

Sharing the Universe

SUMMATIVE EVALUATION REPORT

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Sharing the Universe
Summative Evaluation
Executive Summary

Introduction

The *Sharing the Universe* (STU) project was funded by NSF in 2007 to develop and make available resources and supports to deepen and broaden the education and public outreach (EPO) of amateur astronomy clubs who are members of the Night Sky Network (NSN). To achieve this goal, the project funded a development group: the Astronomical Society of the Pacific (ASP), and a research group: Institute for Learning Innovation (ILI). These two groups worked as partners, both to study the barriers and challenges that existed for amateur astronomy clubs to educational outreach, and to apply what was learned from those studies to develop tools and supports¹ that clubs could use to engage in more and better educational outreach.

Inverness Research Inc. (IRI) was contracted as the external evaluator to conduct the summative evaluation of the *Sharing the Universe* Project, but also to actively participate in monitoring the progress of the project, its evolving theory of action, the partnership and its work over time. In this way, Inverness also played to a lesser degree a formative evaluation role. The evaluation focused on articulating the project's theory of action, documenting the contributions of the projects' resources and strategies to NSN's club outreach efforts, and studying STU as a model of how development and research can work together to strengthen and improve an existing network. Data were gathered through a broad-net reach and impact survey administered to all NSN clubs, club outreach coordinator interviews, NSN mentor focus groups and interviews, and monitoring project and participant events.

Summary Findings

Contributions of *Sharing the Universe* to Night Sky Network public outreach efforts

We identify below five significant contributions to NSN member clubs' outreach efforts, including in the descriptions the kinds of value added to the clubs, and the ways in which STU worked to add that value.

¹ By supports we mean online materials and platforms for the clubs to use to improve their efficiency and EPO efforts, and also strategies for communicating with the clubs as they became familiar with and used those materials and platforms.

(1) STU designed club outreach supports that were highly compatible with the needs, interests and priorities of the clubs. Thus, the supports were seen as valuable to clubs that used them.

The highest priority outreach activities for the clubs include public observation events, events for specific audiences, inspiring and engaging the public, and regular ways of communicating with club members. STU resources – including the highly valued ToolKits, the “Growing Your Own Astronomy Club Videos” and the NSN event calendar – were particularly good fits for these outreach priorities. Clubs that reported using these resources found them to be high quality.

(2) A wide range of resources and a diverse set of clubs meant that the STU project helped clubs in many different ways and to varying extents.

On our surveys and in our interviews we identified a large variety of ways the STU resources contribute to club outreach efforts, including the following:

- recruiting and retaining members, in particular engaging younger members, females and more ethnically and/or racially diverse members
- creating supports for getting public outreach going
- helping clubs welcome and interact with visitors
- strategies for handling challenges that come up during events, including difficult questions
- helping clubs cultivate volunteers
- supporting club members who are most actively engaged in outreach
- managing/organizing club events
- publicizing and promoting club activities and events
- customizing events for different audiences

In summary, a large majority of the NSN clubs reported on our surveys that they use the STU resources, with the most prevalent uses being: 1) for supporting their members engaging in outreach, and 2) for publicizing, marketing and promoting their club and its activities.

The following are illustrative quotes from club leaders:

The NSN outreach resources have been a big part in inspiring our club to participate in public outreach, whether it's using a toolkit activity, or getting an idea from the resources to create our own activity to use at our events.

The ToolKits, handouts, and other materials are so valuable when members do outreach. I think outreach events would be infrequent without this material.

The resources allow us to make better use of our time. We don't have to do the research and testing...The videos make it easier for those who haven't done these kinds of things before by giving them examples and confidence...

They (the resources) are well thought out, well constructed – a pleasure to use.

(3) Clubs' capacity to do outreach has increased.

Most clubs indicated they do more public outreach now compared to three years ago (before the STU project resources and supports were available). Nearly two-thirds of the clubs indicated that more of their club members are now involved in doing public outreach—on average ten more members per club—totaling over 1600 more club members doing outreach.

(4) ILI research findings informed the development process along the way, thus contributing to a beneficial match between the realities of club cultures (including outreach efforts), and the NSN designs for supports to increase and/or improve clubs' EPO.

Using the research lenses of association, hobbyism and volunteerism, ILI's findings from studying amateur astronomy clubs contributed to deepening the project's knowledge about astronomy club culture. This knowledge in turn broadly informed development of both needed and appropriate resources.

In this project, important findings emerged within the following themes or topics:

- the diversity of club "types"
- the "cycle of participation"
- recruitment and retention
- "inreach and outreach"
- the balance between clubs' focus on business and astronomy
- specific challenges clubs face in their overall organization, structure, and activities
- barriers to and motivators for doing outreach

These were just some of the many areas described by ILI that were then applied by ASP to the development process. Research findings about club barriers to outreach in particular (such as lack of time to access and/or knowledge of NSN resources, lack of confidence in working with the public, resistance of clubs to take time for outreach, club leaders getting buy-in from other members, etc.), highlighted the need and demand for improving web-based and live person-to-person access to STU outreach resources and supports for using them. Outcomes from this iterative research/development process

were resources and supports for club outreach efforts that resonated well with clubs that used them, and ultimately ones that influenced the design of the Mentor pilot program.

(5) The “Mentor Pilot Program” was a successful pilot strategy to strengthen the network’s capacity to support clubs interested in increasing and/or improving their public outreach.

The evaluation and research findings indicated that resources could and would be used more effectively if additional human, face-to-face coaching were made available to the clubs. To test this hypothesis STU applied for and received supplemental NSF funds to design and implement a Mentor Pilot Program, which proved to be a win-win arrangement for all involved. The STU team built into the program design careful consideration of new knowledge about the range of ways clubs lead, organize and run their public outreach activities; as well as their deeper understanding of the barriers that clubs face in doing outreach.

The STU team identified, recruited and trained a cohort of Night Sky Network outreach “champions” from a representative group of the amateur astronomy clubs across the country. These advocates were then positioned to work directly (as mentors) with club outreach coordinators. Mentors were overwhelmingly positive about the experience for themselves, the clubs they served, and their own respective clubs. NSN mentors learned more about the NSN network, and they saw clubs they worked with increase their use of the services and resources. Mentors had much to say, including the following representative quotes:

The mentor program has helped these clubs learn how to use the NSN – they were not using it. And it gives new clubs a quick start – I was a Quick Start guide...

Mentors also noted how their work as mentors had impacted their own clubs:

The few clubs I had contact with have gotten back involved with NSN and see the benefits of it. I got my own club to use more services. It’s a matter of staying in touch with the benefits.

The NSN itself saw an improvement in the engagement of mentored clubs with the STU resources and online supports, as well as positive changes happening in the clubs that were not in the mentor program. As one mentor noted,

[The mentor program] produced a ripple effect, with astronomy outreach in particular.

The Mentor Pilot Program has provided a face-to-face, onsite support system for clubs in their own regions, and bolstered the NSN’s capacity to serve clubs through a knowledgeable, local and available mentor. It also resulted in new club-to-club

interactions. The lesson learned from this work is that it is the combination of resources and mentoring that is most effective at helping the clubs both increase and improve their outreach activities.

Final Reflections about the Return on the NSF Investment

The returns on the NSF investments in *Sharing the Universe* were realized in the following ways:

(1) This investment contributed to public outreach efforts of NSN amateur astronomy clubs across the US.

Over 400 clubs had access to high-quality materials for their clubs' activities and organization, including new outreach approaches; personal mentoring; and more effective strategies for club organization and communication. The use of these offerings varied greatly from club to club and depended on initial capacity, interest, and alignment with needs. Given the nature and sociology of the collection of amateur astronomy clubs, the approach of offering many different resources and strategies is most probably an optimal one.

(2) This investment increased the capacity of a national network (Night Sky Network) to support amateur astronomy clubs' education and public outreach efforts.

The STU project significantly increased the capacity of an existing national network – the NSN – to serve its members, and in turn, for them to serve the public. By producing and disseminating valuable resources and strategies the NSN was able to improve its ability to help clubs initiate, improve, diversify and increase their public outreach efforts.

(3) The investment generated and shared new knowledge and insights about amateur astronomy clubs for the broader field.

New knowledge and insights generated includes a more in-depth understanding of the barriers and challenges amateur astronomy clubs face in doing public education and outreach; the tools and strategies that are most useful in helping them address these barriers; the mix of resources and mentoring that is most efficacious; and a better understanding of overall of club culture and how it shapes which improvement efforts are likely to work. During the life of the project, STU partners presented and published research findings and project outcomes for a range of audiences (e.g. Astronomical Society of the Pacific, Astronomical League, Museums and the Web Conference, AAAS, National Recreation and Park Association, American Evaluation Association, *The*

Reflector, Astronomy Education Review, Anthropology of Environmental Education, and numerous proceedings).

(4) The investment also demonstrated a strong and illuminative case of investing in an existing improvement infrastructure.

NSF and other foundations face the challenge of making investments that are both innovative and that have the potential “to scale up.” The STU investment significantly strengthened the work of an existing national network, and, through that network, helped to support and improve the work of over 400 amateur astronomy clubs. This investment leverages an existing national network and the knowledge and good will of thousands of amateur astronomers. It also has the long-term benefit of not only providing immediate services but also building the capacity of the national network as well as the capacity of the individual clubs served.

I. Background – The Sharing the Universe Project

[The benefits of investing in NSN outreach are] the ties to STEM education and getting more people involved. Everyone you show the sky to is a future taxpayer or contributor. Some kid you show Saturn to may some day be a senator in charge of the Appropriations Committee!

(Night Sky Network Club Outreach Coordinator and Mentor)

The Sharing the Universe (STU) project¹ was funded by NSF in 2007 in to develop and make available resources and supports to deepen and broaden the education and public outreach (EPO) of approximately 400 amateur astronomy clubs who are members of the Night Sky Network. To achieve this goal, the project funded a development group: the Astronomical Society of the Pacific, and a research group: Institute for Learning Innovation. These two groups were to work as partners, both to study the barriers and challenges that existed for amateur astronomy clubs to educational outreach, and to apply what was learned from those studies to develop tools and supports² that clubs could use to engage in more and better educational outreach.

Inverness Research was contracted as the external evaluator to conduct the summative evaluation of the Sharing the Universe Project, but also actively participated in monitoring the progress of the project, its evolving theory of action, the partnership and its work over time. In this way, Inverness also played to a lesser degree a formative evaluation role.

II. The Summative Evaluation

A. Evaluation Purpose and Role

Inverness Research's primary responsibility was to produce a summative evaluation that aligned with the project intent and goals, and also to provide an external perspective. Summative evaluation activities, therefore, were all aimed at producing evidence that would contribute to a final report that (a) accurately portrayed the collaborative model, (b) produced findings about the reach and impact of the resources and strategies produced, and (c) could make some claims about the value and possible implications for the broader field of public outreach by amateur science clubs or organizations.

During the research, development and implementation stages of the project, Inverness worked alongside project staff to understand and clarify its theory of action, and supported refinement and articulation of the key concepts and

¹ For more information please visit <http://www.astrosociety.org/stu/index.html>.

² By supports we mean online materials and platforms for the clubs to use to improve their efficiency and EPO efforts, and also strategies for communicating with the clubs as they became familiar with and used those materials and platforms.

constructs related to the club outreach cultures under study. Inverness also assisted in monitoring the development of the outreach tools/strategies. Additionally, as the project partners began working together to understand each other, to work and to be productive, Inverness supported the process of clarifying roles and responsibilities along the way. These are examples of the ways in which Inverness served in a formative evaluation role.

This final summative evaluation report is intended to provide a comprehensive report for the five and a half years of the project, including findings related to the supplemental NSN Mentor program. The intended audiences for this report are the project leadership and the National Science Foundation.

B. Evaluation Domains and Questions

Evaluation domains and questions were revisited and refined during the course of the project, although they remained relatively unchanged. Table 1 provides an overview of the evaluation domains and questions Inverness studied related to each domain.

Table 1. Summative Evaluation Domains and Questions

Summative Evaluation Domains	Summative Evaluation Questions
Define and make explicit the project’s Theory of Action	<ul style="list-style-type: none"> • What are the underlying assumptions and operating principles for the project? • How does the project conceive of its purpose, goals and how it will achieve those? • What design features were built and how did they serve the project?
Document contributions to the “Success” of Astronomy Clubs’ Outreach Efforts	<ul style="list-style-type: none"> • To what extent and in what ways do the tools and strategies developed by and disseminated through the research and implementation phases of this project impact astronomy clubs’ abilities and commitments to conduct more and better outreach efforts? • To what degree does the project add value to existing outreach and the extent which it contributed to the building of club capacities to do outreach? (What has the project given clubs so that they can do outreach better?) • How did club “practices” related to outreach change as a function of engagement with NSN/STU?
Study STU as a model	<ul style="list-style-type: none"> • How do the various components of the project relate to and complement each other? • What do the various components contribute to and gain from each other?

	<ul style="list-style-type: none"> • How does the model enable useful outcomes that would not have otherwise existed? • What are the potential audiences for the research and evaluation findings?
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C. Methods and Data Sources

Inverness used mixed methods including: structured and focus group interviews; participant observations of key project leadership activities and NSN club meetings³; document review (including research reports produced by ILI, and resources produced by ASP); and a broad-net survey that was administered to all Night Sky Network club outreach coordinators. Inverness Research also participated in three annual project retreats, organizing and facilitating the final one held in Inverness, California in November 2010.

Data sources for this report include:

(1) Interviews:

- Project Leaders structured interviews (2010)
- NSN Club Outreach Coordinators or designees (2010)
- NSN Mentors pre-post and focus group during the training (2010/2012)

(2) Reach and Impact Club Survey:

- Administered to all NSN clubs (May 2011)

(3) Monitoring Project and Participant Events:

- NSN club meetings (2008)
- Annual STU Retreats (2008, 2009, 2010)
- Monthly STU leadership conference calls—Inverness participated in select calls, as needed, over the course of the project
- NSN Mentor Training

(4) Document and Resource Review:

- ILI Research Reports including Club Culture, Club Challenges, Mentor Interviews
- NSN Resources, outreach videos

Although the understanding from the start of the project was that Inverness Research would produce one product (namely this summative evaluation report), Inverness also generated two PowerPoint presentations that summarized our works-in-progress and findings (from our leadership interviews and the club survey), as well as a detailed status report on the findings from the broad-net club survey submitted to STU leadership in February, 2012.

³ To get a feel for the amateur astronomy clubs, Inverness Research visited NSN club events during the first and second year of the project. The intention was to visit one or two toward the end of the project, but this did not occur due to limited resources.

D. This Report

This summative evaluation report presents findings related to the reach and impact of the resources produced on the clubs, the partnership, and the capacities built within the Night Sky Network through the STU project.

III. Theory of Action

Inverness began constructing a Theory of Action for the project after the second annual retreat in 2009, a time when we felt we knew enough about the goals, work and partners to inform this purpose. The Theory of Action can be considered a form of logic model. (NOTE: The Theory of Action reported here does not include the supplemental Pilot Mentoring Project.)

For the Sharing the Universe project, the Theory of Action served several purposes for the summative evaluation and the project, including:

1. ***Clarifying goals, work, roles and products:*** The Theory of Action was used as a process and as a tool to promote shared understanding of the project itself, the logic of the goals and work, roles and responsibilities. The first draft of the Theory of Action served as a discussion and rallying point for all members of the collaboration (developers, researchers and evaluators) to come together and arrive at a common understanding about roles, timelines, products, and goals. If for no other reason, it helped to clarify who was doing what, for what purpose, and how the work of the collaborators depended on and informed each other.
2. ***Honing evaluation questions:*** The Logic Model served as a mechanism for Inverness to refine its evaluation questions. Virtually every arrow in the Theory of Action diagram can be translated into a research or evaluation question.
3. ***Portraying the “Collaborative Model”*** – This was a preliminary graphic representation from which a collaborative model could be articulated and portrayed.
4. ***Groundtruthing processes and products*** – Ultimately the evaluation team created a construct by which we could “groundtruth”⁴ the projects activities and products. For example: Did the project do what it said it was going to do? Was the integrity of the partners’ roles and responsibilities maintained?

To assist in articulating the Theory of Action early on in the project (2008) Martin Storksdieck and Jill Stein from ILI created a written narrative, much of which is still applicable to current thinking about the project Theory of Action.

Based on this narrative of the STU Theory of Action, in 2009 Inverness Research constructed a draft of a diagram to represent the Theory of Action, which went through several revisions (Figure 1). The narrative and the diagram with a description follow.

⁴ St. John, M. (2002). Evaluation as groundtruthing. A talk given at Kings College London.

Theory of Action Narrative -- Brief context and background for STU

The Astronomical Society of the Pacific (ASP) has a long history of outreach and community astronomy education. This project builds on a planning grant the ASP executed prior to funding of this project to explore outreach practices and needs of amateur astronomy club members.

According to the proposal for *Sharing the Universe*, there are an estimated 300,000 to 400,000 amateur astronomers in the United States, some 20% of whom are already practicing outreach. Additionally, in early discussions with the STU team, we learned that amateur and professional astronomers sometimes have connections and work together on scientific investigations, and that amateurs are making contributions to the field and being recognized for doing so.

