Validating an Informal STEM Learning (ISL) Framework: Findings from Empirical Research

2017

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I. Project and Research Overview

The Association of Science-Technology Centers (ASTC), Oregon State University's Center for Research on Lifelong STEM Learning (OSU), Pacific Science Center (PSC), University of Washington Museology Department (UW) and the Lifelong Learning Group of COSI Columbus (LLG) collaborated to develop a theoretically grounded and empirically derived Professional Framework, designed for the field of informal STEM learning (ISL). The Framework lays out the skills, knowledge and characteristics needed to guide professional growth and learning at any career stage. It is the first of its kind to detail expectations for job-specific and general skills, and abilities to influence institutional operations and impact.

The project addresses two current and pressing issues: (1) Ensuring that professionals working in science center-type settings have the necessary knowledge and skills to apply the substantial and growing evidence base in ISL, and (2) Understanding and supporting the needs of the full range of ISL professionals during their basic education and at particular points throughout their careers. The underlying assumption is that effective support for ISL professionals requires, at the most basic level, a fundamental understanding of the knowledge, skills, and dispositions needed by working professionals at critical points along their career pathway if they are to use evidence-based practice in their work.

The work for this project was conducted in two phases with eight distinct research and development stages:

PHASE I: **Stage 1** - Literature review and research synthesis; **Stage 2** - DACUM[1] workshops; **Stage 3** - Development of Preliminary Framework; **Stage 4** – Interviews, focus groups, and survey to provide initial validation and usability testing of the Preliminary Framework with targeted audiences.

PHASE II: **Stage 5** - Produce a second iteration of the Framework to be made available again for commentary and feedback from the field; **Stage 6** - Develop online platform through iterative testing to represent the draft Framework in a user-friendly and accessible way;

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[1] DACUM stands for Developing A CUrriculuM, a highly prescribed process that incorporates the use of a focus group in a facilitated storyboarding process to capture the major duties and related tasks included in an occupation.

Stage 7 - Conduct broad-based acceptability analysis with potential users (professionals in the field) via survey and focus groups; and **Stage 8** - Produce Final Framework.

II. Project and Research Goals and Objectives

The ISL Professional Framework is a National Science Foundation Innovations in Development project that combines research on learning theory with analyses of current practice, that acknowledges multiple career pathways for informal STEM learning professionals, and that can guide effective learning practices for the field.

Project goals are to:

1. Articulate the skills, knowledge, and dispositions needed by ISL professionals in adapting research to practice at critical points along their career pathway;
2. Increase understanding of the degree to which these attributes are valued by ISL professionals and their institutions;
3. Advance what is known about effective approaches to supporting ISL professional learning and their impact on public engagement in STEM; and
4. Identify gaps in professional development and support opportunities for ISL professionals, and develop an agenda for advancing a system of coherent professional learning and growth.

The research goal for this project was to collect feedback on the Preliminary Framework via a mixed methods approach in order to align the Framework with the needs and perspectives of the larger science center and science museum field, increase the Framework's usability, and illustrate a wide variety of potential applications for the Framework. More specifically, researchers from OSU, LLG, and UW conducted in-depth interviews, group discussions, and surveys to better understand the needs of ISL professionals, to gauge their reactions to the initial Framework Model, and to determine:

1. Whether the Framework is seen as useful for revising current programmatic offerings;
2. Whether and to what degree changes to current practice could emerge from the Framework; and

3. What barriers users predict when creating, strengthening, or changing support systems based on Framework suggestions.

III. Methodology

The Framework for ISL professionals was built from qualitative and quantitative empirical analyses of actual practices with staff of science centers and other ISL institutions, assessing perceived and actual needs at various career stages, and an analysis of the creation and use of similar learning frameworks in other professions. The analyses included a variety of potential target audiences who engaged with the Framework at differing depths and provided feedback on the applicability of the Preliminary Framework for their particular line of work.

PHASE I:

Semi-structured interviews and in-depth group discussions were used to research stakeholder analysis and feedback, and as a tool in Framework development. More specifically, these methods were used to research audience reactions, expectations, attitudes and interest in Framework domains and competencies, as well as uncovering general background knowledge (preconceptions and misconceptions) about the usefulness of an ISL Framework, and finally, to test preliminary mock-ups, design plans, and overall content in development. Each session was audio-taped and detailed notes were taken.

