual Orientation



The ISL field seems welcoming to non-majority groups outside of race or ethnicity

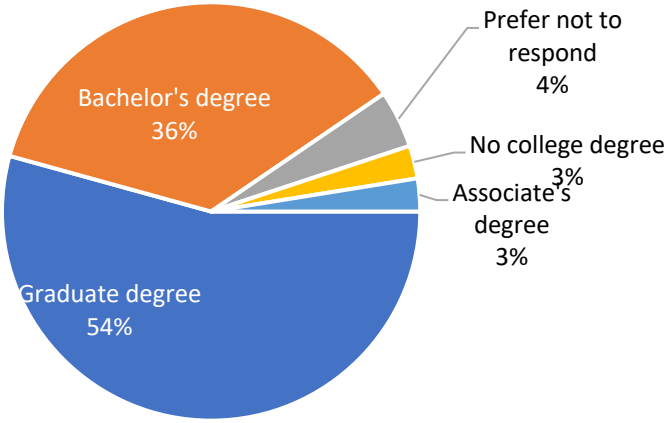
Our results suggest LGBQA+ persons are overrepresented in the ISL field. This also seems to hold for persons with disabilities: While 10% of the respondents did not answer the question about their ability status, 16% of those who did ($n = 91$) reported a disability, a relatively high rate within a professional field.

Overall, our demographic results suggest that the ISL field might be sending mixed messages about how welcoming it is to non-dominant groups. A predominantly "white" field, while likely trending towards progressive and inclusive norms, still struggles to become a home for ethnic/racial identities other than "white", for reasons that are hotly debated in the field, particularly around whether structural racism is ongoing, and to what degree the organizations associated with ISL are doing enough to create cultures, norms, rules and processes that welcome ethnic and racial minorities. Alternatively, the relatively low pay in the ISL field and high expectations for educational attainment might lead to self-sorting towards woman, and some minority groups. It merits further scrutiny whether the field is indeed not welcoming to racial/ethnic minorities, or whether members of those groups who have attained post-secondary degrees may opt for higher-paying professions. [Aside from not being welcoming in other regards such as existing representation, structural racisms, cultural norms, etc.].

The sample trended heavily towards highly educated individuals

Educational attainment in our sample was unusually high compared to census data: 90% had post-secondary degrees (Fig. 4), and while the percentage with bachelor's degrees (36%, $n = 228$) is similar to that of the US population, the percentage of graduate degree holders is about five times that of the population overall (54%, $n = 342$). Furthermore, an additional 5% of respondents hold an associate degree or trade certificate ($n = 16$) or had some college ($n = 14$). Only one respondent indicated a high school diploma as highest degree attainment and one indicated no high school diploma.

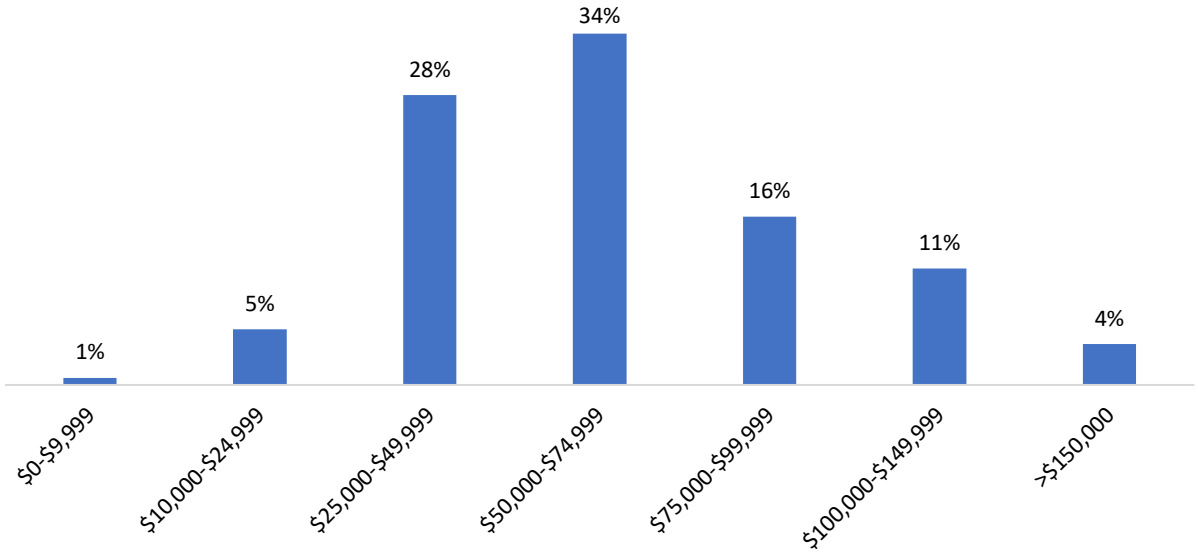
Fig. 4: Survey Respondents' Education Attainment



The sample reports earnings that are below Census expectation

The high educational attainment in our sample would have suggested much higher income than survey respondents recorded (Fig. 5). After controlling for those who did not respond to the personal income item (9% of total, $n = 55$), almost a third earn less than $50K, and another roughly third of the sample respondents earn between $50-75K. Six-figure salaries were reported by 15% of the respondents.

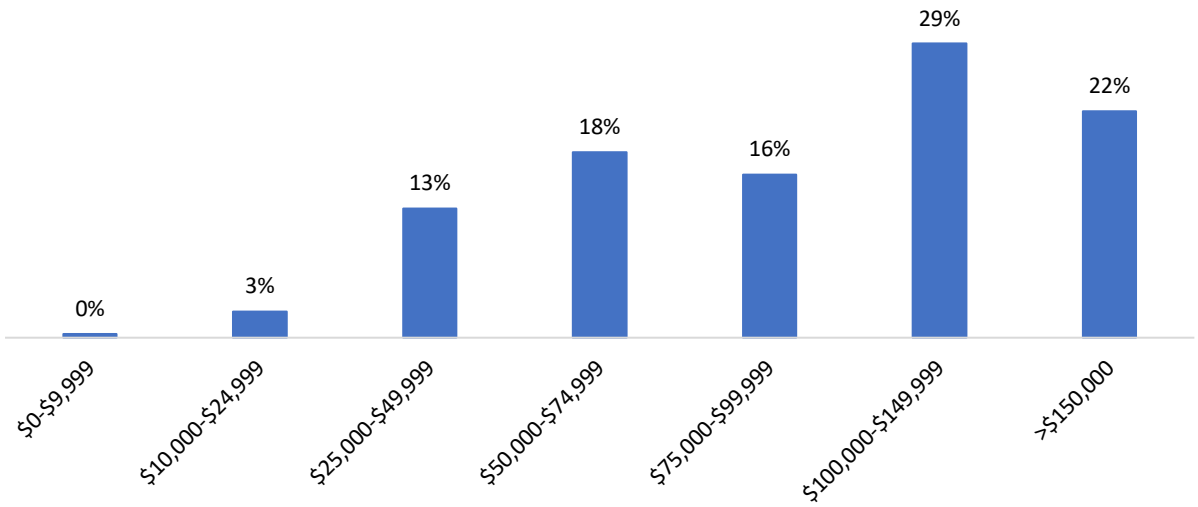
Fig. 5: Survey Respondents' Personal Income



We asked respondents to share their family income, to provide a broader context for the financial situation of ISL workers. We removed respondents who did not report family income (13%, $n = 81$, or 4% more than did not report personnel income). Participants commonly (51%, $n = 278$) reported household income ranging from $100K to more than $150K. Participants less commonly (27%, $n = 168$) reported household income ranging

from $25K–$75K. Participants infrequently (2%, *n* = 16) reported household income ranging from $0–$25K. The family income suggests that two-third of respondents live in households whose income is at or higher than the median household income in the US ($74,580; Guzman & Kollar, 2023), and more than half lived in households with median family income above $100,000, which is around the median income of households in which someone has earned a bachelor's degree or higher ($118,300; Guzman & Kollar, 2022). While these numbers are encouraging, there were nonetheless 16% of respondents who reported family income that was at least a third below the median family income in the US, suggesting the potential for economic distress.