This large number of amateur astronomers, the connections they have and the contributions they already make, coupled with the fact that there is already an infrastructure of astronomy clubs – all form the base of a promising but not-yet-realized capacity for amateurs to make major contributions to the public interest in and understanding of astronomy specifically, and of science more generally.

Goals of *Sharing the Universe*

We understand that the *Sharing the Universe* project had the following three broad goals:

- 1) to better understand the outreach cultures of amateur astronomy clubs and the broader culture in which it exists, as well as volunteerism, hobbyism and club culture in general;
- 2) to support and enhance the efforts of amateur astronomy clubs to conduct more and better outreach to the public; and
- 3) to encourage the public's enjoyment and knowledge of astronomy indirectly through astronomy clubs, ultimately increasing science and astronomy appreciation in the general public.

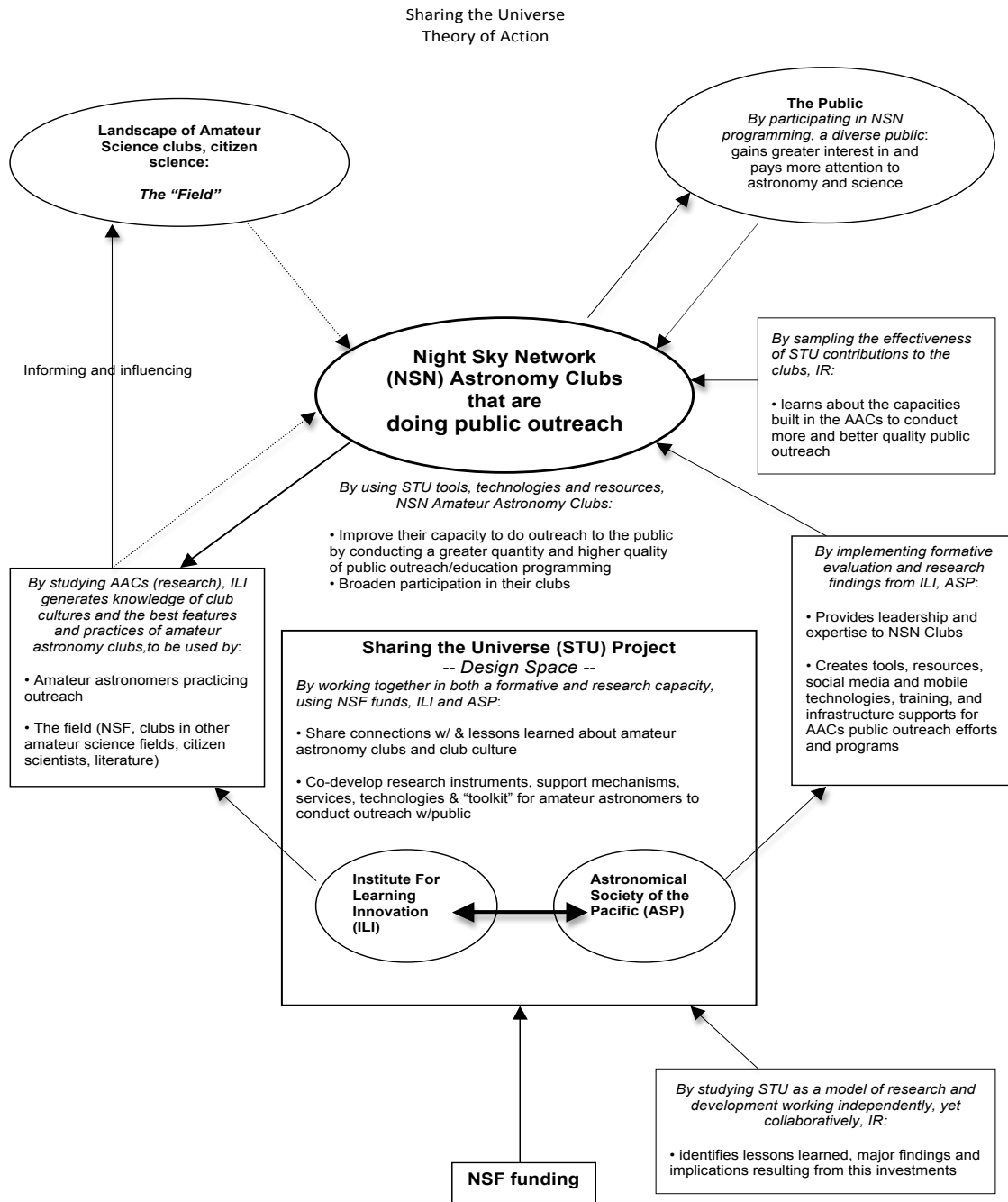
We see these goals as fitting into three broad categories of work: knowledge generation, capacity building, and direct service. These goals were all important, but not equally weighted, in terms of the work of the project. That is, the STU team reported that knowledge about club outreach and capacity building are the highest priority for the work of STU, with the implication that the third goal would be reached as a result.

The Approach of Sharing the Universe

In order to meet their goals, the core staff of STU proposed the following four strands of work:

- 1) to conduct research that studies the cultures of amateur astronomy clubs in order to learn which features and practices contribute to (or detract from) successful public outreach efforts on the part of club members;
- 2) to develop and test tools and resources, based on the findings from initial research, that will improve the quantity and quality of outreach conducted by club members, and increase the diversity of audiences served;
- 3) to disseminate lessons learned, tools and resources to 200 amateur astronomy clubs across the country; and
- 4) to share with other science and environmental education organizations / associations lessons learned about best practices in outreach to the public.

Figure 1. Sharing the Universe Theory of Action Diagram



Discussion of the Theory of Action Diagram

The *Night Sky Network (NSN) Amateur Astronomy Clubs (AACs) doing public outreach* are the central audience for the STU project. They are participants in the Night Sky Network, and as such are recipients of the resources and services generated by STU. The NSN clubs are also the primary source of data for the research being produced by STU.

Other audiences represented in the diagram include the *Public*, which is a primary audience for the AACs outreach efforts, and the *Landscape of Amateur Science clubs (a.k.a. Citizen Science)*, which is a primary audience for new knowledge produced by this project.

The *Sharing the Universe (STU) Project* depicted in the large square is named the "Design Space". The Design Space (the STU Project) is where the partnership between ASP and ILI exists, grows and creates. From their collaboration, ILI produces studies related to club cultures, practices, use of NSN resources, etc. The ILI studies serve to inform the ASP development of tools, resources, and infrastructure supports for AAC's club outreach efforts. The knowledge the ILI studies produce also informs the field of Amateur Science Clubs.

It is within this Design Space that ASP develops and tests their NSN toolkits, videos, platforms, and strategies for engaging clubs. Though the ILI research served a formative role, early on the developers needed more immediate feedback to better match the pace of their development efforts. ASP also used their own formative feedback mechanisms, regularly employing handpicked focus groups of club members (users) to provide immediate and timely feedback from practitioners about their development projects.

NSF funds directly supported the work within this design space.

Evaluation is located outside the Design Space. Inverness Research served as a third-party external entity (though it was drawn into the design space on occasion to help clarify questions and issues, facilitate and, in particular, for the actual design of supplemental Mentor Project). As the external evaluation entity, Inverness Research focused its evaluation on the model of the STU Project as a research and development collaboration (the design space), and surveyed the NSN clubs to learn about the effectiveness of the STU contributions to clubs.

Findings presented in this report relate to those boxes in the Theory of Action that summarize the work of the evaluation: namely the capacities built in the Amateur Astronomy Clubs' outreach and education to conduct more and better outreach; and the discussion of major findings and lessons learned from this investment.

IV. FINDINGS: The Partnership

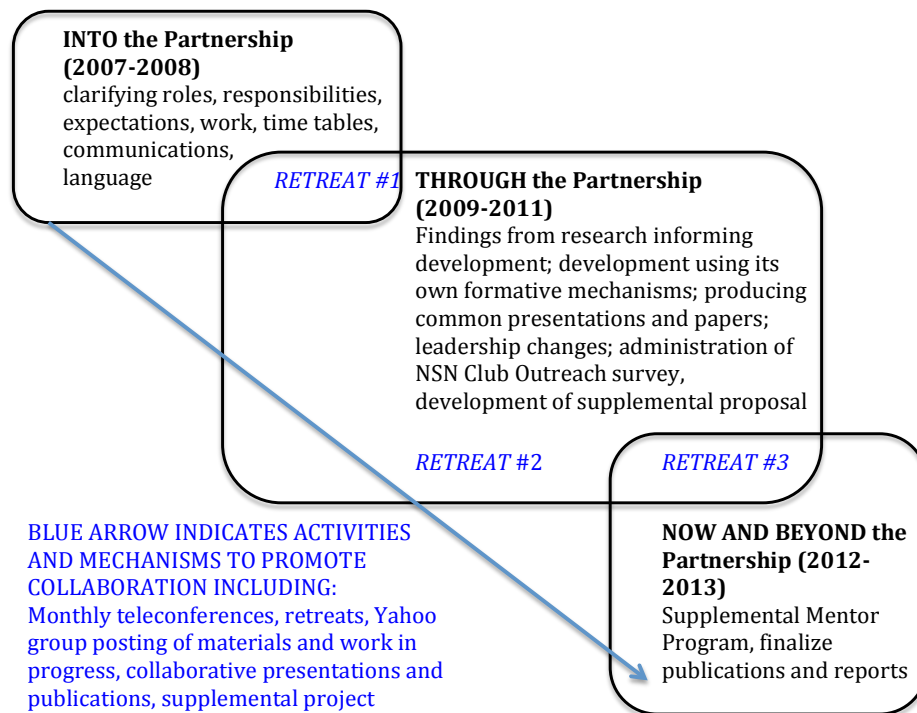
In this section we describe what we call the “*design space*” occupied by ASP and ILI that is referenced in the Theory of Action in the box titled “The Sharing the Universe (STU) Project” (see Figure 1 above). The partnership is portrayed in terms of stages of the collaboration, and in terms of its efforts and activities over the course of the five years of the project.

We have represented evolution of the collaboration by mapping it onto three phases:

- Into the Partnership: Getting it Going
- Through the Partnership: Getting it Good
- Now and Beyond the Partnership: A True Collaboration

We use this construct with the hopes that it may resonate with other, similarly-constructed collaborative partnerships, perhaps shedding some light on expectations and responsibilities, and on the ways in which and extent to which the project provided appropriate time and support mechanisms to grow the work together. We also note, within each phase, selected activities and mechanisms that worked to move the partnership beyond challenges toward accomplishment and production. Some discussion of each of these phases follows.

Figure 2. The ASP and ILI Partnership Over Time



A. INTO in the partnership: “Getting it going”

In this early stage of the project, the partnership was “getting going”. It was a period when the three primary partners (the Astronomy Society of the Pacific, Institute for Learning Innovation, and Inverness Research) learned more about each other through:

- facing tensions related to pace of work and how to be most productive to meet the commitments of the NSF grant;
- spending significant time clarifying expectations, roles and responsibilities; and
- engaging in an acclimation process with the intention of understanding the worlds and cultures of research, practice, and evaluation and how they best intersect and support each other.

In the early stages of the STU project, the ASP and ILI staff (and to a lesser extent Inverness Research) worked to clarify roles for each of the groups (as co-PIs on the project). This involved monthly conference calls to report on current work status, and to provide any data that had been collected or to share and tools and resources that had been developed. The first annual project retreat also served as an opportunity to refine the work of the project and the roles of each primary partner.

B. THROUGH the partnership: “Getting it good”

In the middle stage of the project, the core partners used new knowledge based on earlier research to inform the ongoing development of the Night Sky Network resources. The following details provide context for this stage of the project:

- ASP employed their own formative feedback approaches by asking NSN advisors to review and comment on prototype activities and resources.
- During this time, there were significant leadership changes within one of the core partner institutions.
- During this time, the ASP and ILI collaborated on presentations and papers based on initial data collected during this project. This effort showed intention to contribute to the field regarding project findings.
- Inverness Research, ILI, and ASP worked together to generate a NSN Outreach Survey for all member clubs.

Inverness Research activities to promote collaboration during this middle phase of the project included participation in two annual retreats and in continued monthly calls; and occasional additional planning and work phone calls to further particular pieces of work toward completion.

C. NOW AND BEYOND the Partnership: “True Collaboration and Extension”

At the end of the Sharing the Universe funding, the core partnership implemented the following efforts:

- submitted and received supplemental funding to support the NSN Mentor Program (see details below);
- completed publications and reports as agreed upon in agreements with funders; and
- used lessons learned from this project (based on summative evaluation results and research findings) to inform future work and possible collaborations.

Of particular note at this last stage of the partnership is the funding of the Mentor Program. This supplemental grant from the NSF supported the recruitment and training of six Night Sky Network “Mentors”—these were people who had a significant history of use and success using the NSN resources, and who were considered to be likely liaisons or “champions” for NSN. Over a 6-month pilot period, the Mentors were trained on how to access the detailed resources available to NSN club members, as well as how to gracefully approach reluctant clubs about the benefits on being involved with the Network. The Mentors were then supported in their efforts to train and work with clubs in their region to take advantage of NSN resources and services.⁵

V. Findings: Reach and Impact of the outreach resources and strategies on the NSN Clubs

This section represents survey findings related to reach and impact of resources and strategies produced by the Sharing the Universe project on the NSN clubs.

A. The Broad-net NSN Club Outreach Survey:

The Broad-net NSN Club Outreach survey represents the crux of our summative evaluation work. To inform the dimensions and design the survey, during the summer and fall of 2010 Inverness Research interviewed the STU leadership from ASP and ILI and a representative group of 9 Night Sky Network Club Outreach coordinators. Additionally, findings produced by the ILI about club culture, challenges, and barriers to adopting resources served as an important source of data for framing many of the survey questions. The survey domains, prompts, audience, and the process for administration were a collaborative effort with heavy engagement and input of ASP and ILI; survey design took several months to complete.

It also is important to note that this survey was administered prior to the Night Sky Network Mentor pilot program, which had a measurable impact on clubs’ engagement with the NSN resources (discussed later in the report). These findings were included in a status report that was produced for the STU leadership in February, 2012. At that time key findings were organized as a PowerPoint and sent to STU leadership (Appendix B.) The status report

⁵ Findings from summative interviews with 5 of the 6 NSN Mentors are detailed in Appendix X.

informed the planning for the supplemental proposal work (NSN Mentor Pilot Project) that commenced in Spring 2012⁶⁷.

Findings from the survey constitute the bulk of this summative report and are organized into the following sections:

1. Survey Background and Respondents
2. General Demographics of Clubs⁸
3. Status of Outreach Efforts
4. Awareness, Use and Value of NSN Resources
5. Barriers to Clubs using NSN Resources
6. Communications with NSN and Interests in Networking with Other Club Outreach Coordinators
7. Summary

Each report section presents survey data and results; often these results are accompanied by Inverness Research's comments and/or questions, The Inverness comments and/or questions were intended to stimulate discussion amongst the project leadership. (A few of the ideas raised in response to these questions are included in this report.)

1. Survey Background and Respondents

With significant support and review from the ASP and ILI, in May 2011 Inverness Research launched the Night Sky Network Outreach Coordinator Survey. The purpose of the survey was to document ways the Night Sky Network resources and services are supporting amateur astronomy clubs, with particular emphasis on their outreach activities.

Of a list provided by the NSN (397 clubs were invited to respond to our survey), 162 clubs responded. Additionally, three clubs⁹ indicated their club name was not listed in the choice of clubs given. In total, 46% of amateur astronomy clubs invited to participate in the survey responded. A sizable minority of the clubs that responded were represented by 2-5 responses (more than one person from a club responded to the survey). On average there are 1.3 responses per club. No one club represents more than 2% of the total responses. Of the 234 respondents that started the survey, 206 completed it.

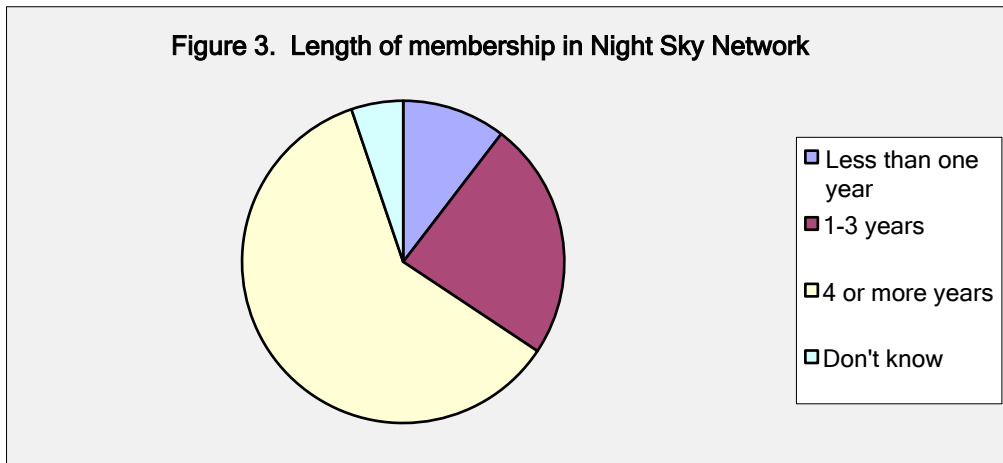
Forty-one states are represented with California, Texas and Florida accounting for 25% of the responses. Most clubs (60%) have been Night Sky Network members for four or more years (Figure 3).

