

Findings From the First Science for Monks Internship

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Reports from the Field:

Inverness Research supports the Science For Monks program through a process of “groundtruthing” where we help the program articulate its theory and intentions, and then make site visits to the field to check the congruence of theory and field realities. This report is part of a series of Reports from the Field where we ask senior researchers to write about their site visits sharing what they learn from their in-depth interviews, observations and discussions with monks and faculty. The reports are intended to maintain an informal tone and reflect the researcher’s impressions as well as the data they have gathered.

Background on this report

These findings and reflections were written by Scott Stambach, a teacher, author, and senior researcher at Inverness Research. Scott first attended a Science for Monks workshop in November of 2015 as a representative of both Inverness and the Knowles Science Teaching Initiative, a fellowship dedicated to developing promising science and math teachers across America. This report was written to make the case that Science for Monks was an effective venue for Knowles fellows to engage in meaningful, multidimensional professional development.

Background on the Science for Monks program

The Science For Monks leadership program is designed to provide Buddhist monks and nuns with an opportunity to learn science more deeply and broaden the connections between science and Buddhist philosophy. Cohorts of monks and nuns spend three years preparing themselves to be leaders for their peers and to help operate local science centers within their home monasteries. Each leadership cohort takes on different projects aimed at helping them improve their skills and capacity, through writing, developing lessons and hands-on activities, creating a community exhibition, and other outreach and research activities they as a cohort decide to take on.

Findings From the First Science for Monks Internship

Part 1: Introduction

This fall (2015) I had the opportunity to collaborate with the Science for Monks (SFM) program as a KSTF fellow and Inverness intern. Given the transformative nature of this professional development, I would like to share a few thoughts on how future collaborations with SFM might be of value to the KSTF and its fellows.

One of my many focuses during the internship was to explore the program objectively and consider its potential benefits as a professional development experience for KSTF fellows, as well as to explore the value of a dialogue between Western science educators and Eastern monks. Having spent two weeks immersed in the program, interviewing both SFM teachers and monks, and designing lessons for monastic science educators, I'm convinced that the experience is powerful and transformative on professional, intellectual, cultural, and humanitarian levels. I've outlined these benefits below as well as some potential roles that Senior and Junior Fellows could play in such a partnership. But, first I should outline the SFM program as well as the role I played during this internship.

Science for Monks was established by the office of the Dalai Lama in 2001 with the mission *to develop the leadership needed to grow and sustain science learning that engages Buddhism with science, and to disseminate the work of the monastics and their unique perspective on science and spirituality*. In its early stages, the program held workshops designed to teach physics, biology, and neuroscience content to monastics who expressed interest. Since then, the program has evolved into a more self-sustaining model by which cohorts of monks who have been trained in science are now teaching science courses at their own monasteries. In other words, science is officially becoming part of the Tibetan monastic education, which has never been done in its 1500-year-old tradition. These science leaders, who include both monks and nuns, are also organizing conferences and exhibitions with scientific themes for both monastic and lay communities. To my knowledge, scientific engagement in a monastic community on this level is unparalleled.

In the interest of building a self-sustaining program by which monks teach each other science as part of their monastic education, the workshops held by Western science educators are now focused on teaching science education methods to monastic teachers. During the two weeks I spent in the Tibetan settlement in Bylakuppe, India, I had the opportunity to observe and take part in one of these workshops. The lessons were primarily designed and delivered by two teacher educators from the Exploratorium. These were highly-trained educators who brought the best of their Western science pedagogy with them to India in two giant suitcases. Specifically, the focus of the workshop was inquiry and 5E-style lesson-planning. In addition, I taught

lessons on project-based learning and cosmology. That said, my primary role was that of a tutor/consultant. As such, I played a similar role to that of resource teachers at a summer meeting. In this capacity, I was able to get to know the monks quite well. In addition to sharing my knowledge of teaching and cosmology, I interviewed many monks and nuns in order to understand their perspective on the program.

As a result of this work, I believe that fellows working with the SFM program through designing workshops and supporting monks and nuns at their science centers would be professionally transformative for both the fellows that participate, and the monastics they work with. I have done my best to summarize these potential benefits below, as well as outline the roles that Knowles fellows could play in the program.