Fig. 6: Survey Respondents' Family Income



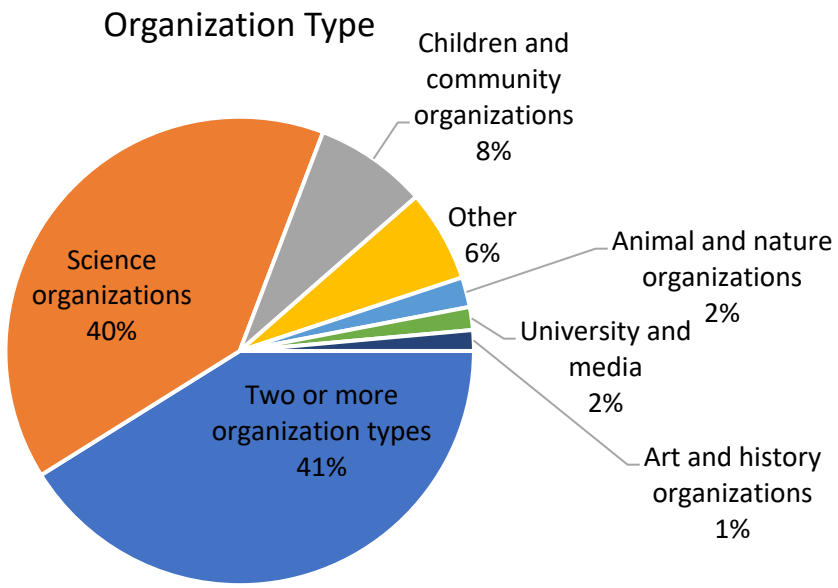
Most respondents work at STEM-focused organizations

Not surprisingly, most respondents (89%, *n* = 558) indicated that STEM is a major focus of their organizations' work, and the STEM focus in our sample was significantly higher even than in the CAISE summative evaluation sample (79%). This involved those whose only mission is science (40%) or those with a variety of missions, of which one is STEM (41%).

Importantly, more than half of respondents (57%) perform two or more roles in their organizations, suggesting that work in ISL institutions is multi-faceted and potentially complex, and that particularly smaller organizations might require flexible and broad skill sets.

Respondents who associated with organizations whose primary focus was science referred primarily to science centers (33%, *n* = 205), and less so to natural history museums (6%, *n* = 39,), or planetariums (2%, *n* = 12). Respondents who were associated with organizations with multiple missions included a combination of children's museums with science centers and planetariums, science centers with other types (e.g., observatories, art museums with science centers, and history museums with science centers.

Fig. 7: Survey Respondents' Organization Type



Key Findings for Lived Experiences in ISL and Awareness of the Framework

The survey was designed to provide insights into the ISL field, specifically: 1) who is in the field, 2) how and why they came to the profession, 3) their sense of belonging in and satisfaction with the field and their organization, 4) transparency and clarity of expectations as a professional at their organization and in the broader ISL field, and 5) familiarity of the ISL Framework. The results of descriptive statistics are reported here, organized by each of these main questions. As appropriate, we have conducted additional statistical analyses to identify differences among groups that may add to the explanatory power of the statistical data (e.g., number of years in the field, education degree attainment, etc.).

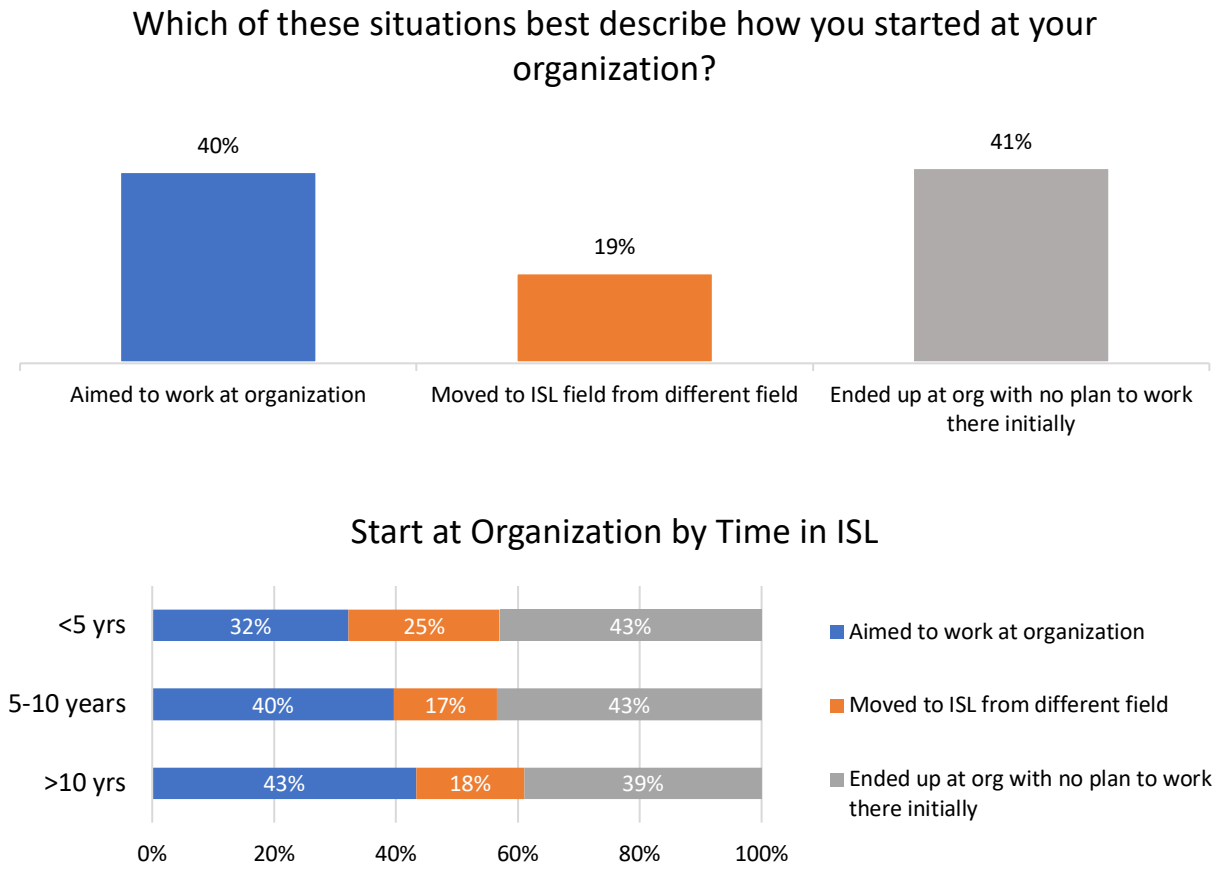
Most respondents had not planned for a career In ISL, and there was no clear, consistent path into the field for them

The data suggests that many might have ended up in an ISL job or career by happenstance, rather than seeking out a (planned) career in ISL. For instance, 60% did not initially plan to work at their current type of organization. It is possible that the figure of 40% of respondents who did intend to be at an ISL organization is relatively high, but there is limited data from similar fields to draw any meaningful comparisons.

Figure 8 illustrates that respondents took divergent paths to work in ISL. ISL as represented in our sample seems mostly comprised of individuals who did not start or intend to be in ISL (60%, $n = 355$), and while fewer than half (41%, $n = 246$) aimed to work at an organization similar to their current employer, about the same percentage (41%, $n = 241$) did not plan to work at such an organization. Additional respondents (19%, $n = 114$) moved into ISL from a similar position in another field.