Individual interviewees and small groups of eight to ten people were carefully selected, with the discussions lasting one to two hours. Several different science centers were involved in providing feedback from a total of twenty-one (21) relevant staff members, representing typical staff samples and covering all relevant job categories within three career stages:

- o Early career – 3 years and less
- o Mid career – 3+ years to 10 years
- o Senior career – 10+ years

Interviews were conducted face-to-face or by telephone and group discussions were all held face-to-face on site at local institutions, using a semi-structured discussion guide. We set the stage for the meeting ahead of time by asking participants to review the following ASTC webpage: http://www.astc.org/professional-development/building-an-evidence-based-isl-professional-framework/, and providing them with a copy of the draft Framework for analysis. At the onset of the meeting, we provided the following project overview:

"We have developed this draft based on literature and 2-day workshops with early, mid-and late-career science center, science museums, and children's museum professionals, and you are now seeing for the first time an early version of what we consider a Framework that helps people understand what it means to be a professional in this field. The framework encompasses the diverse array of types of professionals in science museums (e.g., educators, CEOs, marketing). The purpose is to inform individuals for: career planning; hiring and promotion; supporting, mentoring and coaching professionals within institutions; initial training and education, as well as ongoing professional development. We are now talking with various professionals who represent these potential uses to get a better sense whether we are going in the right direction. We would like you to think of the framework itself (is it coherent, does it leave things out, etc) and we would mostly like to understand how you would use such a document in your particular role."

After giving participants the project overview, we ensured that they reviewed the document or provided the necessary time to look it over. Then, we offered them the option to ask clarifying questions. We then asked them to provide initial, open feedback on the draft framework design, format or content; followed by a more structured portion of the guided discussion consisting of a series of questions via a show of hands that asked them to reflect on their current position. Then, participants were asked a series of broad questions to get at the how, when and why around how they are currently doing professional development.

As part of the discussion, we conducted an exercise asking them to review the framework draft for a few minutes to see if they could find themselves within the domains and to place checks next to the competencies that they felt were most relevant to them. After they had a chance to complete the activity, we asked more specific questions (e.g., Could you find yourself in the framework model? Were there challenges? What additional information would you like to see added to this framework?). To tie things together, we culminated the discussions asking them for thoughts on how the Framework might best be presented in a clear, concise way and whether there was anything else they wanted to share that would help improve the Framework and make it more applicable for their particular work.

The data from these discussions was analyzed by identifying key themes that emerged, using the discussion protocol as a guide. In the end, these discussions provided rich and insightful

information, uncovering important issues to participants and allowing project partners to proceed with greater confidence moving forward. In all, the participants that provided feedback consisted of education, interpretation, visitor services, exhibit developers, human resources, and leadership staff.

In addition to these interviews and small focus groups, we held several discussion sessions with UW Museology students, and organized a session at the annual Association of Science and Technology Centers (ASTC) conference in 2016 to introduce the Preliminary Framework and discuss it with participants. Researchers observed these sessions and documented the contributions.

PHASE II:

Phase II consisted of producing a second iteration of the Framework and making it available again for commentary and feedback from the field. This was done by creating an online presence for iterative testing and conducting a broad-based acceptability analysis of potential users and professionals in the field. The findings from this research provided the project team with information to develop a second iteration of the Framework, considered a final version of the Framework based on the results of the various stages of feedback. At this point we engaged the project's advisory board, DACUM participants, people we previously interviewed, staff from the project institutions, and select individuals in a critical review through a survey process.

IV. Key Findings:

PHASE I:

Collectively, the reflections from the future potential users helped us to understand the usefulness of the Preliminary Framework in guiding institutional and individual decision-making. The Framework was viewed by participants as useful for such things as revising current job descriptions and aiding staff evaluations, but it was not seen as useful (in its current format) for modifying programmatic offerings. Reviewers were consistently able to find themselves within the Framework, but it was more difficult for individuals who do not work on the outward-facing side of science centers and science museums (exhibits, interpretation, education, guest services) or are less familiar with the broader ISL community (e.g., marketing, finance, or human resource staff members) to contextualize the relevance of the Framework for their particular roles.