⁶ The ASP kept close account of NSN Club activity during the Mentor Pilot Program, noting a bump in NSN club online activity as well as measurable increases in use of NSN resources after the implementation of the pilot program. This survey may be of use to the ASP in a year or two to document changes in NSN club activities over time.

⁷ The survey instrument is found in Appendix A.

⁸ When we report for "clubs" we are reporting on those clubs that are included in the survey responses.

⁹ Piedmont Amateur Astronomers, Los Angeles Astronomical Society, and Kiski Astronomers



Inverness Comment: Given the fact that over half of the clubs invited to take the survey did not respond, we wonder if in general the responding clubs are most attentive to outreach and the NSN resources and services. We wonder if, at a glance, ASP might look over the clubs that did not respond to the survey and in a very general way gauge what is known about their outreach and use of NSN. Those that did not take the survey may be a pool of clubs that might benefit most (or at least significantly) from the Mentor work. There are lots of possible hypotheses here, but this is something to consider when considering which clubs the NSN Mentors approach.

NOTE - Inverness sent ASP the list of responding vs. non-responding clubs. Analysis of the clubs showed: Primarily the respondents were from clubs that are currently much more active and involved in using NSN than the non-responding clubs. See table below.

# of clubs	responded to 2011 survey		Active club	Any Upcoming Events	More than 3 NSN Members	Club having any Logged Events	Last Event Logged after 1/1/12
162	YES	# of clubs in category	112	64	139	154	107
		Percent in category	69%	40%	86%	95%	66%
189	NO	# of clubs in category	59	30	104	158	58
		Percent in category	31%	16%	55%	84%	31%

2. General Demographics of the Clubs

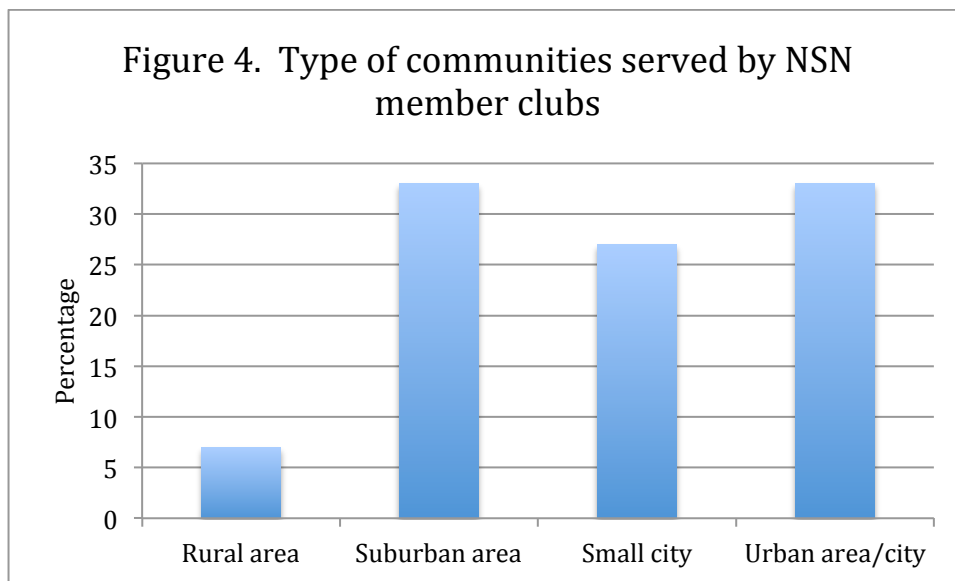
Club characteristics we include in this section are: club size, kinds of communities served, and basic demographic and logistical data about members (such as number of “active members”; leadership roles; age, sex, and ethnicity of members; distances members travel to club events; and numbers of members that conduct outreach).

Club Size:

Responding clubs are of mixed sizes: 14% have less than 20 members, 32% between 21 and 50 members; 27% between 51 and 100 members, 13% between 101 and 150 members, 2% between 151 and 200 members, and 11% reported having over 200 members. —

Communities Served:

Clubs serve a mix of types of communities: fewer clubs (7%) serve rural areas. Approximately one-half (51%) of clubs serve participants who are of middle socioeconomic status. One-third serve participants in a mix of socioeconomic status. (We note these statistics are different than the percentages documented by ASP for the entire network, and only reflect the set of clubs that responded to this survey.)



Clubs reported that approximately one-half (51%) of clubs serve participants who are of medium socioeconomic status (SES), and one third reported a members from a mix of SES; approximately 4% reported either high or low SES and less than 10% did not know.

Club demographics and logistics

In 80% of the clubs, ten or fewer people run the club—including 38% of clubs where five or fewer members run them. At the time of the survey, almost half (48%) of NSN member clubs have presidents that started their tenure as president one to three years previously; about a quarter of the clubs had newer presidents (less than one year as president at the time of the survey).

In terms of age of members served, approximately 60% of the NSN club members are over 40 years of age; 29% are 18-40; and about 8% are under 18. When asked to estimate the percentage of female and male club members, summative numbers indicate that nearly three-quarters of the members are male.

In terms of estimating percentage of members that fall into various ethnic categories, the summative percentages reported indicate that the clubs are more White (non-Hispanic/Latino white) than the general population¹⁰.

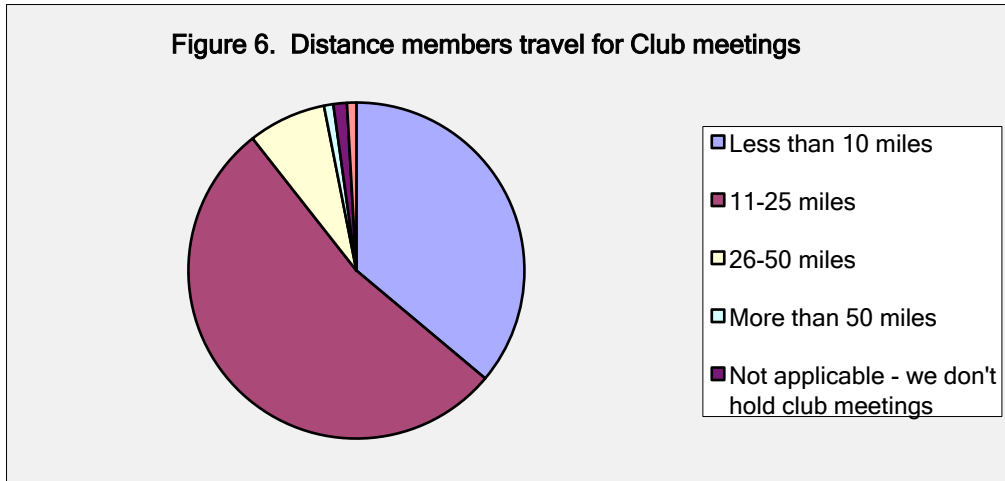
Figure 5. Club member ethnicities

Answer Options	Response Average	Response Total	Response Count
American Indian or Native Alaskan	.94	119	126
Asian (includes Indian, Chinese, Japanese)	3.72	521	140
Black or African American	3.07	452	147
Latino, Hispanic or Spanish heritage	6.89	1,040	151
Native Hawaiian or other Pacific Islander	.24	27	114
White	80.75	15,585	193
Mixed/Multiple races	4.64	552	119
Don't know	28.69	2,697	94

Inverness Comment: We wonder about any comparative data the project may have about club membership demographics and whether the demographics reported by our sample suggest to the NSN that providing more explicit efforts to support recruitment of particular groups (i.e. younger populations, women and underrepresented minorities) is important. Mentors selected for the supplemental grant work included three male and three females, none from “younger” or minority groups.

Clubs most commonly draw their membership from local regions, with 53% reporting that most members travel 11-25 miles to events. Next most common is for members to come from less than 10 miles away (36%). Almost 1 in 10 clubs draws members who come from more than 26 miles away. (Figure 6.)

¹⁰ Wikipedia data: White Americans (non-Hispanic/Latino and Hispanic/Latino) are the racial majority, with an 80% share of the U.S. population, per official estimates from the Population Estimates Program (PEP), or 75% per the American Community Survey (ACS); Hispanic and Latino Americans compose 15% of the population; [5] Black Americans are the largest racial minority, composing nearly 13% of the population; the White, not-Hispanic or Latino population comprises 66% of the nation's total.



Inverness Comment: Clubs are located in places where the need to engage more young and underrepresented people in science is well-documented. Given the reported club membership demographics, again we ask: how adequately can the clubs meet the needs and interests of those less-represented demographic groups? Where in the materials and services are there explicit strategies and suggestions for clubs interested in or dedicated to bolstering membership of under-served audiences?¹¹

3. Status of Club Outreach

In this section we present survey findings that relate to the clubs’ outreach goals, activities, and levels of satisfaction. We also present results from questions that asked about the relationship of the club’s outreach efforts over time and their use of the NSN resources and services.

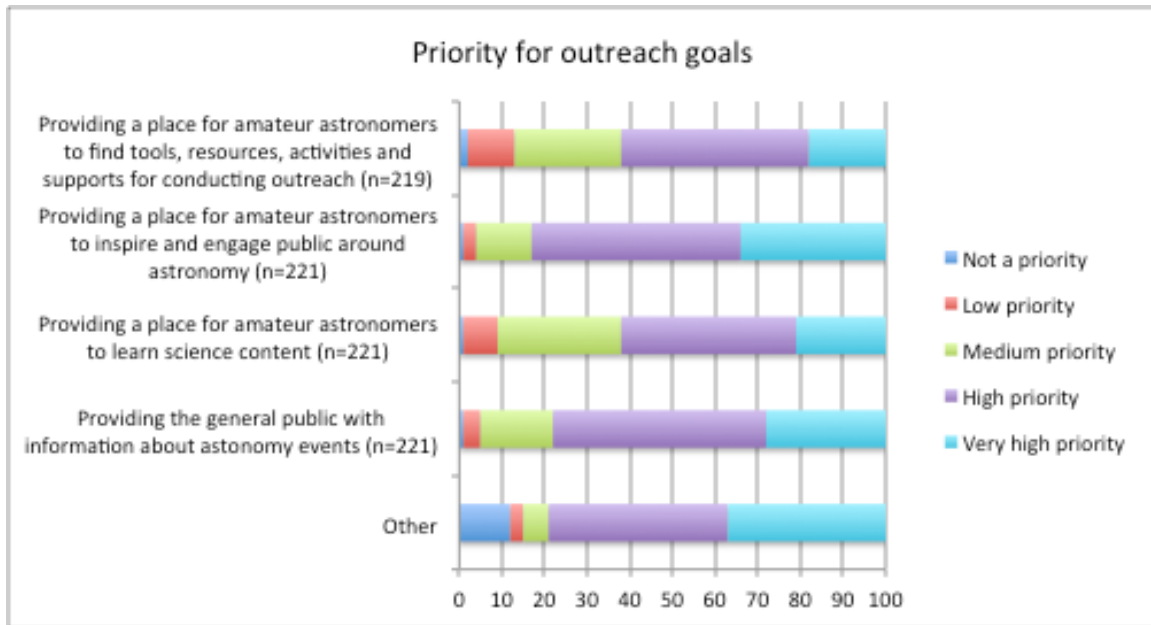
Outreach as a Priority

Club outreach is mostly a *high* to *very high* priority for clubs, with 83% of the respondents rating it as a *high* or *very high* priority, 14% gauging it as a *medium* priority and less than two percent rating it a *low* or *non-existent* priority.

We asked clubs to rate the level of priority for several possible outreach goals. Figure 7 represents the priority ratings for four named goals.

¹¹ Since reporting these results, ASP indicated they reach out to women and young adults through the Growing you Astronomy Club Videos (a subtle approach), and use of Facebook, Twitter and smartphone apps.

Figure 7. Priority for outreach goals



Most clubs have multiple high priority outreach goals, with “Providing a place for amateur astronomers to inspire and engage the public around astronomy”, and “Providing the public with information about astronomy events” topping the list. Seventy-eight respondents named other outreach goals. These goals were quite varied and also in general were ranked as a high priority. Among other *high* or *very high* priority outreach goals described that occurred multiple times in these additional responses were:

Reach out to school-age students [public and private schools].

Providing the public [with] telescope viewing [opportunities].

Investigate science in concert with nature and environment activities.

Frequency and Nature of Outreach Efforts

With one exception, all clubs conduct outreach. About two-thirds (61%) of the clubs have 10 or fewer members who conduct outreach. Approximately one-third (37%) of the clubs have between 11 and 50 members who conduct outreach. Three clubs have 51 or more members who conduct outreach.

When asked how often, if at all, clubs engage in a range of outreach activities, there are a handful of activities that most clubs are doing regularly (at least monthly); many of the rest are infrequently or never done. Topping the list of regularly-offered activities are public observation events, publishing a regular

newsletter, posting information on the club's website, and holding events for specific audiences. Outreach activities occurring with less regularity include making presentations at astronomy conferences or other organizations' meetings/events. Activities at the bottom of the list included Twitter and Facebook posts (171 respondents indicated they never post on Twitter and 113 indicated they never post on Facebook), planetarium shows, and telescope making sessions. Figure 8 shows all responses.

Inverness Comment: Not surprisingly, those outreach activities with the highest frequencies of use align with the highest priorities for outreach goals. Public observation events and events for specific audiences coincide with the highly-rated outreach goal of inspiring and engaging the public, and publishing regular newsletters and posting information on a website coincide with providing the public with information about astronomy events.

NIGHT SKY NETWORK OUTREACH COORDINATOR SURVEY-May 2011



How often, if at all, does your club conduct the following outreach activities?

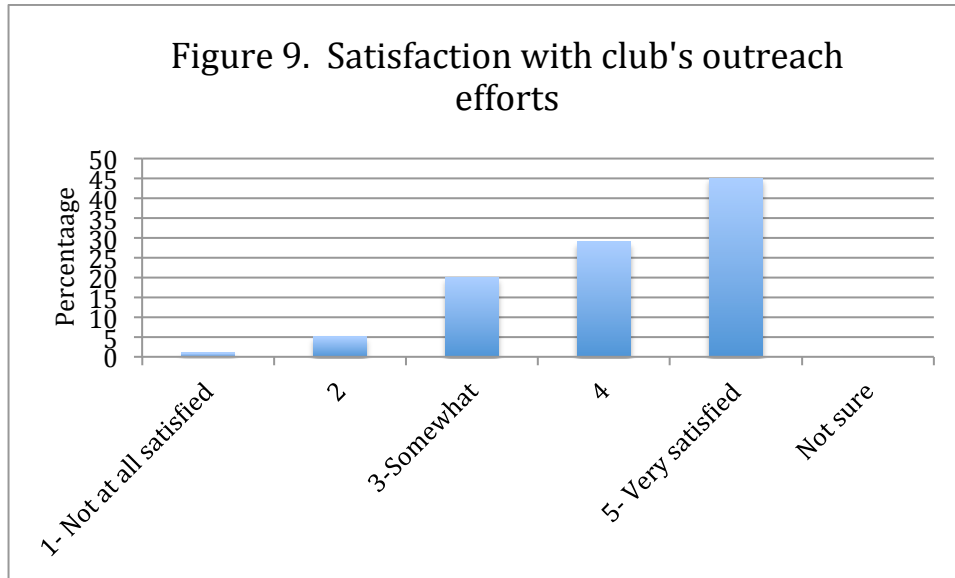
Approximate frequency of this activity

	Never	Less than once a year	Once a year	Twice a year	Quarterly	Once a month	Twice a month	Three times a month	Four times a month	Every few days	Don't know	Response Count
Public observation events (e.g., our hosting star parties, sidewalk astronomy events, etc.)	0.4% (1)	0.0% (0)	0.4% (1)	6.7% (15)	14.3% (32)	39.9% (89)	15.2% (34)	8.5% (19)	9.0% (20)	5.4% (12)	0.0% (0)	223
Events for specific audiences (e.g., scout groups, teacher workshops, school visits, etc.)	0.4% (1)	1.8% (4)	3.1% (7)	16.6% (37)	31.4% (70)	18.8% (42)	9.4% (21)	4.9% (11)	8.5% (19)	4.9% (11)	0.0% (0)	223
Youth meeting (activities for club families or the children of club members)	32.4% (71)	15.5% (34)	14.2% (31)	12.3% (27)	10.0% (22)	7.3% (16)	3.2% (7)	0.5% (1)	1.8% (4)	0.5% (1)	2.3% (5)	219
Publish a regular newsletter)	21.1% (47)	6.3% (14)	1.8% (4)	1.3% (3)	9.0% (20)	57.8% (129)	0.4% (1)	0.0% (0)	1.3% (3)	0.4% (1)	0.4% (1)	223
Post new information on your club's website	5.4% (12)	2.3% (5)	1.8% (4)	5.9% (13)	10.8% (24)	28.8% (64)	9.5% (21)	3.6% (8)	5.9% (13)	22.5% (50)	3.6% (8)	222
Twitter posts	77.4% (171)	0.5% (1)	0.0% (0)	0.0% (0)	1.8% (4)	2.3% (5)	1.4% (3)	0.0% (0)	1.4% (3)	3.6% (8)	11.8% (26)	221
Facebook posts	50.7% (113)	1.3% (3)	0.0% (0)	0.9% (2)	4.5% (10)	7.6% (17)	4.9% (11)	3.1% (7)	3.1% (7)	11.7% (26)	12.1% (27)	223
Planetarium shows	53.8% (120)	8.5% (19)	7.6% (17)	4.9% (11)	7.2% (16)	12.1% (27)	1.8% (4)	0.4% (1)	0.9% (2)	1.3% (3)	1.3% (3)	223
Telescope-making sessions	50.2% (112)	18.4% (41)	10.8% (24)	7.6% (17)	3.6% (8)	4.5% (10)	1.3% (3)	0.4% (1)	1.8% (4)	0.0% (0)	1.3% (3)	223

Figure 8. Frequency of Clubs' Outreach Efforts.