There is not a strong relationship between length of time and how folks began in ISL ($X^2(4) = 6.11$, $p = .191$), and any differences in how folks started in ISL in the last decade are more subtle. Respondents with 10 or more years of experience (43% of >10 yrs, $n = 139$), as well as those with 5-10 years of experience (40% of 5–10 yrs, $n = 63$) had slightly higher rates of aiming to work at an ISL organization than those who had been working less than 5 years (32% of <5 yrs, $n = 39$). A possible explanation for this could be that folks who had a clear pathway into ISL stayed longer, with potentially a greater sense of preparedness and interest of working in the field, than those with less time in the field; this does not take attrition for other reasons into account (i.e., survivorship bias). Regardless of time at an ISL organization, respondents had a similar experience of landing at an ISL organization with no plan to work there (39–43% by time in ISL). It is possible that employees do not need ISL-specific skills to start a career in ISL.

Fig. 8: Survey Respondents' Path to their Organization



Most respondents have been in the ISL field for more than 10 years

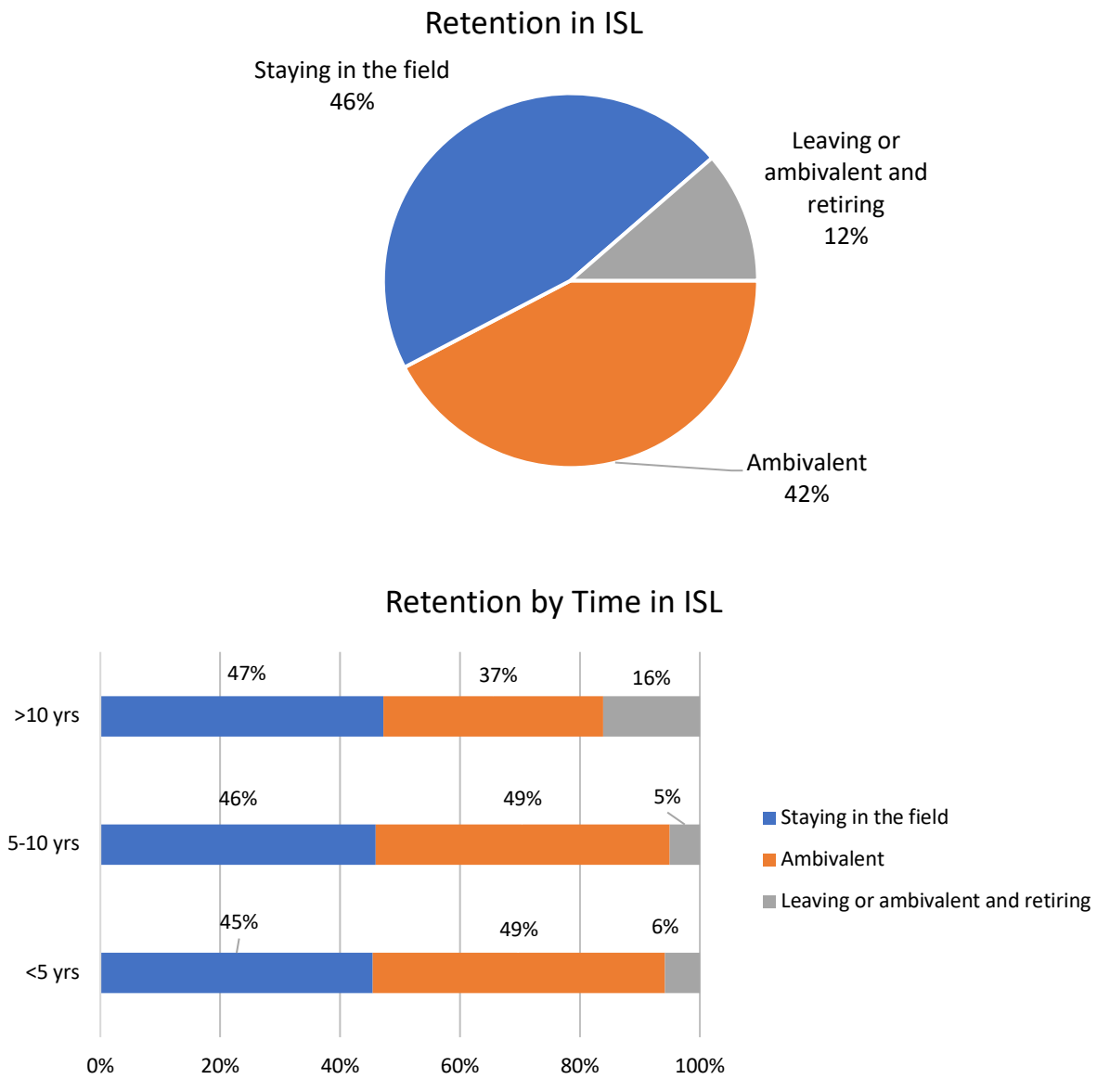
Our sample trended towards experienced individuals. A little more than half of the respondents (53%, $n = 322$) have been working in ISL for more than 10 years; about 30% ($n = 159$) have been in the field for 5-10 years; and a fifth of respondents ($n = 121$) have been working in ISL for less than 5 years.

Nonetheless, more than half of the respondents (54%) indicated uncertainty about their intent to stay in ISL: specifically, 42% felt ambivalent about staying in ISL, and 12%

indicated either their desire to leave or an uncertainty of staying in ISL and the possibility of retiring. These findings suggest the potential for significant future turnover in the ISL field which provides opportunity to diversify the field, but also poses challenges in preserving and transferring wisdom of practice to a new generation of ISL professionals.

Respondents' intent to stay in ISL was consistent around 45-47% regardless of tenure in ISL.

Fig. 9: Survey Respondents' Intent to Remain in their Organizations and in ISL



Respondents have a somewhat weak sense of being a professional at their organization and in the field of ISL

Overall, respondents rated their sense of being a professional in their organization as equal to their sense of being a professional in ISL (M = 3.9 for both). As the bar charts (Figures 10 & 11 below) show, most respondents rated their sense of being a professional above 3 and the mode (most common responses) clustered between agreement and strong agreement. Nonetheless, these scores indicate that a relatively large percentage of professionals provide ratings below "agree." A closer analysis might provide some indication for reasons for those positive but somewhat weak ratings. For instance, respondents rated their familiarity with best practices in ISL at a weak positive M = 3.8, and their ability to apply those in their position at M = 3.8. They did agree that they translate skills and knowledge to ISL from other fields (M = 4.2). Interestingly, respondents did not agree that they need specialized training, such as degrees and certificates, to perform in their position. A rating of M = 3.5 suggests that many might feel comfortable with learning on the job.

While these scores tended to be similar across groups, it is noteworthy that even the 23 professionals with income above $150k rated their sense of being a professional at M = 4.2 for the organization and M = 4.3 for the ISL field, suggesting an upper limit closer to "agree" than "highly agree."