Overall, respondents felt that the Preliminary Framework had the potential to help users prioritize professional development and other career-driven goals. In addition, reviewers of the Framework felt encouraged to take more initiative in terms of their professional development, and saw potential for using it, along with recommended supplemental materials (which still need to be developed), to increase their understanding of what skills and knowledge might support their career paths moving forward. Yet, while the Framework presents a good opportunity for professional development considerations, is not sufficient as a stand-alone resource without a link to concrete supplemental support structures, mechanisms or resources. Suggestions for helpful supplemental materials include such things as tutorials, a repository of job descriptions, relevant stories from the field, a guide to take users through the process, and some sort of synthesizer tool at the end to tie it all together.

A wide variety of potential applications for the Framework were discussed; a few of the key ideas include:

- To indicate what skills and competencies an individual needs to work on in order to move up in their career
- To examine where the organization is falling short (e.g., too many leads, not enough support)
- To develop internal evaluations/performance reviews of staff
- For organizations to identify professional development needs
- To help with hiring process and job descriptions
- To aid in relevant conversations among staff or team members
    - Identify problem areas
    - Assess where one sees self versus where supervisor sees individual in terms of job competencies.

The participants also provided feedback on potential barriers users might face when creating, strengthening, or changing individual or organizational systems based on Preliminary Framework suggestions. One of the barriers experienced by reviewers was difficulty 'wading through' the current framework because it is too dense and too much of a one size fits all (i.e., it needs different levels of drilling down). At the same time, users could not readily see how it could or should be used. For example, many faced challenges when assessing whether the Framework should be applied to the whole institution, a particular department or a program. It

was also unclear whether the Framework's intended use is for personal development or as a supervisory tool and that a different perspective would be used for each. People also struggled with trying to fit themselves into one category; they typically found that they fit in multiple categories and did not know what to do with that fact. There was also a consistent desire for more job specific information. A final, key concern revolved around the domain headings, which were listed as "Support, Manage and Lead." The "Support" category was commonly described as making those in that role feel less important because of its hierarchical nature and in turn, the result was a negative experience with the Framework. One idea for resolving this issue was to get rid of the current titles in favor of something like "Tier 1, 2, and 3." [Note: the current version of the Framework list these three initial time-based stages now as Levels 1, 2, and 3, whereby Level 1 roughly corresponds to DACUM workshop results for those 0-3 years in the field of ISL, Level 2 to 4-10 years in the ISL field, and Level 3 to more than 10 years in the field. However, the Levels are not designed to indicate length of tenure, nor position within an institution. They now represent individual's potential sphere of influence, with Level 1 corresponding to the direct work area, Level 2 to the institution, and Level 3 to the field of ISL.]

When asked to suggest changes to the Preliminary Framework, the respondents essentially agreed on the following key modifications:

- Change or clarify some of the language to avoid vagueness (e.g., develop vs. implement; creativity vs. flexibility) and jargon (e.g., define terms like equity)
- Clarify whether the Framework is intended for use at the institution-level, program-level or individual-level and if all three, distinguish how it should be used by each.
- Domain C needs overall work (e.g., there are two categories within one with multiple items listed, which is not the case with other domains)
- Provide clear expectations and directions (current guiding document is not enough)
  - Better explain what is ultimate purpose of the Framework
  - Set context (e.g., is it for individual or organizational use)
  - Several respondents felt that the Framework would be more useful if it was more prescriptive (e.g., provide a checklist or guiding questions)
  - Move users through sample scenarios of how the Framework can be most useful and what the potential benefits might be for them
- Provide supplementary "how-to-guides"

- How to have effective conversations during evaluations (for both staff member and supervisor)
- How to create buy-in around mission and then, how do develop and foster that connection
  - It was suggested by one participant that we consider a separate category for this (i.e., how individual values support organizational mission)
- Summary of results or wrap up section at the end to tie things together
- Visually, some suggestions for enhancing the pie chart of domains were to color-code the slices (tie colors back to description of each), blur the lines or have them interlock like bicycle gears in order to better illustrate that each of the parts make-up the whole

PHASE II:

The focus groups that were conducted during the 2017 annual meeting of ASTC are not yet fully analyzed, and the survey with more than 400 individuals who represent select reviewers and those who had been involved at earlier stages is still ongoing. However, an initial first analysis indicates support for the Framework, especially once some additional support materials are added (e.g., examples of how people or organizations are using the Framework, a glossary, and a format allowing users to see the Framework all together in one document). Feedback suggests that the Framework 'officializes' the ISL profession and serves as a *"tool to help people understand that they are participating in something bigger than they are."* It was also consistently recognized as a useful resource to craft new job descriptions and as a tool for offering professional development in a variety of situations, including national or regional conferences, to solve organizational-level problems, for on-boarding new staff or assisting staff members moving on to new stages in their careers, or in a self-directed manner.