Level of Satisfaction with Club Outreach Efforts.

When asked how satisfied survey participants were with their club’s outreach efforts, nearly $\frac{3}{4}$ (74%) of the respondents indicated they are *satisfied*, including 45% who indicated they are *very satisfied*. Most of the rest (20%) are somewhat *satisfied*; and only 6% indicate they are *not satisfied* (Figure 9).



Inverness Comment: Nearly 100% of the survey sample indicated their clubs conduct outreach activities. We think this finding — that shows there is a lot of outreach going on — is very promising in terms of club activity/vitality and the common commitment of NSN clubs to reaching out to public audiences. We wonder how cognizant those clubs that did not participate in the survey are about the variety of outreach activities that are possible.

We also wonder how interested the ASP is in encouraging those that are satisfied to consider different or perhaps more effective approaches to outreach. What might motivate clubs that are satisfied with their outreach efforts to try different kinds of resources and/or learn what might be needed to use the NSN resources and tools to support outreach?

Club Outreach Efforts Over Time

We asked respondents to compare the number of club members involved in public outreach now to the number involved three years ago. Of the 167 responses to this question, almost $\frac{2}{3}$ (64%) of the respondents say more club members are now involved with public outreach. Six percent didn’t know and the remaining 30% indicated there was not an increase in members doing outreach. When asked how many more (including new) members are involved

in outreach, on an average there were 10 more per club, with a response total of 1,629 more members doing outreach.

Inverness Comment: The increase in numbers of club members conducting outreach, over the last three years, is impressive. We wonder how this number compares to the total number currently involved, and speculate that this approximate increase aligns with the years of work the NSN has been invested in supporting and promoting outreach through development and enhancement of its resources (via STU), and is well worth reporting. Although we can't assert causality, there is likely a relationship between increased outreach over the last three years and the presence and activity of the Night Sky Network.

4. Awareness, Use and Value of NSN Resources and Services

The survey provided a lot of data related to awareness, use and perceived value of the Night Sky Network resources. We report here on those results we think presented potential implications for the NSN Mentor work.

Awareness

Over half of the respondents are *very familiar* with the resources of the Night Sky Network resources, and about a third are *somewhat familiar* with the resources of the Night Sky Network. The rest indicated they are either *not very familiar* or *not at all familiar*.

When asked about other club members' awareness of the NSN, it was equally divided in terms of those who said that *many* or *most* of the members know about NSN resources, *some* know and *a few* know about the resources.

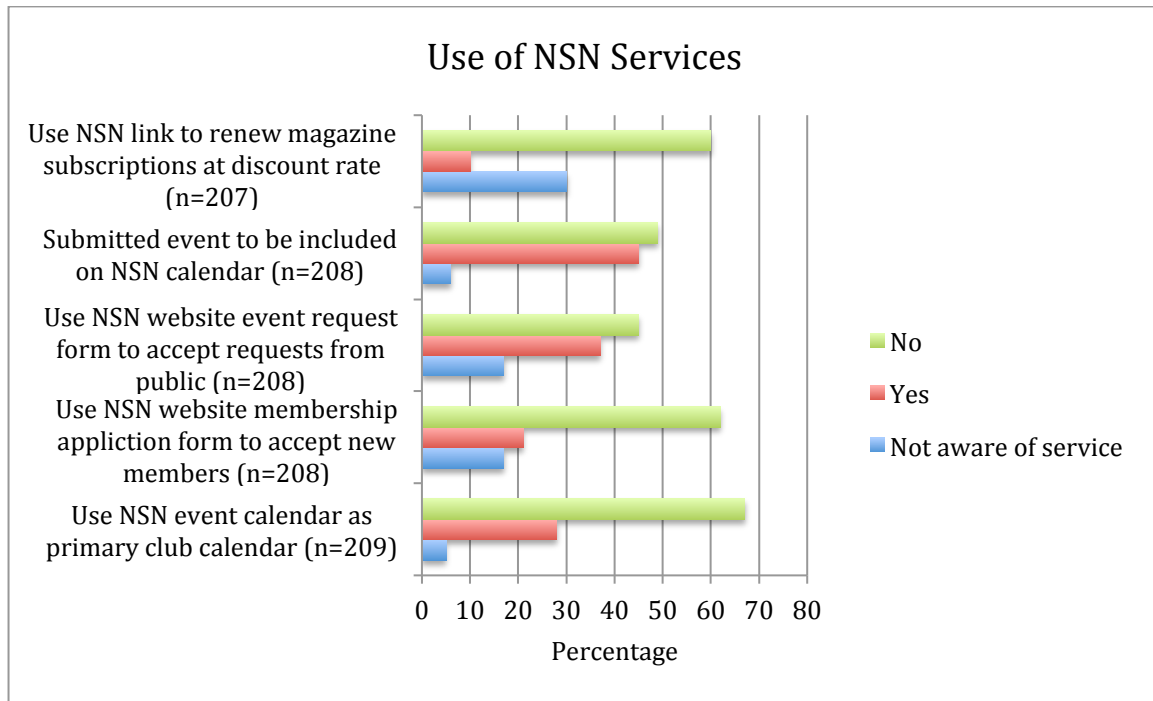
Inverness Comment: There seems to be a wide disparity of awareness about the NSN resources, both amongst the outreach coordinators who took this survey as well as respondents' sense of the awareness of other club members about the NSN resources. How important does the project think it is to address these differences? And how important, if at all, is it that other club members, not necessarily involved in outreach, are aware?

Use and Value of NSN resources and services

We asked respondents to indicate how often their club had used each of the NSN resources, and to rate how valuable they found them. The tool kits, events calendar, and to a lesser degree searching for astronomy activities are the most often used; however, of the frequently-used resources, only the tool kits are *highly valued*. The less-often used iPhone app is well regarded by those who use it. Those that have used the outreach training videos and the Growing Your Astronomy Club videos find them to be of *some* to of *great* value. In general, respondents were positive about the value of those resources they have used.

When asked about NSN services, fewer than half of the respondents avail themselves of the services (Figure 10). Of those services used, most often clubs submitted events to be included on the NSN calendar.

Figure 10. Use of NSN Services

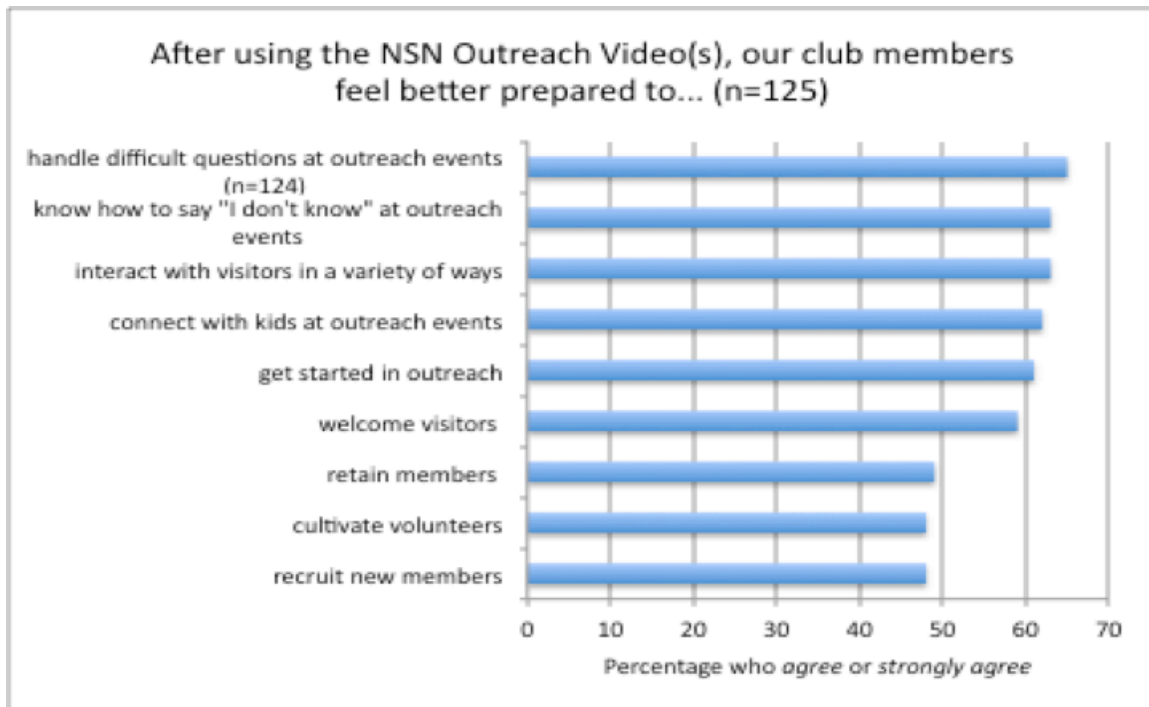


Inverness Comment: These results indicate that there is more work to be done to raise awareness and promote use of the resources and services. That being said, if used, clubs find the resources to be of value. Encouraging more use of the STU outreach resources and services would undoubtedly continue to demonstrate the value of the NSN resources to the clubs.

In terms of recruiting new members, another survey question revealed that the Night Sky Network has helped clubs feel better prepared to attract and engage younger members/participants. About a third of the respondents indicated the NSN has also helped clubs feel better prepared to attract and engage more female members/participants and more ethnically and/or racially diverse members.

Over half (~60%) of the survey respondents have used the videos. Of these, roughly two-thirds agreed that because of the Night Sky Network outreach videos their clubs felt better prepared to handle difficult questions at outreach events. About 50-60% agree they contribute in a variety of ways. Figure 11 shows the percentage that either *agree* or *strongly agree* with various statements about use of the outreach videos.

Figure 11. Use of NSN Videos



Some respondents commented on the videos and resources:

They are well thought out, well constructed – a pleasure to use.

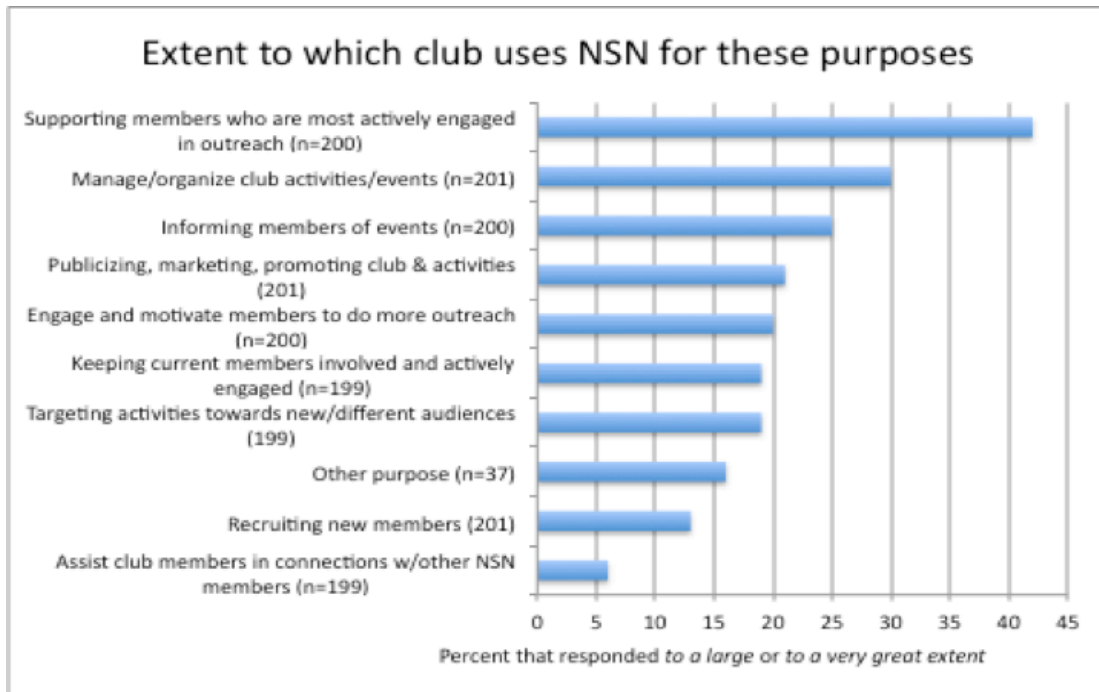
The NSN outreach resources have been a big part in inspiring our club to participate in public outreach from the beginning, whether it's using a toolkit activity or getting an idea from the resources to create our own activity to use at our events...

The resources provided in the tool kits allow us to make better use of our time. We don't have to do the research and testing of projects. The videos make it easier for those who haven't done these kinds of things before by giving them examples and confidence...

The ToolKits, handouts, and other materials are so valuable when members do outreach. I think outreach events would be infrequent without this material. To the designers of the NSN toolkits and handouts - keep up the great work!!

When asked about the purposes served by the NSN resources, answers varied, but most use the resources for supporting members engaged in outreach and for publicizing, marketing and promoting their club and its activities (Figure 12.)

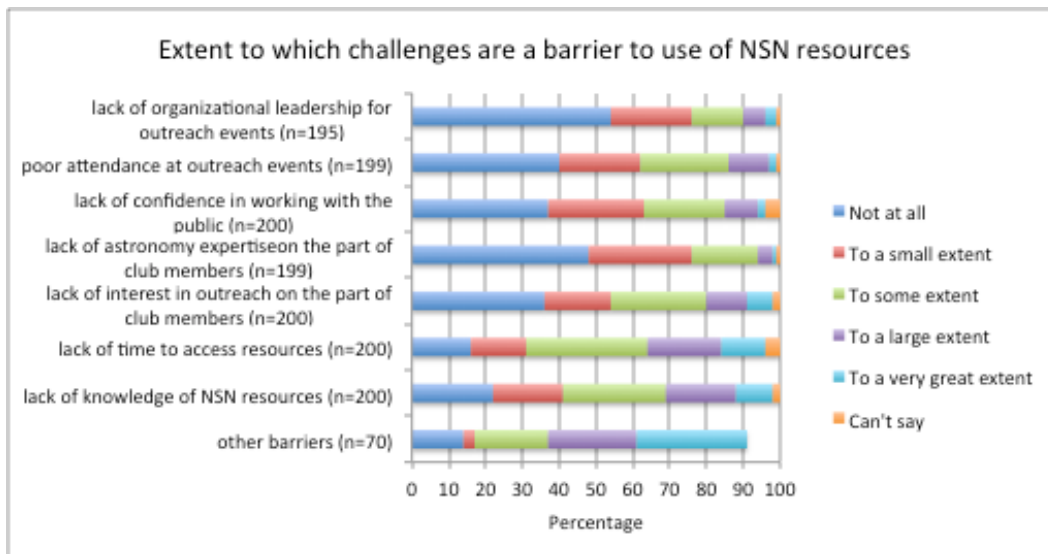
Figure 12. Purposes served by NSN resources



5. Barriers to Clubs Using NSN Resources and Services

Survey respondents indicated that lack of knowledge of the NSN resources and time available to access the resources are the greatest barriers to using the NSN resources (Figure 13). On the other hand, lack of leadership in organizing outreach events and activities was not considered a barrier by a majority of the respondents (76%).