Fig. 10: Survey Respondents' Sense of being a Professional at their Organization

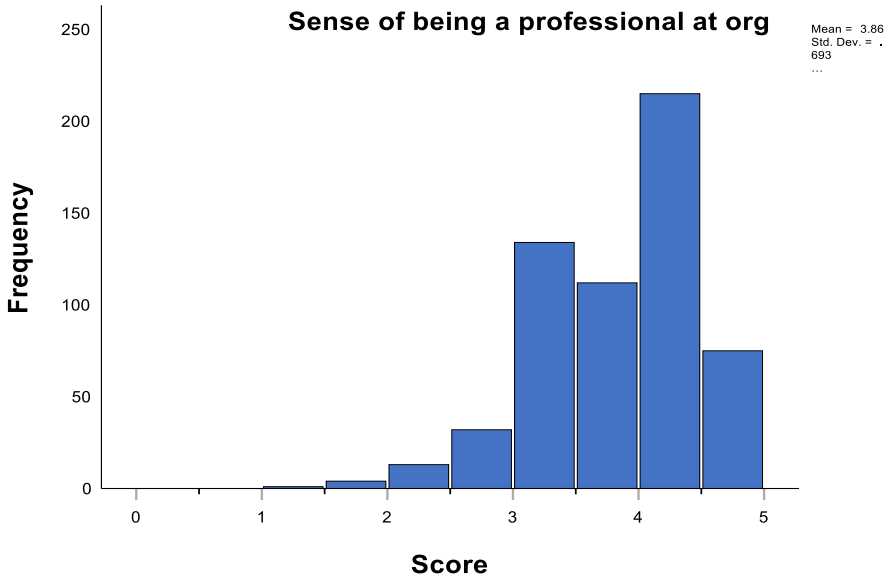
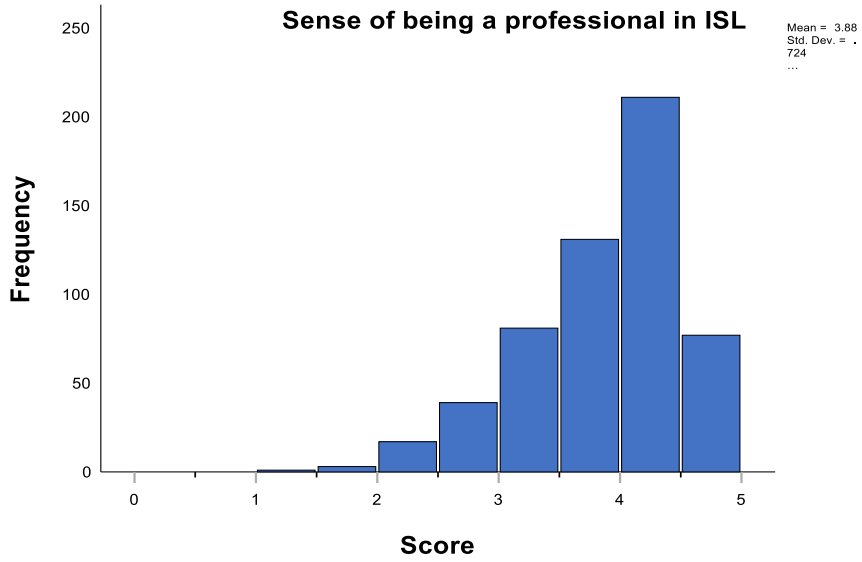


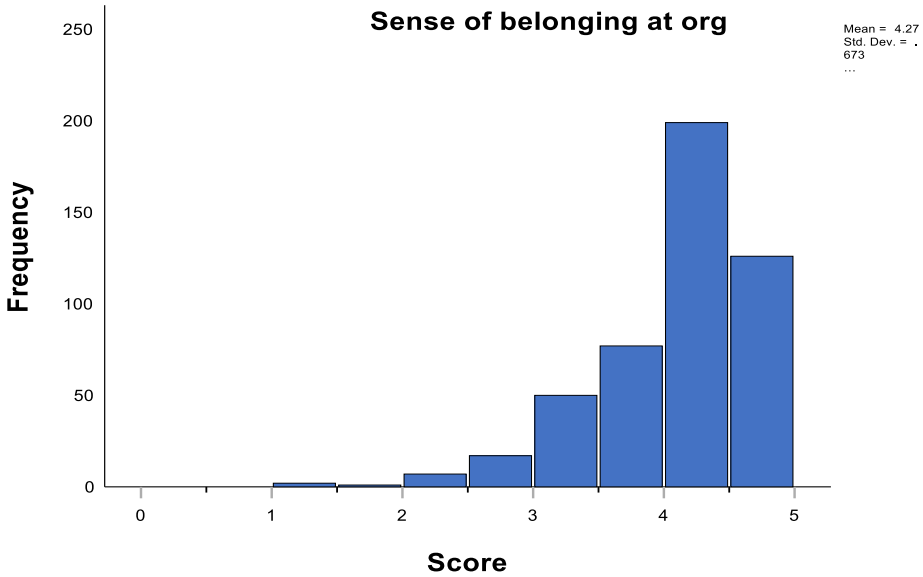
Fig. 11: Survey Respondents' Sense of being a Professional in ISL



Respondents feel like they belong at their organizations but feel less like they belong in the broader ISL field

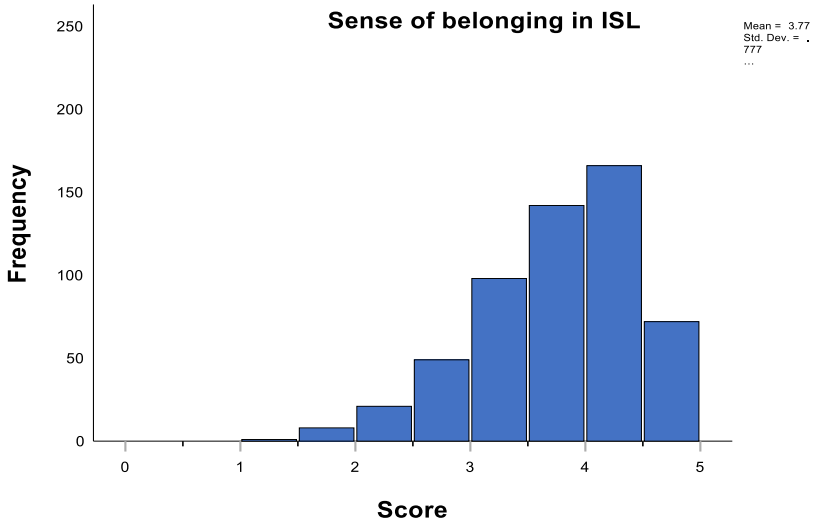
We distinguished in the survey between feeling like a professional (Figures 10 and 11 above), and having a sense of belonging in their organization of the ISL field (Figures 12 & 13, and described in this section). For the most part, respondents feel a reasonable sense of belonging at their organization ($M = 4.3$ – see Fig. 12). However, they did not feel as strongly about a sense of belonging in the broader ISL field (M = 3.8 – Fig. 13).

Fig. 12: Survey Respondents' Sense of Belonging at their Organizations



Even though participants only weakly agreed that they belonged in ISL, they nonetheless excited about the current work in the ISL field (M = 4.3).

Fig. 13: Survey Respondents' Sense of Belonging in ISL



Sense of belonging to an ISL organization and the ISL field correlated positively with (higher) income and for individuals who identified as cis-gender, heterosexual and without disability, though the effect was small.

Respondents somewhat understand the professional expectations in their organizations, though there is a lack of transparency in the broader ISL field

Respondents on average agreed that they understand the professional expectations in their positions (M = 3.9) and that there are clear performance expectations for their positions (M = 3.9). Participants, however, only somewhat agree that there are transparent expectations for them for being part of the ISL field (M = 3.6) or that they are comfortable as a professional because they know what the field expects of them (M = 3.5). Participants are close to neutral about how to advance as a professional in ISL (M = 3.3).

Many respondents noted that professional expectations in the ISL field were only somewhat transparent, indicating a strong need for the ISL Professional Framework and its associated support mechanisms.

A sense of transparency and clarity of expectations in ISL was strongest in respondents who identified as white, cis-male, straight, or who held advanced degrees, though even their average scores only ranged around M = 3.7. People in ISL organizations who feel well-supported in developing their professional skills typically earn over $150,000 annually (M = 4.13, *n* = 23), do university research or instruction (M = 4.0, *n* = 5), indicated working at "other" organizations than the survey options provided (M = 3.9, *n* = 10), and where STEM is a major focus of their work (M = 3.7, *n* =558).