V. Future Research

There is clearly great potential for continued research around this effort, both to get a final, working version of the Framework developed, and beyond that, to study any individual or institutional impacts based on the field-wide use of the Framework, particularly once key supplemental resources are available. Potential future research questions include:

- Does this Framework improve users' ability to articulate their capabilities, and in turn, do they believe their employability might improve? Why or why not?

- Longitudinal study could include case studies of how the Framework has helped individuals chart their career path.
- Based on pilot-testing the Framework at the institutional level (and including newly develop resources as part of the Framework package), what are some examples of how institutions have used the Framework and what metrics were used to measure how it helped the institution?
- What are individual voices from the field saying about how they used the Framework (i.e., In what ways did they use it? Was use of the Framework successful or unsuccessful and why?)
- Budget limitations often prohibit professional development from happening at all or at particular levels within an organization, which in turn can create a separation among employees (this is a particular challenge for part-time and seasonal staff, as well as volunteers); how might the Framework address this issue and help support the professional development and mentoring needs of all ISL employees within an institution?
- Where might different user groups (e.g., supervisors, educators, marketers, etc.) fit into the next evaluative research stage? (Note: this stage of the research did not separate outcomes based on job titles specifically, but this might be an interesting way to approach the next phase of research in order to better understand how current roles within an institution might approach the Framework differently)
- What are the ultimate uses of the Framework over time and who are the primary users of the Framework? (e.g., those new to the ISL field, supervisors).
- Does the Framework create a level of transparency about performance expectations for ISL professionals that support particularly underrepresented minority groups to enter, remain and succeed in ISL?
- What is the overall impact of the Framework on professionalizing the field of ISL?

VI. Conclusion

This project promises to help professionalize the field of informal science learning. In general, professional fields that developed guidance for growth and excellence tend to attract and retain professionals more successfully than those who do not, in part because expectations are

transparent. Our analyses thus far included a variety of potential target audiences who engaged with the Framework at differing depths. In addition to testing the potential efficacy of the Preliminary Framework as a guide for professionalizing ISL, reviewers helped to build the case for the value of professional development (and thus the final Framework) for individuals, supervisors, and prospective employers. Participants in this study expressed a feeling of ownership in this project after being engaged with the Preliminary Framework and asked that they continue to get updates on the Framework as development progresses. In addition, a couple of the institutions involved in the organized discussions expressed a need for institutional staff development and would be very interested in serving as pilot sites for implementing the Framework.

It is important to note that the Framework that results from this particular effort is still limited in scope, but nonetheless is expected to influence professional development offerings by national ISL associations such as ASTC or the Association of Children's Museums; curricula and continuous education of university-based museum education, museology, or free-choice learning programs; support and mentoring strategies within ISL institutions; and career planning of individuals who are currently employed in relevant ISL institutions or are planning to engage in initial training.

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PHASE I:

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When asked to suggest changes to the Preliminary Framework, the respondents essentially agreed on the following key modifications:

- Change or clarify some of the language to avoid vagueness (e.g., develop vs. implement; creativity vs. flexibility) and jargon (e.g., define terms like equity)
- Clarify whether the Framework is intended for use at the institution-level, program-level or individual-level and if all three, distinguish how it should be used by each.
- Domain C needs overall work (e.g., there are two categories within one with multiple items listed, which is not the case with other domains)
- Provide clear expectations and directions (current guiding document is not enough)
  - Better explain what is ultimate purpose of the Framework
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  - Several respondents felt that the Framework would be more useful if it was more prescriptive (e.g., provide a checklist or guiding questions)
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- Provide supplementary "how-to-guides"
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- Summary of results or wrap up section at the end to tie things together
- Visually, some suggestions for enhancing the pie chart of domains were to color-code the slices (tie colors back to description of each), blur the lines or have them interlock like bicycle gears in order to better illustrate that each of the parts make-up the whole