Figure 13. Challenges as barriers to use of NSN resources



A wide range of additional barriers were described by roughly one-third of the respondents, and about a fifth of the respondents indicated other concerns regarding access to or use of specific NSN resources.¹²

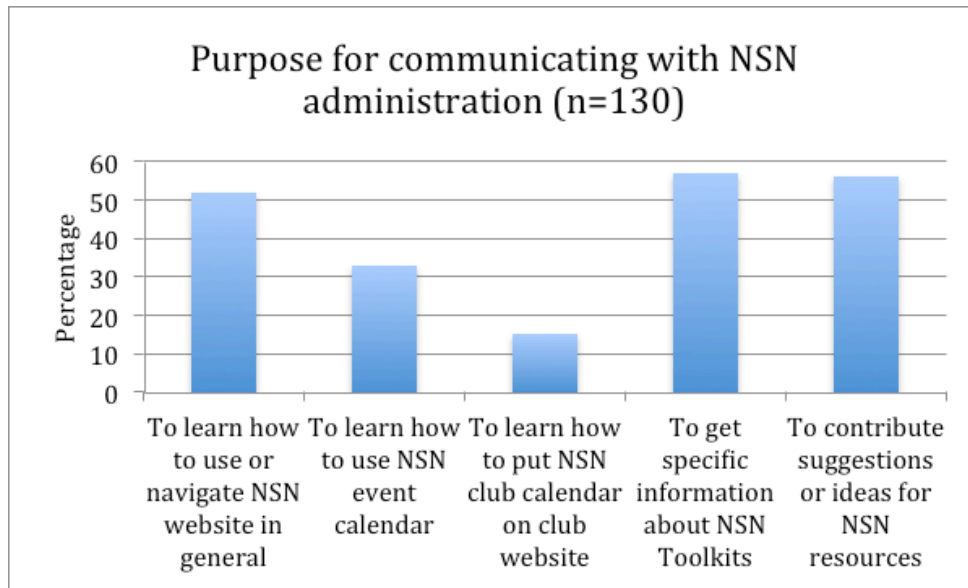
Inverness Comment: The fact that lack of knowledge about the resources was identified as a prominent barrier to use of the NSN reinforces the possible need for an informational and educative role for the Mentors about the resources

One suggestion for how to raise awareness and for clubs to serve as a testimony of value of the resources is to put into the NSN newsletter some news about the survey findings in terms of the value of the resources that clubs are using.

6. Communications with NSN and Interests in Networking with Other Club Outreach Coordinators

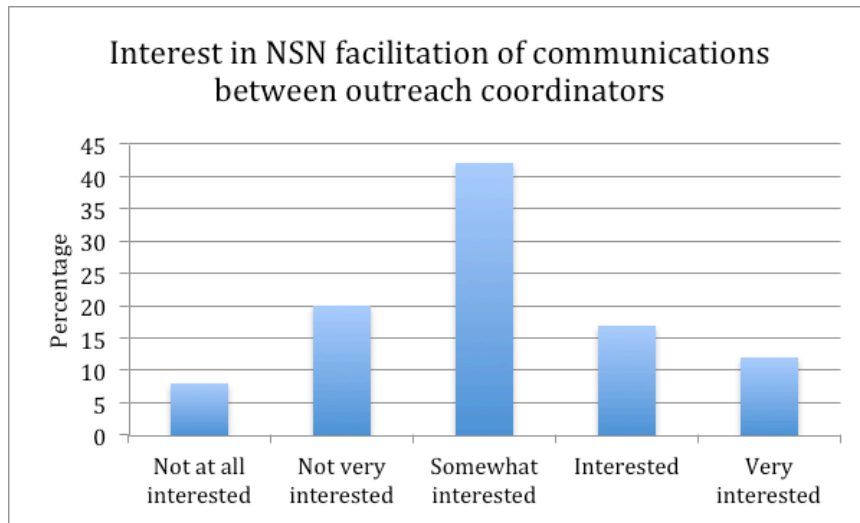
A solid majority of the respondents (69%) have communicated with NSN administrators for multiple purposes (Figure 14). Most communicate through email (91% of those that have communicated in this way), about half by phone and about a quarter in person. Facebook was used by 3% of the respondents.

Figure 14. Communications with NSN



So far, there is little cross-club connection going on, with 66% of the respondents indicating they have not connected with other club coordinators at all. A majority of respondents (71%) are at least somewhat interested in having the NSN facilitate these kinds of connections between outreach coordinators (Figure 15).

¹² We are still in the process of analyzing these comments and hope to have them available to STU in another document within the next two weeks.

Figure 15. Facilitating communications between outreach coordinators

Inverness Comment: Though at the time of the survey there was little cross-club connectivity, the respondents indicated a reasonable interest in the NSN supporting this kind of networking. What could be gained or grown through more cross-club connectivity? Would the time and resources needed to support this kind of networking produce benefits that align with the aims and goals of NSN? How could developing and distributing leadership capacity of the NSN (through the Mentors Program) support cross-club connectivity?

7. Survey Summary

Below we summarize a few ideas from the survey findings, and raise questions that we think may have implications for future work:

- **Outreach is a high priority effort for this group of survey respondents, and most (~75%) are satisfied with their club's outreach efforts.** Is the high level of dedication and priority for outreach of these clubs representative of the whole network? Would clubs that did not respond to the survey hold outreach as high of a priority and be as satisfied with their efforts? How might the other, non-responding clubs be reached?
- **Clubs that know about and use the NSN resources find them valuable, and they serve purposes that align well with high-priority outreach goals of the clubs.** The NSN resources, in particular the toolkits and the videos, add value to the clubs' outreach efforts in a variety of ways. Given this success, how can the NSN expand and deepen this positive effect through its current planned efforts?
- **Barriers rated as most significant in keeping clubs from accessing and using the NSN resources included lack of knowledge about the resources and time to access the resources.** The informational and educative needs for broadening awareness and use of NSN resources and services are a high priority. In particular increasing awareness, knowledge and communication with the clubs that did not respond to the survey, and perhaps deepening the knowledge and

awareness of clubs that did respond, seems to be important and may, in part, be served by the Mentors pilot program.

But perhaps there are other strategies. Will the Mentor program be able to sustain itself and perhaps grow beyond the pilot stage to help serve these or other functions? What are other possible strategies for broadening awareness and use given the clubs' preferred means of communication with the NSN (email and phone)? Are there other ways to think about facilitating cross-club interactions while serving this purpose as well?

- **Prioritizing for STU's investment in time and energy:** Overall, we wonder how important it is to expand membership, vs. expanding and/or deepening outreach activity, vs. expanding cross-club interaction, vs. expanding engagement of non-responding clubs? Prioritizing these many (and perhaps other) possible aims seems worth examining in light of the purposes, plans and designs for the Mentor program.

B. The NSN Mentor Pilot Project

Beginning in the summer of 2010, the STU Leadership Team (ASP and ILI) began thinking about possibilities for submitting a supplemental proposal to NSF. The idea was that this supplemental grant would support an extension for work to amplify and disseminate the resources and supports developed for NSN clubs through the STU project. During the Fall 2010 Annual STU retreat, a specific idea was hatched to use the resources produced and lessons learned about club culture from the work funded to date. The approach would harness existing stellar club outreach coordinators to serve as Night Sky Network "Mentors" who would distribute supports to other clubs in the network.

Subsequently, the STU team submitted a proposal to NSF for identifying a small set of Night Sky Network "champions" (club outreach coordinators with a long track record of education and public outreach, excellent interpersonal skills and a dedication to the NSN) who could serve as regional NSN Club Mentors. The proposal was funded; given the modest resources provided to test this concept (\$100K total), the outcomes of this short six-month effort are significant.

Six mentors were selected based on an application and interview process (conducted by ASP). Once selected, Inverness Research interviewed the six mentors prior to their participation. The Mentor interview protocol was vetted with ASP and ILI in order to gather information that would be of most value to the team as they designed the training event. The outcomes of these interviews were shared in a teleconference with the STU leadership, and focused on Mentor expectations of the mentoring experience more generally, and more specifically on their expectations for the early training session.

The Mentors were brought together for a two-day training session. This session represented perhaps the pinnacle of the collaborative efforts on the part of the ASP, ILI and Inverness Research. Planning the training (prioritizing what to include and why, assigning roles and sessions to ASP, ILI, and Inverness) took

several months and many phone calls that included equitable inputs and facilitation from the collaborators. Topics for the training included: NSN Content Knowledge, Addressing Club Issues, Addressing Challenges to Adopting NSN services, The Mentoring Relationship, and The Mentor's "Toolkit". Sessions were led either individually or collaboratively by the ASP, the ILI, and Inverness. This training event demonstrated the degree to which the collaboration had grown into a success.

The NSN Outreach and Club resources developed by STU were presented in light of how the Mentors could support other clubs in their efforts to learn about and use them. Research findings about NSN member club issues, cultures, and barriers to use were explicitly discussed and integrated into the background that the new Mentors were given about what to expect when working with clubs. And evaluation findings related to barriers to use of the NSN resources were also brought to light for the Mentors.

Evaluating the Mentor Program

It is important to note that ILI researched the Mentoring program as it happened, studying carefully the Mentor/mentee interactions and activities, modes, methods and supports that were more or less effective for the Mentors, the clubs they served, and the program. As noted above, the Inverness Research evaluation of the supplemental pilot effort is intended to complement the detailed research conducted by ILI.

Our evaluation of the pilot project had three foci, all of which were intended, ultimately, to contribute to our overarching summative evaluation questions.

These evaluation foci included:

- (1) **NSN Mentors** – building leadership capacities within clubs and regions
- (2) **Clubs served by NSN Mentors** – leveraging and expanding the use and effectiveness of STU resources
- (3) **The Night Sky Network** – increasing Network capacity to serve astronomy club outreach nationwide

Evaluation activities for the supplement entailed pre-post interviews with the mentors; partnering with ILI to hold a focus group interview at the training; observing the training; supporting the development of the online Mentor logs; reviewing the reports ILI had produced from Mentor interviews they completed; and reviewing the Mentor logs. Outcomes described below are drawn from these sources. (For a complete summary of findings from our Mentor interviews, see Appendix C.)

Key Benefits from the Mentor Project: for the Mentors, clubs, and the Night Sky Network

Overall, the Night Sky Network Mentor program was successful and a positive experience for the Mentors, as well as for the clubs who received their support. Examples of this success are detailed below.

Mentors were overwhelmingly positive about the experience and what transpired for them and the clubs they served. Mentors noted what they gained and learned from the experience:

I learned a lot more about the NSN network... what can and can't be done. People out there want your help, and that's always a good feeling. I really enjoyed going (to the clubs/events) and doing the presentations...

Working with Marni at the convention helped me understand some of the things—getting her to mentor me... one-on-one around the toolkits and the presentations.

I do feel part of a network... the biggest advantage being part of the mentoring team is to learn about people from all over the country who do what we do; how they use the system. Learning about how to not cancel events [when the weather is bad]. Being able to put a face to the name really helps. Mentoring made me feel more a part of a network. Not just a random list any more.

[I gained] knowledge [through] interacting with people... I enjoy helping—being of assistance to someone else, feeding off of their joy. We all get excited. It has been fun, even entertaining at times. I have been doing training; step by step—I am the hand to hold...

Mentors saw the clubs they worked with increasing their use of the services and resources.

They learned how to use NSN; organized their outreach departments. A lot of clubs were not using a calendar; it's helped them with their events. Three clubs I am working with ... (NSN told us not to contact new clubs but to focus on clubs we could move forward with) are using it to communicate with members in an efficient way. They are using the resources—toolkits and the videos, PowerPoints too. That is big point. They are having fun and being creative.

The few clubs I had contact with have gotten back involved with NSN and see the benefits of it. I got my own club to use more services. It's a matter of staying in touch with the benefits.

[The mentor program] has helped these clubs learn how to use the NSN—they were not using it. And gives new clubs a quick start—I was a Quick Start guide. I remember being new—we have only been on it for a year—and you can get lost. They changed it around visually so you can find things. IR: Are ASP staff responsive to suggested changes? Yes. We did that at their office in SF [during mentor training].

Making these clubs aware that the kits are there I can't help think but that there will be more outreach. It is good for the public to know the basic concepts; they will support NASA missions and strengthen science for kids.

One mentor summed it up this way:

Every club we've worked with has gone up (in activity level with NSN outreach resources and supports). Once they start doing it, it's easy.

The data ASP gathered and compiled about club activity vis-à-vis the NSN online during the Mentor project corroborated that statement, as reported in the ILI Mentoring Amateur Astronomy Clubs Report¹³. Figure 16 is excerpted from that report.

Figure 16. Table of Club Activity during Mentor Project

Logs of Night Sky Network Activity

The Table below shows that the mentored clubs (n=55) showed significant improvements in the areas measured over non-mentored clubs, although non-mentored clubs (n=360) also showed improvements in these areas, likely due to the data being collected between April at the end of the Winter, and September at the end of the summer. The mentors experience the following variation in changes in clubs contacted:

- Club Change in Status from Associate to Active – 0-60%
- Clubs with Increase in Upcoming Events – 17-40%
- Increase in Registered Individual NSN Members – 50-87%
- Clubs with Increase in Logged ToolKit Events – 17-80%

Table. Change in Club Use of Night Sky Network

Percent of clubs showing a change in that category from 4/2012 to 9/2012	Club Change in Status from Associate to Active	Clubs with Increase in Upcoming Events	Clubs with Increase in Registered Individual NSN Members	Clubs with Increase in Logged ToolKit Events
% of mentored clubs with positive changes	27.3%	29.1%	65.5%	52.7%
% of unmentored clubs with positive changes	8.1%	9.4%	25.8%	39.7%

One mentor noted that a club he had worked with had begun to work with another club they knew. In other words, the mentoring impact was being felt beyond the club he was working with:

(The mentor program) produced a ripple effect, with astronomy outreach in particular.

Acknowledging clubs not served by the mentors are also making progress (based on the baseline % of non-mentored clubs with positive changes), we do wonder whether the increase in club activity documented for clubs not mentored by the project may have been influenced by this “ripple effect” – perhaps accelerating and/or reviving club progress in adopting NSN services and resources..

¹³ Jones, E., Pettigrew, O., Yocco, V. (2012) Summary Report: Mentoring in Amateur Astronomy Clubs. For access to this report, please contact the Astronomical Society of the Pacific.

Another mentor reflected on how and why he thinks the mentor strategy works for clubs:

Most people are uncomfortable doing something new. If they have someone who can say, "I did this," or "this is what we did", they go "oh, somebody's done this already...", "Here's an answer, I don't have to make a video or present it to my club", it makes it easier on them and when that happens they're more than welcome to have you come in the door.

Mentors also noted how their work as mentors had impacted their own clubs. Here are a few of their comments:

This project gave us more tricks! More and improved use of the Network...Now seeing how extensively people use toolkits, we are starting a Saturday morning training session for club members to do outreach with the public. Our local science center has a room and a timeslot for conducting the training.

Those toolkits are amazing— I know what they have done for the outreach in my club.

Our outreach department was based on an elderly gentleman's time and schedule. When he felt like letting us know he would send out an email about an event. Only about 200 people would get the info (I have 400 members). Now our events are posted ahead of time; we are using the event request with great success. Our new outreach coordinator has been in the reserves in TX—he has stayed in touch [via NSN] even though he is far away. I have the calendar up for 2013 already! The resources—several of our club members are using them, and printing things out. The calendar has been our greatest asset. We needed a physical calendar on our website.

The lack of me bugging them all the time (is a benefit to my club). I handed outreach over to other club members. They see me going out and having a good time and they are talking with people to do programs now.

Mentors provided a needed face-to-face, on-site support system for clubs in their regions. This strategy served to relieve day-to-day demands for support from the "main office" (ASP), provided educational and welcome leadership opportunities for the mentors, served to distribute the supports needed to bolster outreach, and represents a proactive approach to making the quality resources and services of the NSN available to clubs across the country. The presentations the mentors did for different organizations and affiliations also provided that face-to-face interaction. In sum, the Mentor program contributed to the Night Sky Network's capacity to disseminate the resources, support the clubs and to bolster their education and public outreach efforts:

When I did presentations that is when I got the most contact; I had 3 to 4 people come up to me [afterwards] from different clubs [asking for more information about NSN].

Continuing the mentoring work will likely require continued resources. All but one Mentor indicated they would continue informally mentoring clubs as contacts and needs arise, but it was obvious that without financial supports, the time, travel and effort they could invest would be very limited. We wonder if the effective distributed supports, and budding infrastructure, built through the pilot project would be lost if there were no continued ways to support these willing and able NSN champions:

I am thinking that [any future mentoring relationship] will be informal but I will try to keep contact with them. If they are stuck on something they can come to me – I have already told them that. I sent them tutorials from Vivian. I have made myself available.

With most of the clubs I never mentioned that it was a 6-month program; the idea was to contact them saying that we were with another group. The few clubs we are working with now know it's going to end but I am still available to them. And they can contact NSN and ask questions...

And when asked if they would sign up for it again if the opportunity arose, again, all but one Mentor indicated they would, with a few caveats:

[I would do this again] in a heartbeat. The group is really good to work with and is well organized; they got things mapped out for how things are supposed to work; they are good at facilitating and surveying clubs to get input and activate it... it's nice to know when you call the help desk that you know the person on the other end.

I'd definitely sign up for it... I have three more (star parties/NSN presentations) scheduled and am trying to figure out how to get reimbursed for the gas.

You have to really spend some time to find out who to contact to find the person who says yes. You don't need a lot of mentors to cover a lot of territory; you just have to work hard and be diligent.

Mentors also articulated the bigger picture, the overall reasons for and impacts of the Night Sky Network outreach efforts, and their role in the network as mentors:

I still have clubs out there who are almost drowning. [They need] someone to encourage them to use the system for their own good. It's like having a Porsche and you don't know how to open the door; then once you do you can see all the features of the car. (We help them learn how to open the door.)