Fig. 14: Survey Respondents' Sense of Transparency in ISL

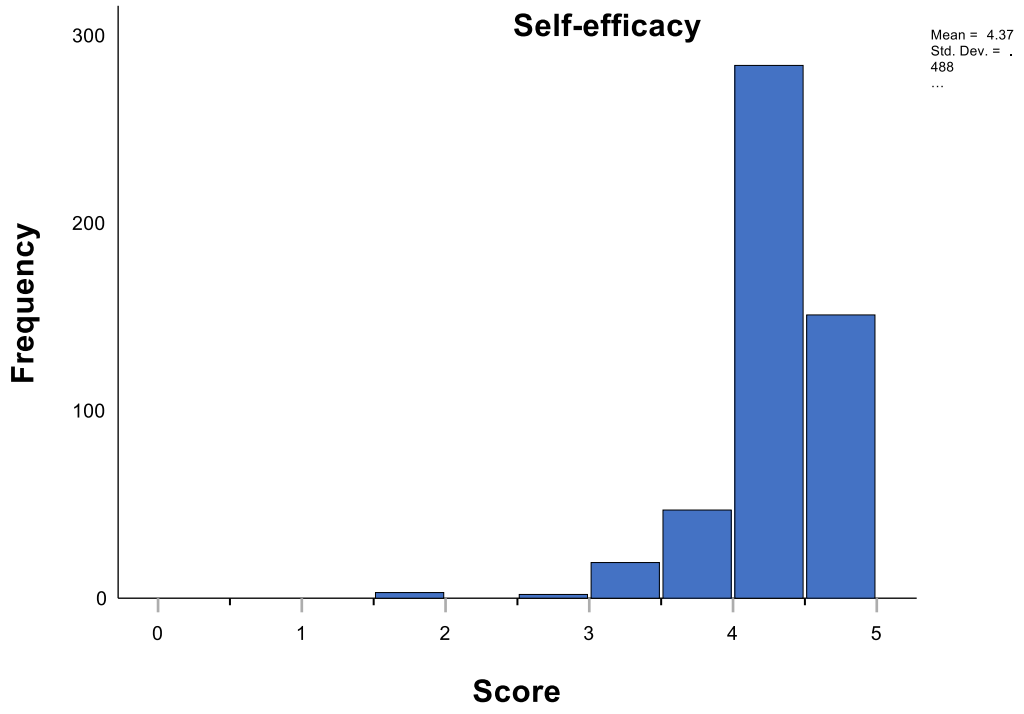


There was high self-efficacy among respondents

On the self-efficacy survey scale, overall, participants indicated belief in their ability as an ISL professional (M = 4.4 – see Fig. 15 for the overall score on self-efficacy), which might somewhat explain why many respondents did not feel strongly about their need for specialized training to be successful in their respective organizational roles.

Respondents who identified as white, cis-gender, heterosexual, and without disability expressed scores similar to the average for the total sample (M = 4.4 for each). For demographics specific to ISL organizations, those who most agreed about their efficacy as a professional make more than $150,000 per year (M = 4.6, *n* = 23), are in creative positions like marketing (M = 4.6, *n* = 9), work at art or history organizations (M = 4.5, *n* = 9), and indicated that STEM is a minor focus of their work (M = 4.5, *n* = 70).

Fig. 15: Survey Respondents' Self-Efficacy

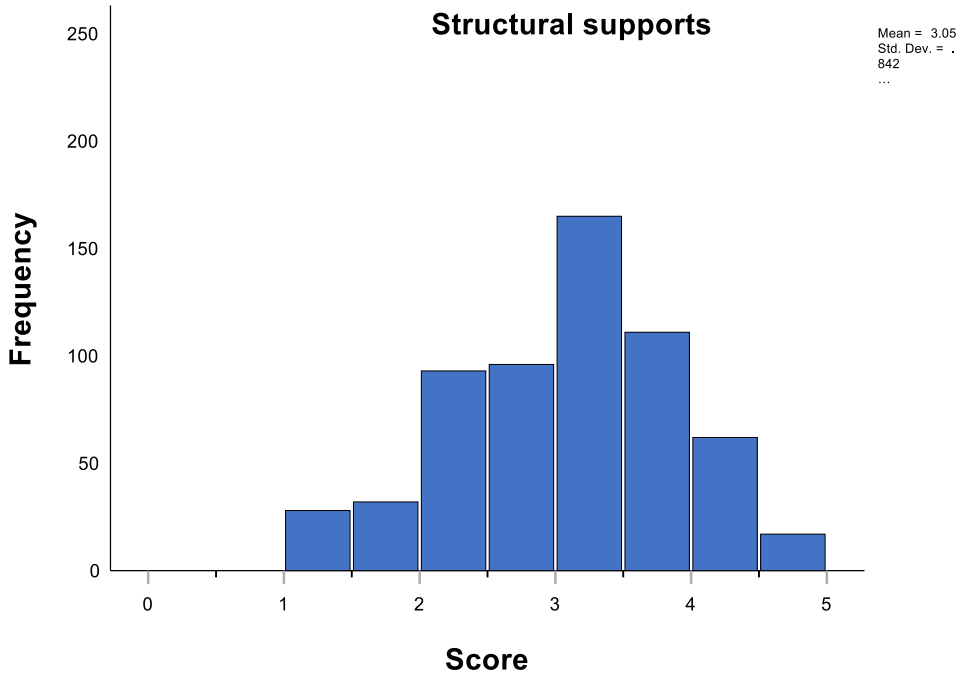


Survey respondents do not strongly feel that their organizations support their professional development

While participants feel efficacious about their current professional practices and about improving their professional practices, they are middling about the structural supports available to them for building their professional competencies (M = 3.1 – see Fig. 16). About equal numbers agreed and disagreed with the idea of receiving sufficient support. Respondents reported limited access to professional learning opportunities and informal and formal professional mentoring.

For instance, participants disagree that they have a formal mentor (M = 2.3). Participants are middling about having informal mentors (M = 3.1), having professional development at their organization (M = 3.3), and that their organizations inform them about professional development opportunities (M = 3.2). Participants somewhat agree that they have financial support from their organization to seek professional development (M = 3.4). The average score around the availability for structural supports differed little between demographic groups, suggesting that lack of (perceived) support is systemic in ISL. Even professionals with incomes above $150k rated the availability of supports for professional learning at only M = 3.5.

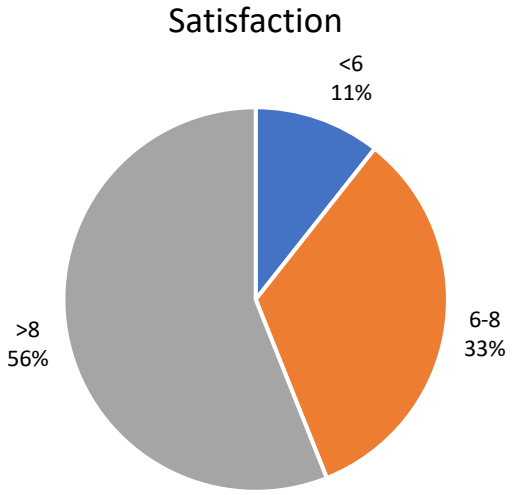
Fig. 16: Survey Respondents' Sense of Structural Supports



Survey respondents were satisfied with working in the ISL field

The mean score on a 10-point satisfaction scale was M = 7.8, indicating participants are moderately satisfied working in the ISL field. More than half of respondents indicated a score higher than 8 (56%, *n* = 353). The satisfaction scale was adapted from a net promotor scale for which an average score of 8 and above represents satisfaction levels associated with active promotion of a product or service (for instance, by mentioning it to others). Scores between 6 and 8 represent satisfaction levels less likely associated with promoting the product or service, a range in which a third of respondents fell (33%, *n* = 210). Scores below 6 might lead to a product or service actively being discussed critically with others, and 11 percent (*n* = 67) of respondents indicated a low satisfaction score. When we compared different groups, reported satisfaction working in the ISL field trended higher for respondents with higher income, who are cis-gender, heterosexual or did not have a disability.