PHASE II:

In Phase II, two focus groups were conducted during the 2017 annual meeting of ASTC, and a survey was sent to approximately 400 individuals, represented by select reviewers and those who had been involved at earlier stages. The results of this Phase are analyzed in-depth below. In sum, however, these analyses indicate support for the Framework, especially once some additional support materials are added. For example, there is still a need to identify and define key words in the Framework which can then also serve as a tool to help introduce new staff to the language of STEM learning. As such, the Framework can lead to "lightbulb moments," where it defines general terms related to what an informal educator does and shows ISL professionals that what they do is a 'true,' valuable profession. Feedback suggests that the Framework 'officializes' the ISL profession and serves as a *"tool to help people understand that they are participating in something bigger than themselves."* It was also consistently recognized as a useful resource to craft new job descriptions and as a tool for offering professional development in a variety of situations, including national or regional conferences, to solve organizational-level problems, for on-boarding new staff or assisting staff members moving on to new stages in their careers, or in a self-directed manner. More specifically, the framework is seen as a *"skeleton to which an organization can put the meat onto"* (as one participant described it). At the same time, it was made clear that the more 'meat' that is put onto the Framework by the project development team, the more prescriptive (vs. descriptive) it may feel to users.

Feedback from Focus Groups

The Framework is seen as very useful for onboarding new staff (e.g., helping to set expectations), assisting staff members as they move on to new career stages or when making transitions from institution to institution, and as part of succession planning. It was suggested that the Framework can help "weed out" staff who are unable to understand the ISL mission. In other words, it can be used as part of the evaluation process to identify staff who may not be the right fit for an ISL role. It can also help a leader know who to invest time in (i.e., the ones who are intrinsically motivated to pursue personal professional development). The Framework is viewed as not only about helping individuals grow into a particular job, it is also about developing soft, transferrable skills and gaining a broader perspective about the ISL field.

There is still some confusion as to whether the Framework should be used at a personal, departmental or institutional level. An outstanding question is whether it should be presented as a way for new professionals to progress and stay in the industry or to start at the top, where the institution owns the Framework and aligns it to their internal mission and vision. For the most part, practitioners could see how they might use the Framework for personal growth and felt that the application of the Framework would work best if it is self-directed (implemented by individual staff members, not an institutional top-down approach). For example, the Framework can serve as a mechanism for professionals to take ownership of their professional development and use it as a conversation starter with supervisors to move forward in their careers. Conversely, some respondents immediately saw the Framework being practically used at an institutional level because it provides a way to create consistency in professional development by providing common language, accountability, and responsibility to build upon across departments. It is also seen as meshing well with what is currently being implemented in staff annual reviews, in that it describes what one does daily, and could help coworkers to understand why one approaches issues in the way they do. However, it is important to note that if staff-wide implementation is to occur, this will likely be an effort that needs to work in tandem with the institution's human resources department and as such there is a need to train human resource professionals on aspects of the Framework. In addition, there is a general need that all involved be aware of institutional barriers that prevent professionals from progressing from Level 1 to Level 2 or 3.

Ultimately, it is up to the institutions to define success in a way that is best for their communities and, in turn, they should place emphasis on where the Framework can be used in their particular contexts.

One of the questioning series we asked participants is to explain their likes and dislikes about the Framework and the website (islframework.org) where it is presented. A summary of the feedback is highlighted below:

Likes:
- ➢ Focus group members liked seeing the fluidity of levels and ability to break out each level into discrete steps for staff to take to move up.
- ➢ The Framework leaves room to incorporate staff from all different departments, including those who are not connected to educational goals of an institution.
- ➢ Website is easily accessible (e.g., high-contrast; easy to enlarge and remain true to the integrity of the website design; easy to navigate).
- ➢ Participants appreciated the continuity of keywords across domains and levels.
- ➢ Respondents felt that the Framework officializes the ISL profession.
- ➢ Competency profiles are a useful resource to craft new job descriptions for positions that do not yet exist at an institution.

Dislikes:
- ➢ Users found it difficult to navigate between levels and among different competencies and found there was too much need for clicking back and forth.
- ➢ The Framework is not functional for part-time or short-term staff.