Also [the benefits of investing in NSN outreach are] the ties to STEM education and getting more people involved. Everyone you show the sky to is a future tax payer or contributor. Some kid you show Saturn to may some day be a senator in charge of the Appropriations Committee!

VI. Conclusions and Lessons Learned

In this section we discuss two primary contributions of this NSF investment:

- A. STU as a case of network capacity-building
- B. STU as a case of collaboration between research and development

The report ends with three of many lessons learned along the way; we feel these particular lessons carry specific implications for future similar investments.

A. STU as a case of network capacity-building

Network studies Inverness Research has conducted over the course of at least two decades¹⁴ provide a framework for how we are considering the capacities built through the STU project for the Night Sky Network. This framework is focused on characteristics of a healthy network¹⁵. Importantly, we are not gauging the health of the Night Sky Network; rather, we are using the framework as a way to organize the capacities the Sharing the Universe project built in relation to those characteristics.

According to this framework, key characteristics of a healthy network include:

Characteristics of a Healthy Network
(informed by K. Provan's work)

- 1) **A shared vision of the identity, purpose, and work of the network**
 - 2) **Support for real work and concrete contributions**
 - 3) **Internal connections and coherency**
 - 4) **Mechanisms for drawing upon and contributing to participating members**
 - 5) **Multiple opportunities for participation and interaction with the network**
 - 6) **Recognized and valued by the broader field**
 - 7) **Development of network governance and administration**
-

¹⁴ Inverness Research has studied networks over the past 30 years, a few of which include: The National Writing Project, The Nanoscale Informal Science Education (NISE) Network, Communicating Ocean Science to Informal Audiences (COSIA), and Community Science Workshops (CSW). For more information about network studies by Inverness Research see <http://www.inverness-research.org>.

¹⁵ This framework with more detailed indicators for each characteristic is Appendix D of this report.

Following is a discussion of capacities we think the Sharing the Universe project built in the Night Sky Network.

1) A shared vision of the identity, purpose, and work of the network: STU gave the Night Sky Network a concrete opportunity to revisit, redesign and reinforce aspects of the interface, resources and supports it provides to amateur astronomy clubs including but not limited to the Night Sky Network. This process entailed regular and repeated communications within its own organization, and with the researchers and evaluators about what those supports and resources were and were not intended to do. Through this continuous revisiting and—depending on the particular resource being developed or supports being designed—the NSN re-affirmed and more clearly articulated what it is and isn't in terms of its vision, identity and purpose. The supplementary Mentor Pilot Project also insisted that ASP be clear and concise in its articulation and representation of what it is, what it isn't, what it does and doesn't do, and how it manages itself. All of these processes required clear, concise and repeated communications about its vision, purpose and work.

2) Support for real work and contributions: We think that support for real work and contributions to amateur astronomy education and public outreach is the essence of the Sharing the Universe project. This is evidenced by looking at the achievement of the project in terms of the materials, resources, and supports designed and built by STU, and by considering the fact that these resources were all informed by rigorous and legitimate research and evaluation (internal and external). As a result of these efforts the capacity of amateur astronomy clubs to conduct education and public outreach efforts increased.

3) Internal connections and coherency: The Mentor program selected and supported six outreach coordinators who worked within their own club's geographic region to support other nearby clubs' outreach efforts. As a result, regional club-to-club connections were established and began to grow, thereby increasing internal connections across clubs within the network. The broad-net survey indicated club outreach coordinators were interested in connecting with other club outreach coordinators. This program succeeded in beginning to grow these connections.

4) Mechanisms for drawing upon and contributing to participating members: Throughout the development process for the various resources produced (toolkits, videos, etc.) ASP consistently showed a strong desire to draw upon and be responsive to feedback and input from its NSN members. This seemed to be part of the culture of ASP—they highly value their members' perspectives, needs and abilities, and make exceptional efforts to discover those assets and insist they drive and inform ASP's improvement efforts. Additionally, the research arm of the collaboration played a critical role in informing the development efforts about the experience, cultures and knowledge of clubs' outreach efforts.¹⁶

¹⁶ Early on there were tensions between ASP and ILI because of the strong desire of ASP to learn from ILI's research about these clubs' cultures, needs, and outreach efforts to incorporate that new knowledge into their development efforts. As ILI's research evolved and as they became more sensitive to the formative needs of ASP, ILI produced several important documents for the

5) Multiple opportunities for participation and interaction within the network: If the Night Sky Network could be thought of as a wheel—with the hub of the wheel being the ASP and its supports for the clubs, the interaction of the ASP with the clubs as the spokes, and the interactions between the clubs as the outside of the wheel—the most opportunities for participation and interaction with the network remain with the hub: the ASP. The revitalized NSN platform, the club outreach resources produced by STU, and the Mentors' support for clubs to access and use those resources significantly enhanced that interaction (between clubs and ASP). To a lesser extent (simply due to the capacities of the Mentors to serve clubs), the interactions between clubs through the outreach coordinators was also strengthened.

6) Recognized and valued by the broader field: As of September 2012, ILI produced or participated in 13 conference presentations; 3 conference posters; 3 reports/news articles; 9 conference proceedings manuscripts, and 3 papers and chapters because of and/or related to the Sharing the Universe project. Of these 31 scholarly products, we count 13 that involved both ILI and ASP partners in the production (42%). The content of these products all reflect attributes and outcomes of the research and development.

The productivity that this project demonstrated in terms of sharing new knowledge with the field shows the significant capacity built by the project to share information about supporting a culture of public outreach. The Night Sky Network is an example of what could be possible for other amateur science organizations.

7) Development of network governance and administration: This characteristic of a healthy network remained unchanged with the exception of the enhancement and distribution of supports that were generated through STU, including the recruitment and training of Mentors.

B. STU as a case of collaboration between research and development

We would like to begin our discussion of this contribution of the project by pointing out a general concept about groups who work together on projects such as Sharing the Universe. We think it is worth noting the distinction between a partnership and a collaboration¹⁷:

project including a significant ethnographic report documenting club cultures; a shorter report about club barriers and challenges to adopting resources; a Phase II research report about club adoption, use and barriers to use of the web-based tools and functions; and continual updates about publications and presentations. In this regard, the research arm of the project, ILI, served as a mechanism for the network to draw upon (the knowledge of) its participating members.

¹⁷ Definitions excerpted from Wikipedia.

- A *Partnership* is an arrangement where parties agree to cooperate to advance their mutual interests.
- *Collaboration* is working together to achieve a goal. It is a recursive process where two or more people or organizations work together to realize shared goals. This is more than the intersection of common goals seen in cooperative ventures, but a deep, collective determination to reach identical objectives.

The STU project began in partnership mode, but grew over time—and not without significant conscious effort—into a true collaboration. While the actual products generated through this investment are a testament to the functionality of the collaboration, we consider the conceptualization, ultimate funding and execution of the Pilot Mentor project to be the pinnacle of this partnership, where all participants brought their unique knowledge, visions and expertise to bear on this effort. It not only served to increase the fruits of the projects' labors (growing new knowledge about club cultures, and about use and barriers to use of EPO resources), but it also served to distribute the network supports through the Mentors, drawing upon and contributing to the leadership capacities of the individuals involved, and impacting clubs' outreach capacities.

To gain a healthy understanding of and respect for the traditions of each of these partners, and to build on and through (rather than around) these disparate cultures required determined leadership as well as clear and shared understandings about what each partner stands to gain and learn from their work together. In this sense, STU is a strong example of a case of true collaboration.

C. Three Key Lessons Learned

Though many lessons learned could be extracted from the findings presented in this report, following are three that we feel are paramount to consider when funding future similar efforts. Each presents an observation, the challenge, and a recommendation.

1) **Collaboration is hard work, requires persistence and leadership:** It is critical to grapple honestly and candidly early on in any project with perceptions about roles, and discrepant working cultures of partners in development, research and evaluation. Simply pointing out the issues isn't sufficient. Leadership, facilitation, and a "third space" are required in order to unpack and clarify what the expectations, roles and responsibilities of each partner are in such a collaboration. For Sharing the Universe, the ASP took an active, assertive and highly respectful role in this endeavor, and we call it out here in the service of potential future investments of a similar nature. Likewise, the responsiveness and sensitivity of ILI as a research partner to the pertinent needs for information, data and findings resulted in a growing responsiveness and willingness to produce results in a timely fashion for the project. Time and resources for building productive relationships is essential for a true collaboration to grow.

2) **Formative evaluation was a moving target for this project and should be more explicitly planned for in future investments.** Though academic research may and ultimately did serve the purpose of formative evaluation for the project, it typically doesn't. In this case the research group made explicit efforts to assist the project in this way. Likewise the evaluation built into the proposal was first and foremost characterized as summative, and the evaluation team found itself struggling with how it could serve any formative role without expending significant resources originally dedicated for summative evaluation. Hence, the developers were left to use their own internal feedback processes (focus groups) early on in the project until the research was far enough along to speak to their needs, and the summative evaluation was well on its way. For future investments, we recommend formative evaluation be explicitly defined, planned for and funded from the start.

3) **Assertive, sensitive, and responsive leadership is essential.** Without the tenacious leadership of the developers (ASP) and their consistent, respectful and honest rendering of what the project committed to accomplishing, we speculate that the high degree of success and productivity of this collaboration would not have been realized. The ASP brought to the project a sincere strength in willingness to learn to make adjustments while holding firm to the promises and goals of the project, and to making consistent timely progress in production. Likewise, with a change in ILI leadership that occurred about a third of the way into the project, a new and somewhat refreshed viewpoint was brought to the table in terms of what research could contribute to the project. We viewed this as an opportunity that the project seized (rather than as a challenge for the project to appease). Considering none of the original research members of the STU team were active participants in the end, the catalogue of publications and presentations produced through the research team is quite remarkable. And though the leadership of the evaluation team also turned over twice in the project, two of the members remained onboard, bringing to bear insights into the history of the work of the group over time.

In considering future investments in long-term partnerships and collaborations that involve research and development, we suggest a careful consideration of the leadership (PIs) in order to predict the likelihood of their persistence and dedication to the fundamental premises, goals and outcomes of the project. In the case of Sharing the Universe, the result of the relationships built between the development and research teams—even as personnel changed—produced clear evidence of a highly productive and robust collaboration. This collaboration significantly improved the quality and quantity of outreach conducted by NSN member astronomy clubs, and generated new knowledge about amateur/hobby club culture and outreach that is informing the broader field.

Appendix A:

NIGHT SKY NETWORK OR
BROAD-NET CLUB OUTREACH
SURVEY INSTRUMENT

NIGHT SKY NETWORK OUTREACH COORDINATOR SURVEY-May 2011

INTRODUCTION

To Night Sky Network Outreach Coordinators,

The purpose of this survey is to document ways the Night Sky Network (NSN) resources and services are supporting amateur astronomy clubs. By responding to this survey, your input contributes important data related to the reach and impact of the NSN resources and services. We anticipate the survey taking approximately 15-20 minutes.

Please know that your perspectives and opinions are critical to the ongoing success and improvement of the program. Also, be assured that all responses will be aggregated and reported anonymously - no one will be able to identify your individual responses nor your club.

Please note: You will need to complete the survey in one session, because once you hit the "submit" button on the final page of the survey you will not be able to go back.

Those who complete the survey by May 27th can be entered into a drawing for a \$50 amazon.com gift certificate. Thank you for taking the time to fill out this survey!

NIGHT SKY NETWORK CLUB BACKGROUND INFORMATION

Answering the following questions will give us some general information about your club.

1. Name of your club

If your club name was not listed, please provide it here

2. City where your club is located

3. State where your club is located

4. How long has your club been a member of Night Sky Network (NSN)?

- Less than one year 1-3 years 4 or more years Don't know

5. How many members does your club have? How many are active members? How many run the club and/or conduct outreach?

Club members

Active members

Members who run the club

Members who conduct outreach

Please respond for each question.

NIGHT SKY NETWORK OUTREACH COORDINATOR SURVEY-May 2011

6. Please estimate the percentage of your club members in each of the following age groups. (Enter whole numbers that add up to 100%.)

Under 18	<input type="text"/>
18-40	<input type="text"/>
Over 40	<input type="text"/>

7. Please estimate the percentage of female and male club members. (Enter whole numbers that add up to 100%.)

Female	<input type="text"/>
Male	<input type="text"/>

8. Please estimate the percentage of your club members in each of the following ethnicity categories. (Enter whole numbers that add up to 100%.)

American Indian or Native Alaskan	<input type="text"/>
Asian (includes Indian, Chinese, Japanese)	<input type="text"/>
Black or African American	<input type="text"/>
Latino, Hispanic or Spanish heritage	<input type="text"/>
Native Hawaiian or other Pacific Islander	<input type="text"/>
White	<input type="text"/>
Mixed/Multiple races	<input type="text"/>
Don't know	<input type="text"/>

9. Approximately how far do most members travel to club meetings?

- Less than 10 miles
- 11-25 miles
- 26-50 miles
- More than 50 miles
- Not applicable - we don't hold club meetings
- Don't know

10. Which of the following best describes the community your club serves?

- Rural area (strongly rural characteristics and pop. less than 5,000)
- Suburban area (pop. of 5,000 to 100,000 near or part of a larger populated area)
- Small city (pop. of 5,000 to 100,000, not part of a larger populated area)
- Urban area/city (strongly urban characteristics and pop. over 100,000)

NIGHT SKY NETWORK OUTREACH COORDINATOR SURVEY-May 2011

11. Which of the following best describes the socioeconomic status (SES) of participants at your club's activities (that is, those who attend your club's outreach events)?

- High SES
- Medium SES
- Low SES
- Mixed SES
- Don't know

12. How long ago did your current club president start his or her tenure?

- Less than a year ago
- 1-3 years ago
- 3-5 years ago
- Over 5 years ago
- Don't know

CLUB OUTREACH EFFORTS

As defined by the Night Sky Network (NSN), "**outreach is any activity that involves sharing astronomy with your community, with youth groups, or with your astronomy club members.**" This section asks questions about your club's outreach efforts.

13. Does your club conduct outreach?

- Yes
- No

14. To what extent would you say that outreach is a priority for your club?

- Outreach is not at all a priority.
- Outreach is a low priority.
- Outreach is a medium priority.
- Outreach is a high priority.
- Outreach is a very high priority.
- Don't know

NIGHT SKY NETWORK OUTREACH COORDINATOR SURVEY-May 2011

15. How high a priority is each of the following possible outreach goals for your club?

	Not a priority	Low priority	Medium priority	High priority	Very high priority
Providing the general public with information about astronomy events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Providing a place for amateur astronomers to learn science content	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Providing a place for amateur astronomers to inspire and engage the public around astronomy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Providing a place for amateur astronomers to find tools, resources, activities and supports for conducting outreach	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please rate priority, then describe below)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other outreach priorities

16. How often, if at all, does your club conduct the following outreach activities?

Approximate frequency of this activity

Public observation events (e.g., our hosting star parties, sidewalk astronomy events, etc.)	<input type="text"/>
Events for specific audiences (e.g., scout groups, teacher workshops, school visits, etc.)	<input type="text"/>
Youth meeting (activities for club families or the children of club members)	<input type="text"/>
Publish a regular newsletter)	<input type="text"/>
Post new information on your club's website	<input type="text"/>
Twitter posts	<input type="text"/>
Facebook posts	<input type="text"/>
Planetarium shows	<input type="text"/>
Telescope-making sessions	<input type="text"/>
Newspaper and/or magazine articles	<input type="text"/>
Media presence on TV and/or radio	<input type="text"/>
Astronomy conference presentations	<input type="text"/>
Presentations to other organizations' meetings, events or conferences	<input type="text"/>
Other (please indicate frequency here, then describe below)	<input type="text"/>

Other outreach activity (please describe):

NIGHT SKY NETWORK OUTREACH COORDINATOR SURVEY-May 2011

17. How satisfied are you, overall, with your club's outreach efforts?

- 1 Not at all satisfied
- 2
- 3 Somewhat satisfied
- 4
- 5 Very satisfied
- Not sure

AWARENESS, KNOWLEDGE AND USE OF NSN RESOURCES AND SERVICES

The following questions ask about your own and your club members' knowledge of and use of Night Sky Network resources and services, such as the Event Planner, Outreach Training Videos, and Toolkits.

18. Overall, how familiar are you with the resources of the Night Sky Network (NSN)?

- Not at all familiar
- Not very familiar
- Somewhat familiar
- Very familiar

19. How many club members other than yourself would you say know about the NSN resources?

- None
- A few
- Some
- Many or most
- Don't Know

20. Please indicate how often your club has used each of the following NSN resources and - for those resources your club uses - how valuable you find them.

Note, we have provided the web address for particular resources. To refresh your memory, you can copy and paste the web address onto your search engine.