Fig. 17: Survey Respondents' Satisfaction in ISL



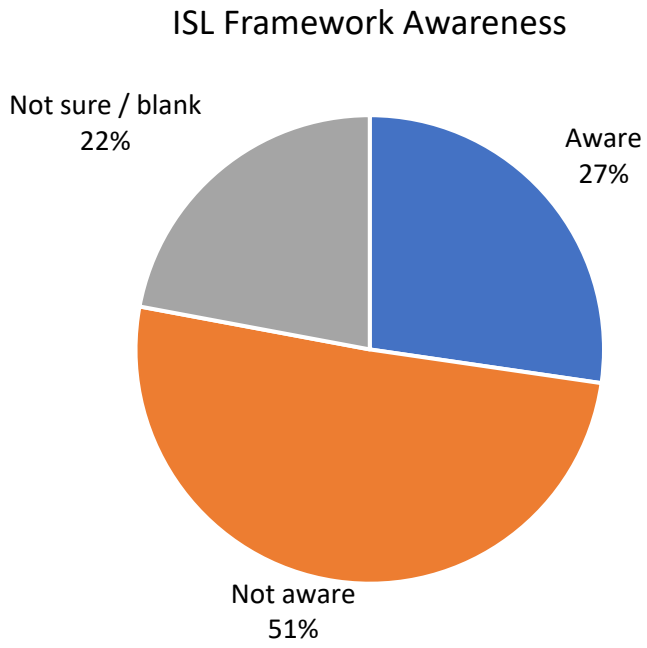
A resource such as the Framework could provide clarity and transparency

Findings overall suggest that the Framework could provide clarity and transparency, especially for those who moved into the ISL field "serendipitously" and who lack foundational training in some of the fundamentals of ISL. The Framework could also serve as a tool for keeping professionals who might move to nearby professions in the field, so long as sufficient opportunities for support and advancement go along with increased transparency.

So far, familiarity with the ISL Framework is mixed

Awareness of the framework within the field of ISL is still relatively low. A quarter of respondents were aware of the ISL framework (27%, $n = 172$) but most respondents were not (51%, $n = 319$) or did not respond/were unsure if they were aware of the ISL framework (22%, $n = 139$). These results were expected since efforts to socialize the Framework in the community have been limited (at the writing of this report). Thus, there is a significant opportunity to boost awareness of the ISL framework within the ISL community, particularly once support mechanisms for utilizing the framework are available.

Fig. 18: Survey Respondents' Awareness of the ISL Framework



Familiarity with the framework increases with educational attainment (Fig. 18), time working in the ISL field (Fig. 19) and serving in a leadership role (Fig. 20).

Fig. 19: Survey Respondents' Awareness of the ISL Framework by Educational Attainment

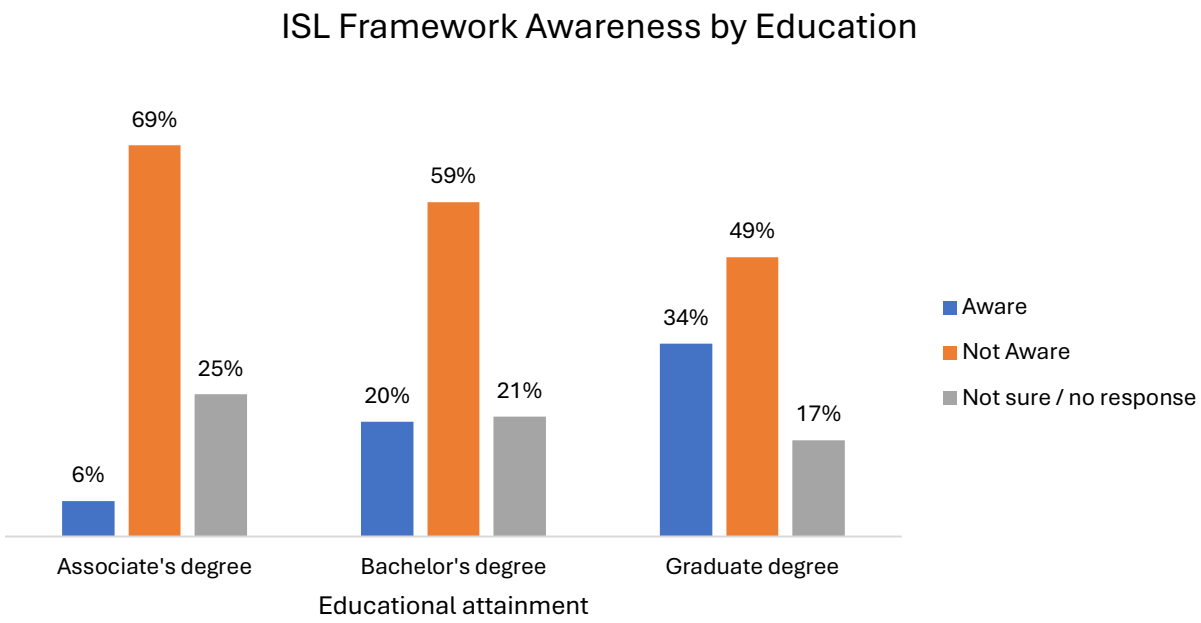


Fig. 20: Survey Respondents' Awareness of the ISL Framework by Time Spent in ISL

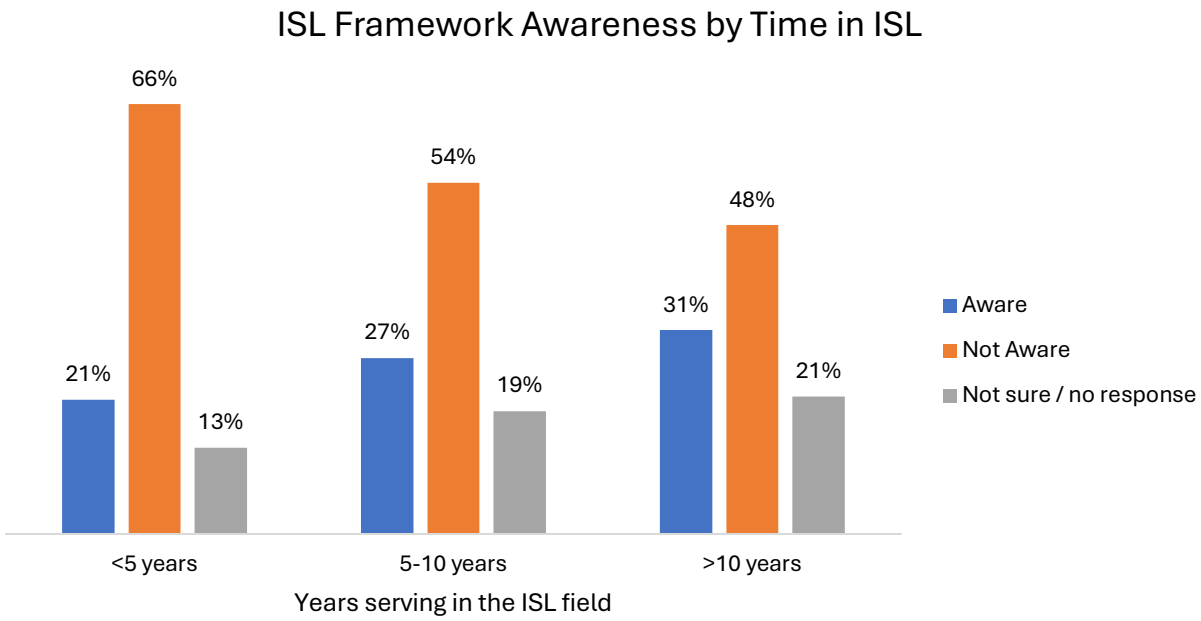
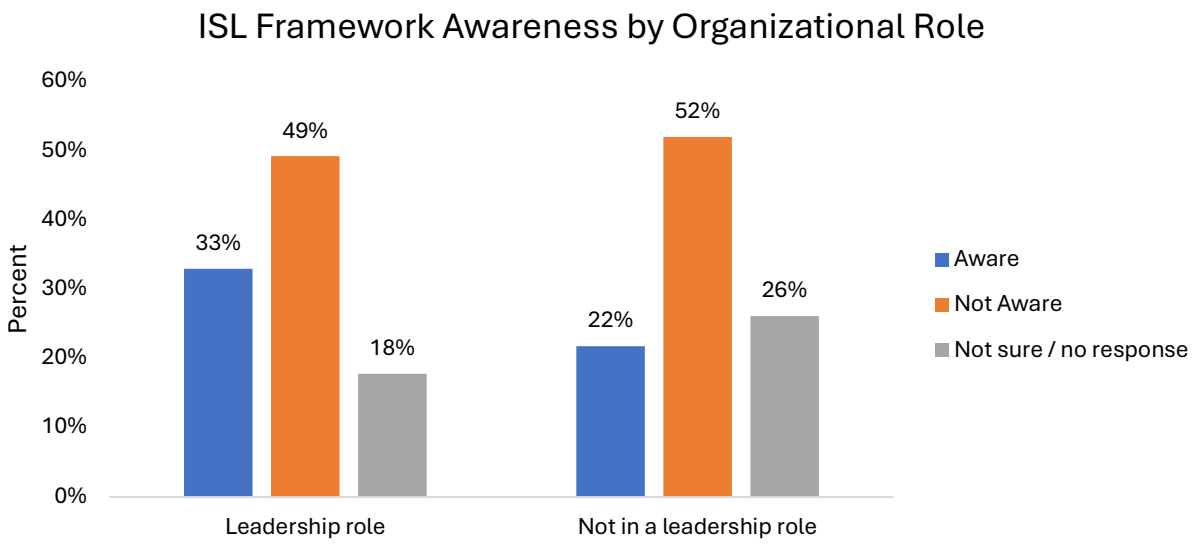