Overall, focus group participants indicated that one of the greatest strengths of the Framework is its' ability to help with staff retention. In the field of education, retention is directly correlated with effectiveness. Perhaps the ISL field operates the same way. If ISL professionals use the Framework to become more effective professionals, it may have a direct impact on retention. An interesting story shared by a participant who has been in the field for 20 years was that it did not dawn on him until four years ago that he had a career. He went on to say that he only felt buy-in to the industry after attending an Association of Science and Technology Centers (ASTC) conference for the first time. The gist of the story is that such things as attending conferences with others in the same field of work or having a unified model or framework from which to identify one's self in the larger field can be reassuring to individuals who might not be aware of the larger network of like-minded professionals or may lack confidence in their skills for moving in a new direction within the discipline. The Framework can help to confirm that individuals are, professionally, "on the right track" and can facilitate a sense of ownership over one's career in the same way that attending major conferences can make this connection.

Feedback from Survey

The survey was designed to assess the clarity and utility of the Framework itself, as well as user satisfaction with the associated website (e.g., appearance, navigability). A survey link was emailed to 360 people working in a variety of positions at almost 3 dozen ISL institutions, with two follow-up communications resulting in a 15% return rate. Despite the fact that most respondents (87%) had never used a Professional Learning Framework before, the vast majority (92%) were able to review and understand the Framework well enough to provide substantive feedback and suggestions.

Feedback about Framework

Although most participants (80%) felt that the Framework was useful as-is, nearly half provided suggestions for changes to improve its effectiveness in the future. The comments fell into five broad categories:

➢ ***Provide specific examples***. Currently the Framework contains a progression of competencies across three levels. About a third of commenters suggested adding examples of specific elements at each level of the Framework to better allow users to know where they are in the Framework and how they could move across levels over time. For instance, one user stated, "For future editions, it would be great to have examples and/or case studies of the domains and what it looks like in real life."

➢ ***Clarify levels/categories***. A similar number of respondents suggested ways to make the levels of the Framework clearer to users. For example, one user commented "The different levels make it seem as though Level 3 is the end of the progression. There may be a better way to lay it out, so that it doesn't seem as though Level 1 is forgotten once you "move on" to a higher level." Others wanted "consistency between the levels such as knowledge is first, skill is second, and "engagement" is last."

➢ ***Connect to resources***. Many users commented that they would like "direct links within the Framework for ISL educators to find PD opportunities and resources on specific areas of growth." Another stated, "There are no specific recommendations of how a young professional would go about obtaining the competencies described. Shouldn't there be resources described such as available publications, museum management course, or conferences such as ASTC?"

➢ ***Add more detail and instruction for use***. Some users pointed out that the Framework may be used differently by individual professionals vs. at the institutional level and

requested information for how to use it effectively for assessing employees or informing individuals' professional trajectories. In particular, several users suggested providing indicators to allow one to know whether they have achieved certain competencies.

> ***Solicit feedback from a variety of ISL professionals***. Although there were only two comments in this category, they bear consideration in future iterations. One respondent suggested that "research-heavy institutions may have been over-sampled" in this process and that the Framework should be tested at more diverse ISL institutions. Another recommended "soliciting feedback from HR professionals as they are unlikely to be on standard ISE lists but have considered these issues deeply."

The survey also sought feedback on how participants might use the Framework in the future. The majority of respondents indicated that the Framework seemed helpful either at the level of individual professionals at ISL institutions, or for the institutions themselves for setting goals or evaluating employees. Three quarters of respondents provided descriptions of how they might use the Framework which fell into two broad categories which we discuss below.

> ***Inform goal setting and professional growth***. Most respondents recognized that the Framework could be used to set either personal or institutional goals and direct professional growth opportunities. For example, one user stated, "I am at the beginning of my career as an educator in the ISL field, this framework could help inform the decisions I make regarding professional development." Similarly, "I will use it to get a benchmark of where I am now as well as identify some priorities of where I want and need to grow."

> At the institutional level it was suggested that the Framework "could [connect] to our institutional level guide as suggested guidelines for training, job descriptions and job promotion." It was also seen as a starting point for dialogues with staff: "As a Supervisor who regularly hires and trains new, entry-level staff, I would definitely use the Framework as part of the initial on-boarding and training to give

them a better understanding of the field."