	Frequency of use	Value (Leave blank for resources your club does not use)
NSN Events Calendar	<input type="text"/>	<input type="text"/>
NSN Tool kits	<input type="text"/>	<input type="text"/>
NSN Teleconferences with scientists	<input type="text"/>	<input type="text"/>
Search for Astronomy Activities (http://nightsky.jpl.nasa.gov/download-search.cfm)	<input type="text"/>	<input type="text"/>
Go StarGaze, the iPhone app (http://itunes.apple.com/us/app/go-stargaze/id380833895?mt=8)	<input type="text"/>	<input type="text"/>
NSN Facebook page (http://www.facebook.com/nightskynetwork)	<input type="text"/>	<input type="text"/>
NSN outreach training videos (http://www.astrosociety.org/SharingTheUniverse/)	<input type="text"/>	<input type="text"/>
Growing Your Astronomy Club videos (http://www.astrosociety.org/SharingTheUniverse/)	<input type="text"/>	<input type="text"/>

NIGHT SKY NETWORK OUTREACH COORDINATOR SURVEY-May 2011

21. Please indicate whether or not you use the following services provided by NSN:

	Yes	No	Not aware of service/resource
Do you use the NSN event calendar as the primary calendar for your club?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do you use the membership application form on the NSN website to accept new members?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do you use the event request form on the NSN website to accept requests from the public?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have you submitted a regional and/or national event to be included on the NSN calendar?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do you renew magazine subscriptions at the discount rate through the link on NSN?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. Please indicate how often your club uses the following NSN services, and - for those services your club uses - how valuable you find them.

	Frequency	Value (Leave blank for services your club does not use)
Duplicate recurring events	<input type="text"/>	<input type="text"/>
Log outreach events after they are held	<input type="text"/>	<input type="text"/>
Message groups to inform members of upcoming events	<input type="text"/>	<input type="text"/>
Event RSVP option to know which club members have agreed to help at an upcoming event	<input type="text"/>	<input type="text"/>
Cancel events and inform members of cancellations	<input type="text"/>	<input type="text"/>
Club member roster to manage membership and keep club member contact information up-to-date	<input type="text"/>	<input type="text"/>
Track volunteer hours	<input type="text"/>	<input type="text"/>
Manage club contacts	<input type="text"/>	<input type="text"/>
Request outreach handouts from NASA partners	<input type="text"/>	<input type="text"/>

NIGHT SKY NETWORK OUTREACH COORDINATOR SURVEY-May 2011

23. If you have used the NSN outreach videos, please rate your level of agreement with each of the statements listed below. (If you have not used the NSN outreach videos please skip this question.)

After using the NSN outreach video(s), our club members feel better prepared to:

	Strongly disagree	Disagree	Mixed	Agree	Strongly Agree	Don't know/Not Applicable
welcome visitors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
retain members	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
recruit new members	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
cultivate volunteers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
get started in outreach	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
interact with visitors in a variety of ways	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
know how to say 'I don't know' at an outreach event	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
connect with kids at outreach events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
handle difficult questions at outreach events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

24. To what extent are the following challenges a barrier for your club in using the NSN resources?

Extent to which this is a barrier

lack of knowledge of NSN resources that are available	<input type="text"/>
lack of time to access resources	<input type="text"/>
lack of interest in outreach on the part of club members	<input type="text"/>
lack of astronomy expertise on the part of club members	<input type="text"/>
lack of confidence on the part of club members in working with the public	<input type="text"/>
poor attendance at outreach events/activities	<input type="text"/>
lack of leadership in organizing outreach events/activities	<input type="text"/>
other barriers (please describe below)	<input type="text"/>

Other barriers:

NIGHT SKY NETWORK OUTREACH COORDINATOR SURVEY-May 2011

25. Please add other comments on any of the challenges you identified above related to accessing and/or using specific NSN resources:

VALUE AND IMPACT OF NSN ON CLUB ACTIVITIES AND STRUCTURES

26. To what extent has your club used NSN services and resources for the following purposes?

	Not at all	To a small extent	To some extent	To a large extent	To a very great extent	Can't say
Publicizing, marketing and promoting your club and its activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recruiting new members	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Targeting activities towards new/different audiences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Keeping current members involved and actively engaged	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informing members of events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Managing and/or organizing club activities and events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engage and motivate club members to do more outreach	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assisting your club members in making connections with other NSN club members	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Supporting your club members who are most actively engaged in public outreach	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other purpose (please describe below)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other:

27. To what extent do you agree or disagree with each of the statements listed below:

Because of the NSN resources, our club feels better prepared to...

	Disagree strongly	Disagree	Mixed	Agree	Agree strongly	Don't know	Not Applicable
...attract and engage younger members/participants.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...attract and engage more ethnically and/or racially diverse members/participants.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...attract and engage more female members/participants.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

INVOLVEMENT IN THE NIGHT SKY NETWORK COMMUNITY AND OTHER NSN CLUBS

NIGHT SKY NETWORK OUTREACH COORDINATOR SURVEY-May 2011

These questions ask about your engagement with the Night Sky Network - frequency, purpose, quality of interactions, as well as a couple of questions about connecting within and across Night Sky Network clubs.

28. Have you communicated directly with any of the NSN administrators?

- Yes No

29. For what purpose(s) have you communicated with NSN administrators? (Please check all that apply.)

- To learn how to use or navigate the NSN website in general
- To learn how to use the NSN event calendar
- To learn how to put the NSN club calendar on the club website
- To get specific information about the NSN Toolkits
- To contribute suggestions or ideas for NSN resources

30. How have you communicated with the NSN administrators? (Please check all that apply.)

- By email By phone By Facebook In person By texting

31. To what extent have you connected with other astronomy club coordinators as a result of, or via the NSN?

- Not at all
- To a small extent
- To some extent
- To a large extent
- To a very great extent

NIGHT SKY NETWORK OUTREACH COORDINATOR SURVEY-May 2011

32. How interested are you in having the NSN facilitate communications between club member outreach coordinators?

- Not at all interested
- Not very interested
- Somewhat interested
- Interested
- Very interested

SUMMARY QUESTIONS

These questions ask about your sense of how your club has evolved over time in relation to education and outreach efforts. This section also invites other thoughts or suggestions.

33. Compared to three years ago, are more of your club members involved in public outreach activities?

- Yes
- No
- Don't know

34. Approximately how many more (including new) members are involved in outreach?

Please type an estimate here.

35. Overall, to what extent has the NSN contributed to and supported your club in the following ways?

	Not at all	To a small extent	To some extent	To a large extent	To a very great extent	Can't say
Making outreach events/activities a higher priority for club members	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increasing our club's capacity to conduct outreach events/activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increasing the number of outreach events/activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increasing the quality of our outreach events/activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reducing the burden on club leaders who market outreach events and/or who run the club	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

36. Please note here any concerns regarding access to or use of specific NSN resources.

NIGHT SKY NETWORK OUTREACH COORDINATOR SURVEY-May 2011

37. Are there any closing comments you would like to make to NSN regarding their outreach resources?

THANK YOU!

Thank you very much for your assistance. Before you submit your survey, please provide your email address if you would like to be entered in the drawing. ***Please be assured that your address will not be used for any other reason - it is for the sole purpose of the Amazon drawing.***

38. Email address (needed for entry in the drawing for Amazon gift certificates)

Email address

Please re-enter

Please submit your survey now.

Appendix B:

SELECTED FINDINGS FROM NSN CLUB OUTREACH SURVEY

Sharing The Universe

SELECTED FINDINGS FROM
NSN MEMBER CLUB OUTREACH COORDINATOR
SURVEY

Implemented by Inverness Research
Summarized March 2012

What are NSN club members' priorities in terms of outreach?

Most clubs have multiple high priority outreach goals, the higher priorities including:

- Providing a place for amateur astronomers to inspire and engage the public around astronomy
- Providing the public with information about astronomy events

When asked about other outreach goals 78 respondents named others. These goals were quite varied and also in general were ranked as a high priority. Among other high or very high priority outreach goals described that occurred multiple times in these additional responses were:

- Reach out to school-age students (public and private schools)
- Providing the public telescope viewing (opportunities)
- Investigate science in concert with nature and environment activities

How many NSN member clubs are doing outreach?

With one exception, all clubs conduct outreach:

- About two-thirds (61%) of the clubs have 10 or fewer members who conduct outreach.
- One-third (37%) of the clubs have between 11 and 50 members who conduct outreach.
- Three clubs have 51 or more members who conduct outreach.

What kinds of outreach do clubs conduct?

Regularly offered activities are:

- public observation events
- publishing a regular newsletter
- posting information on the club's website
- events for specific audiences

Kinds of outreach (cont.)

Activities at the bottom of the list included:

- twitter and Facebook posts (171 respondents indicated they never post on twitter and 113 indicated they never post on Facebook)
- planetarium shows
- telescope making sessions

How satisfied are clubs with their outreach efforts?

When asked how satisfied survey participants were with their club's outreach efforts, nearly $\frac{3}{4}$ (74%) of the respondents indicated they are satisfied, including 45% who indicated they are very satisfied.

- *IR: What might motivate clubs that are satisfied with their outreach efforts to try different kinds of things and/or learn what might be needed to use the NSN resources and tools to support outreach?*

How familiar are outreach coordinators with NSN resources?

- Over half of the respondents are *very familiar* with the resources of the Night Sky Network resources.
- About a third are *somewhat familiar* with the resources of the Night Sky Network.
- The rest indicated they are either not very familiar or not at all familiar.

Which NSN *resources* do people use, and do they value those resources?

- The **tool kits, events calendar**, and to a lesser degree searching for **astronomy activities** are the most often used
- Of the frequently used resources, only the tool kits are highly valued.
- The less-often used iPhone app is well regarded by those who use it.
- Those that have used the outreach training videos and the growing your astronomy club videos find them to be “of some” to “of great” value.

Which NSN *services* do people use, and do they value those services?

Fewer than half of the respondents avail themselves of the services. If they use them, most often clubs log outreach events after they are held.

- *IR: These results indicate that there is more work to be done to raise awareness and promote use of the resources and services. That being said, if used clubs find the resources to be of value. Encouraging more use of the STU outreach resources and services would no-doubt continue to demonstrate the value of the NSN resources to the clubs. [The mentors could have a role in raising awareness and promoting use of NSN.]*

How have the NSN videos assisted outreach coordinators?

Over half (~60%) of the survey respondents have used the videos.

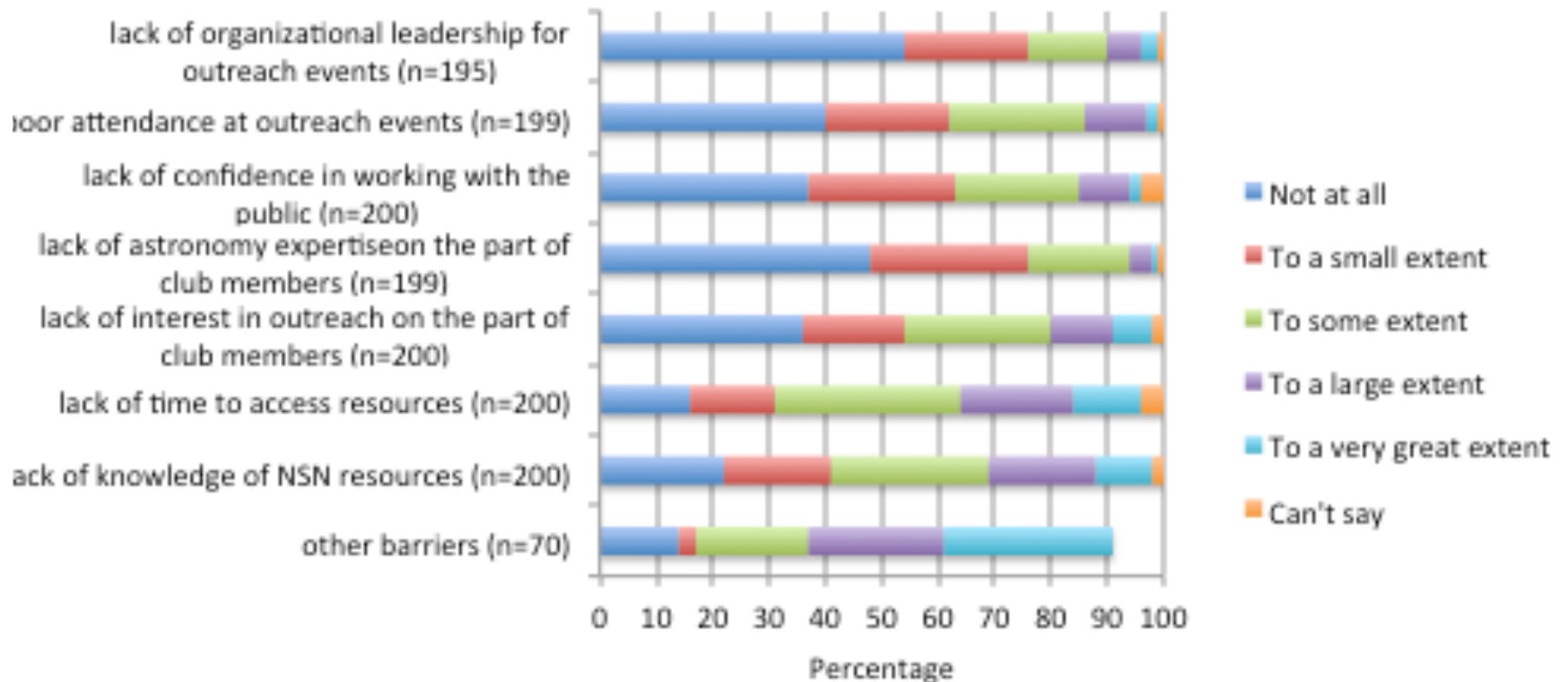
- Of these, roughly two-thirds agreed that because of the NSN outreach videos their clubs felt better prepared to handle difficult questions at outreach events.
- About 50-60% agree they contribute in a variety of ways (e.g., getting started in outreach, learning how to say 'I don't know' at outreach events, welcoming visitors, and connecting with kids).

For what purposes do outreach coordinators use the NSN resources?

- Most use the resources for supporting members most actively engaged in outreach, and for publicizing, marketing and promoting their club and its activities.

What are the barriers to the use of NSN?

Extent to which challenges are a barrier to use of NSN resources



What is keeping outreach coordinators from using the NSN?

Lack of time to access, and lack of knowledge about them, were the two greatest barriers to the use of NSN resources.

- *IR: The fact that lack of knowledge about the resources was identified as a prominent barrier reinforces the priority of an informational and educative role for the mentors about the NSN resources. (We also wonder if to some degree the lack of time to access resources may also be a function of lack of knowledge about the resources.)*

Do NSN member clubs communicate and share their work with each other?

- So far, there is little cross club connection going on, with 66% of the respondents indicating they have not connected with other club coordinators at all.
- A majority of respondents (71%) are at least somewhat interested in having the NSN facilitate these kinds of connections between outreach coordinators.
 - *IR: Though at the time of the survey there was little cross-club connectivity, there respondents indicated a reasonable interest in the NSN supporting this kind of networking. What could be gained or grown through more of this kind of connectivity? Would the time and resources needed to support this networking produce benefits that align with the aims and goals of NSN? How could developing and distributing leadership capacity of the NSN (through the Mentor Program) support cross-club connectivity?*

Appendix C:

SUMMARY OF FINDINGS FROM MENTOR INTERVIEWS

Sharing the Universe
Summary of Findings from Mentor Interviews
Conducted September 2012

Introduction

This document summarized key ideas we heard from interviewing five of the six Night Sky Network Mentors in September 2012. An effort was made not to duplicate, but rather to compliment the information gathered by ILI about the mentor/mentee relationship and the nature of the mentors' work. We have included a large number of quotes¹ because of their insightful and compelling nature, and their potential use in work going forward.

About the Mentor Strategy

All mentors valued the initial training that took place in San Francisco and felt that the initial face-to-face meeting was important, especially for developing camaraderie and connection between the mentors, and between the mentors and the NSN staff:

When we first started the group we had email communications - that set the tone; but the key factor was getting us all in the room. It's kind of hard to beat that. ...It's hard to get more than one person in the room; [but] once we got to know each other the discussion group and video conferences worked well. Hopefully that will continue. I am in several other groups that work like this, we do video-conferences once a month; get together once a year. ...Working on projects together was helpful. Might be cheaper to move the meeting around a little to different regions.

The regular teleconferences were also valued; mentors considered the Yahoo Group to be less valuable in terms of staying in touch and sharing resources and ideas.

The telecons kept you focused; [we learned] what other mentors were going through. It was encouraging.

I didn't use the Yahoo group that much. I participated in the conferences and that was excellent.

The mentors felt supported by ASP/NSN staff:

IR: Do you feel you could go back to ASP for support? Oh yeah – they are very good at giving support. We even feel we can make suggestions to the website.

¹ Some quotes have been lightly edited for grammar.

Face-to-face meetings were also considered essential to setting up the initial mentoring relationship between the NSN mentors and the clubs they served. Phone was seen as the next-best way to communicate, with email being much less successful, especially in the early time of relationship-building:

The more contact the better – face to face if possible; to send us out the clubs to work with them for a Saturday all day... email is ok, and I have gotten a little response – will back it up with phone calls. People are busy; they have trouble getting communications started. But once the contact is made it's fine.

The role of the mentors turned out to be an inspirational, and supporting and instructional one. That is, the mentors were not in a position to make decisions for the clubs they were serving, nor to tell them what to do in terms of using NSN or conducting outreach. Rather, the mentors saw their role as being one of informing the clubs about the benefits of using the NSN, and helping the clubs to get started using the many NSN resources:

[The mentors' service or role was] making other clubs aware of the benefits of NSN, [and to] take away some of the hard work they have to do. To get the word out to the public.

Expectations About the Mentor Program

The mentors all reported that the experience of mentoring turned out as expected – the mentors felt that they were well-prepared to do their work:

It went pretty well as I expected. Mostly I didn't have enough time to do more – no reason I cannot keep mentoring – I will still keep track of the clubs I mentored. Other people had more time.

I suppose it was more than I expected it would be. Sometimes more attention was devoted to a club than I expected they would need... we were not given any instruction - that was part of the project: to see what we could do. They [NSN staff] made excellent suggestions, like having us tell the mentee clubs: "we are not here to help, but rather to open the door and tell you about the NSN features and benefits." They gave us free reign.

One mentor was surprised that the actual number of clubs he mentored wasn't greater:

I expected to do more mentoring and more clubs mentoring...I had 6 or 7 that I worked with.

Benefits

Benefits to the clubs “served” (“mentees”)

The NSN, as a network of amateur astronomy clubs, is providing the infrastructure and the mechanisms for club members to interact, to learn what others are doing, to get inspired, and to improve their own club infrastructure to facilitate outreach efforts. Within this network, the mentors seem to have served the function of making a more direct connection between the less active NSN clubs and the resources, people and benefits that are available to them:

We have another person who is not connected with NSN but he has made himself a liaison between clubs. He is [now] a member of all the clubs; he said ‘[the NSN is] a way for all of us to connect with each other.’

The few clubs I had contact with have gotten back involved with NSN and see the benefits of it. I got my own club to use more services. It’s a matter of staying in touch with the benefits.

The few [clubs] that I talked to, they have increased their website to include the NSN; added a few things to show... increased their involvement with the NSN compared to before. I think it was a real positive for them.

Having someone that club members can go to and talk to about their issues and problems is extremely important. Like Ken Frank was a mentor for me – without him it would not have worked.

Most of the clubs I contacted did not know how to use NSN and didn’t bother learning, or they had it for years and whoever used to do the work on it such as posting of events [moved on]...

They learned how to use NSN; organized their outreach departments. A lot of clubs were not using a calendar; it’s helped them with their events. Three clubs I am working with ... (NSN told us not to contact new clubs but to focus on clubs we could move forward with) are using it to communicate with members in an efficient way. They are using the resources – toolkits and the videos, powerpoints too. That is big point. They are creating events that are more like a flyer - having fun and being creative...

[The mentor program] has helped these clubs learn how to use the NSN – they were not using it. And gives new clubs a quick start – I was a Quick Start guide. I remember being new – we have only been on it for a year – and you can get lost. They changed it around visually so you can find things. IR: Are ASP staff responsive to suggested changes? Yes. We did that at their office in SF [during mentor training].

Most people are uncomfortable doing something new. If they have someone who can say, "I did this," or this is what we did", or "I have this and this is what we did," they go "oh, somebody's done this already..." "Here's an answer, I don't have to make a video or present it to my club", it makes it easier on them and when that happens they're more than welcome to have you come in the door...

Every club we've worked with has gone up (in activity level with NSN resources and supports). Once they start doing it, it's easy.

Benefits to mentors' own clubs

The mentors did feel that the NSF investment in this mentoring project helped to build the capacity of NSN member clubs to do more and better outreach:

Yes. I think it will [improve the club capacity] – those toolkits are amazing – I know what they have done for the outreach in my club. Making these clubs aware that the kits are there I can't help think but that there will be more outreach. It is good for the public to know the basic concepts; they will support NASA missions and strengthen science for kids.

This project gave us more tricks! More and improved use of the Network. We have gone almost exclusively [to NSN] for the newsletter and communications. Finally getting people to have a handle on logging in and recording their hours. IR: Do you think your club has more capacity? Yeah, you bet. Now seeing how extensively people use toolkits, we are starting a Saturday morning training session for club members to do outreach with the public. Our local science center has a room and a timeslot for conducting the training. IR: It seems like the connection with the Science Center lends imprimatur or stature to your efforts... Yes, that is what we thought too.

I would say it is extremely valuable [as an investment] – the NSN is tremendous. It is a great strategy to get more clubs to be involved directly. If someone shows [clubs] how NSN works then it makes a big difference. For example we are going to start our meetings – you need the same level of training for other clubs... it greatly expands the use of the resources. If we touch one club we touch 25-500 people. A whole region! The classic example is tons of classrooms who just look through scopes – they say, 'oh look, wow!' and that's the end of it. The kit is how to get them beyond that. That step is huge. In terms of public education, NSN might be one of the best investments around – the activities and resources are already done. The infrastructure is very subject to input – they change things that we [mentors] had issues with. [As a comparison], we work with the science center but have no input into their website.

Yes, of course I feel part of a network. As far as our club is concerned there are a lot of benefits that make it worthwhile to be a member. Because of toolkits and all the outreach the final benefits go to the audiences. The whole purpose. It's been fun as a group of us together; it was a blast doing it. I had the opportunity to go back to Chicago for the Astronomy Conference; that was a giant plus – saw the planetarium, observatory, and meet a lot of people in astronomy. Then meeting the other mentors, going to SF, was great fun. [When IR asked this mentor what his club got out of him being a mentor, the same person said:] I don't think my particular club did; I was utilizing the NSN the best I could. I don't think the club members got anything out of me being a mentor.

Our outreach department was based on an elderly gentleman's time and schedule. When he felt like letting us know he would send out an email about an event. Only about 200 people would get the info (I have 400 members). Now our events are posted ahead of time; we are using the event request with great success. Our new outreach coordinator has been in the reserves in TX – he has stayed in touch [via NSN] even though he is far away. I have the calendar up for 2013 already! The resources – several of our club members are using them, and printing things out. The calendar has been our greatest asset. We needed a physical calendar on our website.

I found NSN by accident. I talked with my president about it; it had everything that our club needed. I learned that all the clubs have the same problems that we can improve by using NSN. We are bringing in young people; the affiliation with JPL and NASA [is drawing them].

The lack of me bugging them all the time (is a benefit to my club). I handed outreach over to other club members. They see me going out and having a good time and they are talking with people to do programs now.

Benefits to the mentors themselves

All the mentors interviewed agreed that they felt that they were a part of a network of amateur astronomy clubs, and that they received a range of benefits by participating in this project:

Yeah, I do feel part of a network... the biggest advantage being part of the mentoring team is to learn about people from all over the country who do what we do; how they use the system. Learning about how to not cancel events. Being able to put a face to the name really helps. Mentoring made me feel more a part of a network. Not just a random list any more. The Astronomical League doesn't have this kind of communication system. They are big [on outreach] – the two work together very nicely.

The biggest thing is when we got together we had nice discussion about how we use the network and how to help clubs overcome issues. If we hadn't had those meetings we wouldn't have been able to help the clubs – time to explore aspects that we didn't know about and lots of ideas from other people.

Yes I feel part of a network, but I am not an amateur astronomer – [I'm] a 'wanna be' – I am more doing the paperwork. I was doing that for NSN too. I am a beginner... The clubs know it. They are teaching me a little every now and then.

You can always go on there [the NSN website] and see what other clubs are doing. The 'Stars In the Night Sky Network' – that is one feature I do miss – maybe it's still there – they used to feature some club or person... it made you feel you were a member with all these clubs, not just you and ASP.

I learned a lot more about the NSN network... what can and can't be done. People out there want your help, and that's always a good feeling. I really enjoyed going (to the clubs/events) and doing the presentations...

Personally, benefits include meeting a great group of people; making connections. IR: Did you gain leadership skills or opportunities? Yes, got to be part of a talk at NE Astronomy Forum; local mid-state convention. IR: Did you gain increased confidence around presenting? Yes. We didn't have to invent anything; the NSN provided presentations – the group is terrific at putting together materials so we don't have to invent the wheel.

This is the part of astronomy I like: talking to people, I like the outreach portion of astronomy more than the astronomy. I like doing NSN presentations to the clubs, actually doing the events more than anything else. ...I do 5-10 outreach events a month.

One mentor discussed the importance of they themselves continuing to be mentored and to received help from the NSN staff:

Working with Marni at the convention helped me understand some of the things – getting her to mentor me... one-on-one around the toolkits and the presentations. If they wanted people to give presentations.... I gave a talk at a star party; I thought it was horrible – If I had had some one-on-one training for presenting talks [that would be good]... but NSN didn't [necessarily] expect [the mentors] to give talks.

Benefits to the network

The concept of the NSN Mentor project was built on the idea of tapping pre-existing NSN capacities for serving amateur astronomy clubs, including the new resources and web-based platforms developed and supported through the STU project. By

recruiting and selecting mentors that are representatives of the NSN Club community (some of whom already had initial contacts and relationships with other clubs), and by selecting people who enjoy the networking process, and are passionate about helping other amateur astronomers and the public gain access to the extensive resources and benefits of the NSN, the network benefited in a variety of ways. The following quotes exemplify the work that the mentors had been doing and are doing now to benefit the network:

One person contacted me for some reason that had nothing to do with NSN. He asked, 'What can I do to make this and that better?' I realized I was doing this [mentoring] already! He was not aware that some of the questions he was asking me that he could get help from the NSN. Like the outreach videos... He is now using everything [on NSN] – he has everything going...

When I did presentations that is when I got the most contact; like at [xx presentation] I had 3 to 4 people come up to me from different clubs [asking for more information about NSN].

[I gained] knowledge, interacting with people, I think I enjoy helping. Being of assistance to someone else, feeding off of their joy. We all get excited. It has been fun, even entertaining at times. I have been doing training; step by step – I am the hand to hold...

One mentor noted that a club he had worked with had begun to work with another club they knew. The mentoring impact was being felt beyond the club he was working with.

(The mentor program) produced a ripple effect, with astronomy outreach in particular.

He also talked about the big picture... why reaching more through education and public outreach is important:

Also the ties to STEM education and getting more people involved. Everyone you show the sky to is a future tax payer or contributor. Some kid you show Saturn to may some day be a senator in charge of the Appropriations Committee!

The Future of the Mentor/Mentee Relationship

In most cases the mentors made no mention to the clubs they served that the project was ending at this time. They intend to continue their relationships with the clubs they had worked with, being available when they are needed to support the use of NSN. Also, a few mentors specifically said that they told the other clubs that they can contact the NSN for assistance:

I am thinking that [any future mentoring relationship] will be informal but I will try to keep contact with them. If they are stuck on something they can come to me – I have already told them that. I sent them tutorials from Vivian. I have made myself available.

I made it clear to the clubs that if something happens and you can't get me, ASP will help you. They are very accessible.

I understood that I will keep going [doing mentoring].

With most of the clubs I never mentioned that it was a 6-month program; the idea was to contact them saying that we were with another group. The few clubs we are working with now know it's going to end but I am still available to them. And they can contact NSN and ask questions. They have my phone number and email – some added me as an honorary club member which was very sweet. I get all of their business email; have been following along that way. If I see something that is incorrect on their website [related to NSN] – I contact them (double-listing of an event; typos; etc.).

One mentor specifically mentioned that he/she did not have plans to continue the mentor relationship:

I never told [the clubs I worked with] that there was a time limit on it, that it was coming to an end. I just let them know that I was helping the NSN and I never wanted them to feel that I was employed by the NSN. I think they will move off on their own now.

Four of the five said that they would participate again in any similar mentoring opportunity that might come their way in the future:

Oh yes – definitely. Well, I really love people and especially those interested in the same thing as me. I like being able to make contact with other people in the clubs. It's more the personal part relationships with club members [that I value].

[I would do this again] in a heartbeat. The group is really good to work with – well organized; they got things mapped out for how things are supposed to work; they are good at facilitating and surveying clubs to get input and activate it. I've been working with NSN for 5 years. ... it's nice to know when you call the help desk that you know the person on the other end.

I don't know that I would want a paid position – if instead of the stipend they covered travel to go talk to clubs... that would be a reasonable investment. I think people would do it for a small stipend.

I'd definitely sign up for it... I have three more (star parties/NSN presentations) scheduled and am trying to figure out how to get reimbursed for the gas.

The one who did not want to continue reported that:

I don't think I would do it again, because I have so many other things that I am doing. At this period of my life I'm not able to do it like I was then.

Mentors commented on the kinds of skills and qualities are useful for a mentor to have:

IR: Does a mentor need to have special content knowledge? No. IR: What about leadership skills? Yes, leadership skills are important; and you have to know all the benefits of NSN... you can be a beginner but need to be the kind of person that is outgoing but not pushy. You have to present it in an excited way, someone who can put it across as "this is an exciting thing that you could have; it's all free." [It's important] to show enthusiasm.

Suggestions and Concerns about Future Mentoring Programs

One commented on the need to be persistent and hard-working to get clubs on board with NSN, and the importance of being clear about which mentors are working with which "mentee" clubs:

You have to really spend some time to find out who to contact to find the person who says yes. You don't need a lot of mentors to cover a lot of territory; you just have to work hard and be diligent. We covered each others tracks at time (it confused the club when two of us contacted the same club).

I think some of the mentors needed to get a little busier. I covered a lot of territory and tried to contact as many as I could. I think the clubs all need to be contacted to find out why they are not using it. I have an example of a club that has had it for years and they don't know what it is. One has stacks of toolkits and only one person uses it.

One mentor felt strongly that some sales background is needed, and used the "corporate office/district manager" metaphor to describe his sense of how the program could or should be structured:

You need to have a sales (management) background. They (ASP) are the corporate office and we are regional directors... holding us accountable in some way is important.

One mentor talked about how the NSN seemed to be cumbersome for some clubs, especially in terms of logging event data:

The hardest thing that I have seen; the root of issues and problems that clubs have with the NSN is the amount of ... there is usually one person in a club that will input all the info into the NSN. What I found is that most members of the club don't go to the NSN to look around or input info; most members don't want to log their hours or events. In a club trying to find one person to do it is extremely difficult. I just... in my club most people don't go on the NSN; a lot don't go on our website either. Where the NSN requires some input in order to get something out of it; what you get out of it outweighs what you put into it. Mostly I found little resistance to using NSN. I talked with about 40 clubs; most were positive. When I talked with people one-to-one they wanted to spread the word.

One mentor talked about the challenge that was presented in a situation where two mentors contacted the same club; they figured out there were two mentoring roles to play, and carefully negotiated what was needed. Consideration for these kinds of circumstances should be given in the future.

Other comments

If I was going to expand I would think about having regional [training] meetings at other conventions, or just places that are convenient.

ASP has so much to do; I think everyone should give ASP money.

NSN is perfect for any kind of a hobby group. To organize events, rosters. Emailing is easier. It simplifies the organization of any kind of club.

My hope is that they will bring in people [to ASP/NSN] who can answer questions. I still have clubs out there who are almost drowning; someone to encourage them to use the system for their own good. It's like having a Porsche and you don't know how to open the door; then once you do you can see all the features of the car. [We help them learn how to open the door.]

Appendix D:

CHARACTERISTICS OF A HEALTHY NETWORK

Characteristics of a Healthy Network¹

Inverness Research

(a work in progress)

1) A shared vision of the identity, purpose, and work of the network

- Good progress on creating a shared vision of the network amongst current members and partners
- Good progress on creating a core group of institutions to provide a nucleus for the growth of the network
- Vision for the expansion and further development of the network is emerging

2) Support for real work and concrete contributions

- Very strong start-up in terms of exhibits, forums, programs, and web material
- Design and implementation of meetings, courses, and professional development workshops
- Good start-up on prototypes, models, or pilots
- Early production and publication of research and evaluation studies, surveys, and guides

3) Internal connections and coherency

- Working groups or partnerships are increasingly well-defined and making progress
- Good cross-institutional collaborations within the working groups or partnerships
- Beginnings of cross-partnership or cross-strand collaborations and contributions
- Beginnings of larger sub-networks

4) Mechanisms for drawing upon and contributing to participating members

- Respecting the differences in institutions and their varying strengths and perspectives
- Taking advantage of natural variation to test and refine models and approaches
- Need to go beyond production and dissemination approach

5) Multiple opportunities for participation and interaction with the network

- Multiple opportunities generated for learning about the domain of the network
- A few early and illuminative examples of including new institutions and people
- Networks of existing partners invited to participate

6) Recognized and valued by the broader field

- Good progress on making broader contacts in the domain
- External perceptions of the network are positive
- Initial interest in participation and interaction

7) Development of network governance and administration

- Very good collaboration amongst core partners
- Administrative team very strong with complementary skills and perspectives
- Good ability to identify critical issues, problems, and emerging needs

¹ This framework is informed by K. Provan's work:

Provan, K., Milward, H. 2001. Do Networks Really Work? A Framework for Evaluating Public-Sector Organizational Networks. *Public Administration Review*. 61(4):414-423;

Provan, K., Veazie, M., Staten, L., Teufel-Shone. 2001. The Use of Network Analysis to Strengthen Community Partnerships. *Public Administration Review*. 65(5):603-613.