Fig. 21: Survey Respondents' Awareness of the ISL Framework by Role at Organization



Conclusion

In the early 2000s, John Falk and Julie Risien (Risien & Falk, 2013) conducted a small study for the Center for the Advancement of Informal Science Education (CAISE) that explored whether there was a sense of community and identity around "informal science education." Was ISE (or ISL) a field? Did those working in science centers, science museums, natural history museums, zoos, aquariums, etc. see themselves associated with the organizations they worked for and identified those as part of a broader field, or did they make the connection between those organization types? The answer back then, as it seems to be now, is ISL or ISE are not necessarily seen as a "field", as a coherent set of ideas that unite different organization types that all serve audiences as part of a non-school-based (informal, free-choice) cultural experience in science (or now STEM). This has implications for the ISL Framework. Not only might this framework serve the purpose to provide transparency in what it might take to work in the field of informal STEM education/learning, or serve as guidance for career development and advancement, but it might be a tool for creating awareness around the unifying idea of ISL/ISE itself.

This notion of the framework in a dual role, supporting individuals in ISL/ISE while promoting the very idea of ISE/ISL, poses communication challenges, but also significant opportunities for field-wide advancement of basic concepts related to that which makes informal STEM engagement powerful and significant in society.

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Appendix: The ISL Framework Survey



Introduction

Thank you for taking our 15-minute survey about your work experience and needs as a professional in the "Informal STEM Learning field."

This survey will help us improve the Informal STEM Learning Professional Competency Framework, which is designed to support individuals like you and your organizations to understand the skills needed to succeed in this field. Your responses will help us create the right support for everyone and ensure that the framework is useful for all.

In this survey, the term "Informal STEM Learning field" refers to settings like science centers, science museums, natural history and children's museums, nature centers, zoos, aquariums, botanic gardens, planetariums and other non-school settings where people can learn about STEM in engaging ways outside of schools.

An "Informal STEM Learning professional" is someone who works in these places, irrespective of the particular role they may play at their institution. We want to hear from many different people, so we can create helpful resources and tools to make it easier for professionals like you to grow in your career.

We are a team with members from the Association of Science and Technology Centers (ASTC), the Center for Research and Evaluation at COSI Columbus, and Oregon State University's STEM Research Center who received funding from the National Science Foundation to develop supports for the ISL Framework (DRL 2215274: Building Supports Towards a Useful, Usable, and In-Use Framework of Professional Competencies in the Informal STEM Learning Field).

Your participation is, of course, entirely voluntary and you can stop the survey anytime you want to or skip questions you don't feel like answering. We may keep the information you give us during the survey even if you stop, but please let us know (see email below) and we will eliminate your entries in their entirety. As we wrote: your participation is entirely voluntary, and we are grateful for your help!

You should know that the survey data will be collected and stored in Oregon State University-endorsed cloud drives with two-factor authentication and access granted only to members of the research team affiliated with the university. While we will not use your name or organization when we report results, we would like to ask your permission to use your demographic information (e.g., age range) to describe the group of people or subgroups who answered the survey (we will not focus on individuals like you). Rest assured that the information you give us will only be used for this study. We will not share it with others or use it in future studies without your consent.

If you have any questions, please contact the study lead ("Principal Investigator" in federal research lingo), Dr. Kelly Riedinger, at kelly.riedinger@oregonstate.edu. If you have questions about your rights or

welfare as a participant, please contact the OSU Human Research Protection Program office, at (541) 737-8008 or by email at IRB@oregonstate.edu.

Do you consent to participate in this survey and acknowledge that you are at least 18 years of age?

- ○ I consent
- ○ I do not consent

Informal_STEM_Learning_Setting

Informal STEM learning refers to lifelong learning in science, technology, engineering, and math (STEM) that takes place across a multitude of designed settings and experiences outside of the formal classroom. Some of the most common informal STEM learning organization types are listed below.

What type of informal STEM learning organization are you currently affiliated with? We recognize that your particular organization might fall under multiple categories. If so, then please select all that apply. Feel free to add your organization type if you do not see it represented.

- ☐ Aquarium
- ☐ Arboretum or botanical garden
- ☐ Art museum
- ☐ Afterschool or youth development organization
- ☐ Children's or youth museum
- ☐ Citizen science organization

- ☐ Broader impacts professional
- ☐ Director, President, CEO, or other organizational leader
- ☐ Education program developer or designer
- ☐ Education, learning, or social science researcher
- ☐ Educator
- ☐ Evaluator
- ☐ Exhibit developer or designer
- ☐ Facilities or maintenance staff
- ☐ Funder
- ☐ Instructor
- ☐ Manager or unit director
- ☐ Marketing or outreach professional
- ☐ Policymaker
- ☐ Producer
- ☐ Scientist, engineer, and/or mathematician (conducting research)
- ☐ Student
- ☐ Teacher
- ☐ University or college instructor
- ☐ Vice President or other senior director
- ☐ Writer, journalist, or editor
- ☐ [ ] Other (please specify)

Sense of being a professional

To what extent do you agree or disagree with each of the statements below. Please use a scale from 1 to 5 where 1 is "strongly disagree" and 5 is "strongly agree."

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Stro agı
	1	2	3	4	5
I need specialized training (e.g., certificates, degrees) to perform in my position.	○	○	○	○	○
There are clear performance expectations for my position.	○	○	○	○	○
My position is necessary for informal STEM learning to occur at my organization.	○	○	○	○	○

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Stro agı
	1	2	3	4	5
I am familiar with current informal STEM learning best practices.	○	○	○	○	○
I apply current informal STEM learning best practices in my work.	○	○	○	○	○
I apply best practices from fields other than informal STEM learning in my work.	○	○	○	○	○
I am familiar with literature that discusses the basics or foundations of informal STEM learning.	○	○	○	○	○

Sense of belonging

To what extent do you agree or disagree with each of the statements below about your **current organization**? Please use a scale from 1 to 5 where 1 is "strongly disagree" and 5 is "strongly agree."