> ➤ ***Provide evaluation and guidance***. A common challenge identified at ISL institutions is a lack of consistent methods for evaluating staff. A number of respondents suggested that the Framework could address this challenge. For example, "one of our goals as an institution is to cultivate a knowledgeable and innovative staff, but at this time, we have no consistent method for evaluating staff where they are. This model seems in line with what is needed across the industry."
>
> In addition, it could be used to provide guidance to employees in meeting their professional goals: "As my institution looks for ways to support PD (usually by spending as little money as possible) I think it would be helpful to share this with colleagues, both for people to use for their individual careers and for our HR department to use for thinking about how to support the staff as ISL professionals."

Feedback about Website

In general, users were satisfied or extremely satisfied with the website's navigability (90%), organization (90%), appearance (93%), and overall usefulness (83%). In addition, most users (81%) were able to find relevant information within the website. However, there were several suggestions for increasing the usefulness of the website in the future including:

> ➤ Allow users to login to the site and monitor their progress in each category
> ➤ Provide additional resource tabs with examples
> ➤ Provide downloadable PDF version of the Framework for offline reference
> ➤ Clarify instructions for how to navigate the Framework

Overall, survey respondents indicated that the current version of the Framework and the associated website have great potential for supporting professionals in a variety of positions within ISL institutions. However, it is clear that the Framework's utility would be greatly

expanded with the addition of more content, particularly specific examples and indicators of competencies and links to relevant resources. These findings will be used to inform future iterations of the Framework and website in order to continue to provide a valuable resource for ISL professionals.

VI. Future Research

There is clearly great potential for continued research around this effort, both to get a final, working version of the Framework developed, and beyond that, to study any individual or institutional impacts based on the field-wide use of the Framework, particularly once key supplemental resources are available. Potential future research questions include:

- Does this Framework improve users' ability to articulate their capabilities, and in turn, do they believe their employability might improve? Why or why not?
    - Longitudinal study could include case studies of how the Framework has helped individuals chart their career path.
- Based on pilot-testing the Framework at the institutional level (and including newly develop resources as part of the Framework package), what are some examples of how institutions have used the Framework and what metrics were used to measure how it helped the institution?
- What are individual voices from the field saying about how they used the Framework (i.e., In what ways did they use it? Was use of the Framework successful or unsuccessful and why?)
- Budget limitations often prohibit professional development from happening at all or at particular levels within an organization, which in turn can create a separation among employees (this is a particular challenge for part-time and seasonal staff, as well as volunteers); how might the Framework address this issue and help support the professional development and mentoring needs of all ISL employees within an institution?
- Where might different user groups (e.g., supervisors, educators, marketers, etc.) fit into the next evaluative research stage? (Note: this stage of the research did not separate outcomes based on job titles specifically, but this might be an interesting way to approach

the next phase of research in order to better understand how current roles within an institution might approach the Framework differently)

- What are the ultimate uses of the Framework over time and who are the primary users of the Framework? (e.g., those new to the ISL field, supervisors).
- Does the Framework create a level of transparency about performance expectations for ISL professionals that support particularly underrepresented minority groups to enter, remain and succeed in ISL?
- What is the overall impact of the Framework on professionalizing the field of ISL?

VI. Conclusion

This project promises to help professionalize the field of informal science learning. In general, professional fields that developed guidance for growth and excellence tend to attract and retain professionals more successfully than those who do not, in part because expectations are transparent. Our analyses included a variety of potential target audiences who engaged with the Framework at differing depths. In addition to testing the potential efficacy of the Preliminary Framework as a guide for professionalizing ISL, reviewers helped to build the case for the value of professional development (and thus the final Framework) for individuals, supervisors, and prospective employers. Participants in this study expressed a feeling of ownership in this project after being engaged with the Preliminary Framework and asked that they continue to get updates on the Framework as development progresses. In addition, a couple of the institutions involved in the organized discussions expressed a need for institutional staff development and would be very interested in serving as pilot sites for implementing the Framework.

It is important to note that the Framework that results from this particular effort is still limited in scope, but nonetheless is expected to influence professional development offerings by national ISL associations such as ASTC or the Association of Children's Museums; curricula and continuous education of university-based museum education, museology, or free-choice learning programs; support and mentoring strategies within ISL institutions; and career planning of individuals who are currently employed in relevant ISL institutions or are planning to engage in initial training.