Part 2: The Potential Benefits of Knowles Fellows Collaborating with the Science for Monks Program

1. Collaborating with Science for Monks teachers means being immersed in a rich inquiry-based professional development workshop.

Working with the Exploratorium teacher educators who headlined the Science for Monks workshop (Tammy Cook-Endres and Zeke Kossover) was one of the important professional development activities I've experienced as a Knowles fellow. They brought highly-tested Exploratorium inquiry activities for the purpose of teaching both content and pedagogy. This meant that I was able to directly observe complete and authentic inquiry-based lessons delivered in their entirety. In other words, all the important pedagogical steps were presented and clearly articulated.

I've long felt that as well-intentioned as conferences are, they often have an authenticity problem. After attending sessions on inquiry or other educational approaches to science instruction I feel inspired, but ultimately lack a clear vision for how to pull it off in the classroom. This is a concern that seems to be shared by many of my teacher peers. I think that it is extremely hard to have the vision and confidence to pull off any kind of instruction where students build their own understanding in complex ways *without observing skillful practitioners in the moment working through complete lessons*. Workshops tend to do a bit better since the instructors often model their methods while teaching the content of the workshop. But even these suffer a lack of authenticity because the audience is educators who know too much for the experience to truly be authentic (i.e. teachers don't really ever behave like true students). Moreover, it's impossible to really observe the dynamics of a new teaching method objectively when you are embedded in the experience.

While watching the instructors at Science for Monks it occurred to me that I was watching skilled inquiry practitioners do their thing authentically for the first time: i.e.

reacting to student thinking in real time, pacing, attending to student misconceptions, reacting and adjusting based on the needs of the room. For the first time, I came away with a clear vision of what a truly polished inquiry approach can look like in a classroom.

2. The Science for Monks program helps fellows grow by requiring them to think deeply about how to teach novice (monastic) teachers how to teach science.

After teaching for the first time as a graduate student, I remember feeling like I had finally understood physics for the first time. And this is despite having already earned my degree and taking Masters level coursework. There was something about thinking through how I'd explain basic concepts that forced me to move to a deeper level than when I studied for exams. I hadn't felt this way again until these two weeks in India in which I spent time thinking about how I'd teach monastics *how* to teach science.

It is hard to convey how much I've learned as a result of being forced to think through what I do (and often realizing what I *don't* do enough of) in order to help others understand what is essential and important in the practice of teaching science. For this reason, this experience has been a very important step in my professional career. Even now as I write this, I feel excited to go back into my classroom and fine-tune my practice based on what I've learned simply from thinking about how to teach monks.

3. Tibetan Monks make ideal students to test out new lessons and pedagogy.

Teaching lessons to monks is like removing friction and air resistance in order to solve fundamental physics problems. Monks are a unique audience in that they are intelligent and extremely analytical and yet come into the classroom with almost no formal science instruction, much like high school students do. And what they do come in with is often a series of deeply held misconceptions, also much like our own students. Most of what Tibetan monks know of physics and cosmology comes from a Buddhist text called the Abhidharma, which teaches that the universe is a mountain named Muru surrounded by seas and islands, so you can imagine how basic and misconceived their science understanding can be.

So this means that all the key challenges of building knowledge in another human being are present because the monks are so new to science learning. And at the same time the auxiliary challenges of education like low-engagement, issues of belonging, struggles at home, and immaturity aren't present. Teaching monks is like having a testing ground for mastering the strict pedagogy of a lesson without having to worry about the other challenges that disrupt learning. It gives us a vision of what the ideal lesson could look like, so that we can then reflect and build on it to meet the more challenging needs that arise in a high school classroom.

4. Science for monks reminds us that the purposes of education go beyond teaching content and require a solemn consideration of scientific ethics.

The Dalai Lama encourages the science education in monasteries for two vital reasons. First, he realizes that it would be difficult for monastics to become agents in improving the world if they were not literate in science. Second, he feels that Western science could grow through exposure Tibetan values like altruism and compassionate service. In a world filled with worries about climate change, genetic modification of life, cloning, artificial intelligence, technological isolation, and what seems to be a growing pathological dependence on the internet, the Dalai Lama saw a chance to bring a spirit of ethics and service to the pursuit of science.

All of this illustrates the spirit with which the monastics in the Science for Monks program approach learning. These monks are here to learn science *in order to serve humanity*. And when we work closely with and educate these monks, that spirit and intention becomes infused in our own practices. Their environment and world constantly remind us that our purpose is bigger than teaching quadratic functions and chemical reactions—we are also training the generation who will take care of our species and planet.

5. The Science for Monks program is unique in that it is a *service-based* professional development experience.

Science for Monks is a relatively young program aiming to introduce Western science into a millennia-long tradition that was formerly purely meditative and philosophical. It aims to train monks to teach other monks science in order to integrate Western scientific thought into its system, and then use that knowledge to become a relevant voice in serving the planet. The idea that Knowles fellows might play a part in shaping this tradition I find pretty extraordinary. Currently, the Tibetan diaspora is working hard to maintain their cultural identity and heritage, while at the same time attempting to modernize and stay relevant in a globalized world. Knowles fellows would be taking their expertise, drive, and heart and share it with a culture that has suffered greatly over the 20th century. This is a truly unique and meaningful opportunity. And something you simply cannot get at a traditional conference or workshop.

6. Despite being an international cultural immersion experience, the Science for Monks internship is not prohibitively expensive.

In fact, it's not much more costly than a typical conference or workshop, and in some cases may even be less expensive. Once a KSTF fellow arrives in the Tibetan settlement, there are no further expenses. The guesthouse is free, as are the three meals they serve each day. Transportation from the airport/hotel to the settlement is also covered by the program. This leaves only the flight and, potentially, vaccinations as expenses. An average round trip flight from the United States to India is around \$1,500. And most

health insurance policies offer subsidized access to travel doctors and/or travel clinics to provide travel vaccines. Even if a fellow wants to take a rickshaw into town to explore, these rides convert to roughly a dollar. Many fellows might want to spend a night in a hotel (as I did) before the ride to the settlement, in order to rest and acclimate to the new environment. At most, this will cost \$100 even for the higher end Indian hotels. Therefore, a KSTF fellow would be able to participate in a Science for Monks professional development for approximately \$1600.

Additional thoughts

1. **The Science for Monks Program adds public relations value to KSTF:** I don't know much about the public image and branding for foundations, but it seems there would be a benefit to collaborating with an organization who is philanthropically involved in the act of teaching science to Tibetan monks and nuns, many of whom are refugees.
2. **Working with the Science for Monks program establishes a KSTF presence in the international education world:** Again I'm not sure how this may play out in the goals and vision of the organization, but this collaboration would definitely expand its influence and connections internationally.

Part 3: Potential roles for KSTF fellows in the Science for Monks program.

There are several important ways for KSTF fellows to contribute to the program through their professional development grants. Below I've shared some ideas that came out of conversations with the leaders of the monastic science centers and SFM coordinator Bryce Johnson.

1. Fellows could pair up with a master teacher (like I did with Tammy and Zeke from the Exploratorium) and design/implement 2-week workshops for monks. These workshops would fall into two possible categories:
 - A. Workshops for monks with little or no science background. In this case, the workshops would focus specifically on building content knowledge.
 - B. Workshops for monks who are already teachers for their monastic centers. These workshops would focus on teaching effective science pedagogy while also teaching content. In other words, the master teacher/fellows would conduct content-based lessons while being explicit about the methods they're using so that the monastics can then use those methods in their own setting.

2. Junior fellows could pair up with senior fellows to design 2-week teacher workshops for monks. These workshops would again fall into the same two categories mentioned above.
3. Senior or junior science fellows could pair up with monastic teachers at their centers to design and execute lessons for the monks at their centers. This is an especially important opportunity especially since the monastic science teachers have expressed a need for support. Sending Knowles fellows to collaborate would be both an amazing professional development and cultural experience for a fellow, while providing much needed support to the monks on the ground.
4. Senior or junior science fellows could develop and plan 2-week workshops for lay Tibetan teachers who are employed by the monasteries to teach the monks. One common concern amongst the teacher leaders at the monastic science centers is that the lay teachers are not always adequately prepared for the challenge.
5. There was a commonly expressed need in the monastic centers for a stronger foundation in math education, since it is so foundational for advancing content in most of the scientific disciplines. KSTF math fellows could also play a role in the Science for Monks programs by leading math workshops for monks, or teaching math education methods to lay and monastic teachers.