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strong agre
	1	2	3	4	5
When I am with colleagues at my organization, I feel like I belong.	○	○	○	○	○
I have a place at the table at my organization.	○	○	○	○	○
I feel connected with other people at my organization.	○	○	○	○	○
By being at my organization, I make it a better place.	○	○	○	○	○
My presence at my organization matters.	○	○	○	○	○
I'm excited about the mission and work of my organization.	○	○	○	○	○
The mission of my organization aligns with my values.	○	○	○	○	○

To what extent do you agree or disagree with each of the statements below about the **informal STEM learning field**? Please use a scale from 1 to 5 where 1 is "strongly disagree" and 5 is "strongly agree."

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strong agre
	1	2	3	4	5
I have a place at the table in the informal STEM learning field.	○	○	○	○	○
I feel connected with other people in the informal STEM learning field.	○	○	○	○	○
My presence in the informal STEM learning field matters.	○	○	○	○	○
I'm excited about the work that we do in the informal STEM learning field.	○	○	○	○	○

Perceived barriers for building professional competencies

To what extent do you agree or disagree with each of the statements below? Please use a scale from 1 to 5 where 1 is "strongly disagree" and 5 is "strongly agree."

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
	1	2	3	4	5
I know what to do in my position	○	○	○	○	○
I feel competent at what I do.	○	○	○	○	○
I can improve my professional practices.	○	○	○	○	○
I can create deeper ties with other professionals at my organization.	○	○	○	○	○

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
	1	2	3	4	5
I can create deeper ties with professionals at other organizations.	○	○	○	○	○

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
	1	2	3	4	5
I have a formal mentor.	○	○	○	○	○
I have one or more informal mentors.	○	○	○	○	○
There is professional development (e.g., in-service, online module, workshop) available to me at my organization.	○	○	○	○	○
My organization informs me of professional development (e.g., webinars, conferences, leadership development courses) external to my organization.	○	○	○	○	○
My organization supports me financially (e.g., stipend or fees covered) to seek professional development external to my organization.	○	○	○	○	○

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
	1	2	3	4	5
I know what others expect of me as a professional in the informal STEM learning field.	○	○	○	○	○
I know what to expect of myself as a professional in the informal STEM learning field.	○	○	○	○	○
I feel comfortable as a professional in the informal STEM learning field because I know what is expected of me.	○	○	○	○	○
I know how to advance as a professional in the informal STEM learning field.	○	○	○	○	○

Satisfaction and retention

Which describes your intent to stay in the informal STEM learning field? (Please select all that apply)

- ☐ I can see myself working for my organization in the short-term.
- ☐ I can see myself working for my organization in the long-term.
- ☐ I can see myself working for a different organization but staying in the informal STEM learning field.
- ☐ I can see myself working for a similar organization that is not in the informal STEM learning field (e.g., moving from a science center to an art museum).
- ☐ I can see myself working in a different field (e.g., moving from a science museum to a classroom).
- ☐ I plan to retire in the near future.

To what extent do you agree or disagree with each of the statements below? Please use a scale from 1 to 10 where 1 is "not at all satisfied" and 10 is "very satisfied."

	Not at all satisfied									Very satisfied
	1	2	3	4	5	6	7	8	9	10
Overall, I am satisfied with my current position.	○	○	○	○	○	○	○	○	○	○
I would recommend my position to others.	○	○	○	○	○	○	○	○	○	○
Overall, I am satisfied with working in the informal STEM learning field.	○	○	○	○	○	○	○	○	○	○
I would recommend working in the informal STEM learning field to others.	○	○	○	○	○	○	○	○	○	○

ISL Framework awareness

Are you aware of or have you heard of the Informal STEM Learning Professional Competency Framework featured at www.islframework.org? (Please select one)

- ○ Yes
- ○ No
- ○ Not sure / don't remember

Have you visited the Informal STEM Learning Framework website? (Please select one)

- ○ Yes
- ○ No
- ○ Not sure / don't remember

Have you used the Informal STEM Learning Framework in some way? (Please select one)

- ○ Yes
- ○ No
- ○ Not sure / don't remember

If you feel comfortable, please share with us briefly how you have used the Framework?

Professional experiences

Which of these situations best describe how you started your position at your organization? (Please select one)

- ○ I aimed to work at an organization like the one I'm currently working at.
- ○ I moved into the informal STEM learning field from a similar position in a different field.
- ○ I happened to end up working at my organization, but I did not plan to work there initially.

For how many years have you been working in public engagement with STEM, informal STEM education, or science communication? (Please select one)

- ○ Less than 5 years
- ○ 5-10 years
- ○ More than 10 years

Demographics

We ask the following questions about your demographic information so that we know who is and is not represented in the field of informal STEM learning. We know this information is sensitive and personal, but it helps us understand who participated in our survey and who comprises the ISL field. We have endeavored to use up-to-date identity language, but we realize that we may not have included your preferred identity. If this is the case, please feel free to self-describe.

Which of the following racial or ethnic background(s) best describes you? (Please select all that apply)

- ☐ American Indian, Alaska Native, or First Nations
- ☐ Latiné or Hispanic
- ☐ White or European origin
- ☐ Asian or Asian American
- ☐ Middle Eastern or North African
- ☐ Black or African American
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ Another race or ethnicity not listed above
- ☐ Prefer not to respond
- ☐ [ ] Prefer to self-describe

What is your gender? (Please select all that apply)

- ☐ Woman
- ☐ Man
- ☐ Non-binary
- ☐ Transgender
- ☐ Cisgender
- ☐ Agender
- ☐ Genderqueer or genderfluid
- ☐ Prefer not to respond
- ☐ _____ Prefer to self-describe

Which of the following best represents how you think of yourself? (Please select one)

- ○ Straight/Heterosexual
- ○ Gay or Lesbian
- ○ Bisexual
- ○ Queer
- ○ Asexual
- ○ Prefer not to respond
- ○ _____ Prefer to self-describe

What is the highest degree or level of school you have completed? (Please select one)

- ○ No high school diploma
- ○ High school diploma, GED, or alternative credential

- ○ Some college
- ○ Associates degree (e.g., AA, AS) or trade certificate
- ○ Bachelor's degree (e.g., BA, BS)
- ○ Graduate degree (e.g., MA, MBA, PhD, JD)
- ○ Prefer not to respond

Do you have a disability? We are interested in this identification regardless of whether you typically request accommodations for this disability.

- ☐ I have a disability
- ☐ I do not have a disability
- ☐ Prefer not to respond

SES Personal and family

Which of the following best describes your personal income last year? (Please select one)

- ○ $0-$9,999
- ○ $10,000-$24,999
- ○ $25,000-$49,999
- ○ $50,000-$74,999
- ○ $75,000-$99,999
- ○ $100,000-$149,999
- ○ More than $150,000
- ○ Prefer not to respond

Which of the following best describes your family's income last year? (Please select one)

- ○ $0-$9,999
- ○ $10,000-$24,999
- ○ $25,000-$49,999
- ○ $50,000-$74,999
- ○ $75,000-$99,999
- ○ $100,000-$149,999
- ○ More than $150,000
- ○ Prefer not to respond

We recognize that each of us brings intersecting identities to any conversation. What additional information, if any, would you like to share with us about the individual perspective(s) you bring to the work of informal STEM learning or science engagement?

Compensation

We want to be able to compensate the first 200 people who respond to the survey with a $10 gift card. If you would like to be compensated, please provide us with your first and last name and email address. Thank you!

Name (first and last):

Email: