



*REPORTS FROM THE FIELD*



**SCIENCE FOR MONKS**

Science For Monks and Nuns

Bhutan Leadership Workshop  
Field Report

Fall 2019

*Scott Stambach*



## 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***

*This document was written by Scott Stambach, a teacher, author, and senior researcher at Inverness Research. It chronicles a two-week Science for Monks and Nuns Leadership Institute Workshop in Paro, Bhutan. The workshop, which took place in July of 2019, provided an introductory chemistry, neuroscience, and leadership education to the participating monastics, while also sparking cross-cultural dialogues on an array of topics, including the role of Buddhism in the modern world, how to cultivate intellectual humility in science, and the value of culture in rapidly developing societies.*

### ***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.

**Science for Monks and Nuns**  
Bhutan Leadership Workshop  
July 15-29, 2019

**I. Bhutan as a Strategic Opportunity to Connect Buddhist Monastics with Science.**

Recreating the magic and complexity of Bhutan is delicate work. This is especially true at a moment in history when Bhutan is a living example of impermanence—outgrowing its isolated past and trekking into a new and uncertain future. I spent many moments throughout this workshop thinking about the words that could bring Bhutan to life in a faithful way. It could be that there aren't many places left on the planet with which to compare Bhutan. Or perhaps there is something so compelling about this idyllic Himalayan kingdom that insists you get its story right.

So maybe it makes the most sense to start with the words of someone who spent his life living and breathing the spirit of Bhutan. Lama Ngodup, the happy-go-lucky director of the philanthropic *Ati Foundation* and organizer of the workshop, described his country this way:

“Bhutan is a small nation of 700,000 people trying to find a seat in the world while sitting in the mountains between four much larger countries. China to the north has over a billion people. India to the south has over a billion as well. Nepal to the West and Bangladesh to the south with millions of their own. We do not have a powerful economy or missiles. And yet we have found a voice in the world and maintained our values and independence for centuries in spite of our size. How is this possible?”

I resonate with this quote because it deftly introduces the audacious determination that one cannot help but admire about Bhutan. This report reflects this bold spirit—especially as it manifests in the visions of the monastic participants in this workshop.

As I mentioned, Bhutan's otherworldliness is not easy to convey. But if you were to close your eyes and imagine a verdant Irish plain with mountains thrust up through the ground, coated with Himalayan birch trees, conifers, and dense ferns, all decorated with Spanish moss like prehistoric garland you would be getting close. Add in the constantly evolving clouds and mists that twist through these mountains and the picture of Bhutan gets a bit more faithful.

Another way to picture this corner of the world might be to imagine traveling a millennium back in time to witness the planet when the line between civilization and nature was not so stark. A perfect example of this modern-day time warp is the city of Punakha, Bhutan's former capital. This ethereal city is composed of a giant majestic Dzong,<sup>1</sup> sitting at the convergence of two rivers, surrounded by a sparse collection of farms and dwellings. The first time I saw

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<sup>1</sup> A city fortress that is part administrative center and part monastic accommodation.

Punakha, I couldn't help but wonder if this is what a medieval city like Budapest looked like when it was just a blossoming river settlement.

Another feature one cannot help but notice is the inextricable way that Buddhism is woven into daily life. Bhutan's hills are adorned with monasteries and small temples. There are alters in almost every home, shop, and office. One quickly gets the sense that Buddhism is a pervasive and inseparable part of the life and identity of this small country. This along with the rich culture, wisdom, and traditions that permeate Bhutanese life, might be the answer to Lama Nodup's question of how Bhutan found an audible voice in the world despite her size.

One needn't search long for evidence of Bhutan's cultural impact on the world stage. Bhutan's constitutional monarchy has gained international attention for conceiving of Gross National Happiness (GNH) as a standard of measure for development and national well-being. One could think of Gross National Happiness as Bhutan's way of codifying its traditional Buddhist values into the fabric of its government. The GNH metric for development has become so appealing to a modern world saturated with economic indicators of growth that it has been borrowed and integrated in varying degrees by many nations and municipalities throughout the world, including British Columbia; Seattle, Washington; Thailand; the United Kingdom; United Arab Emirates; and municipalities like Somerville, Massachusetts.

Bhutan's growing recognition as a nation with a rich culture and new ideas to offer the planet does not mean its own path to development has been easy. The incredible pace of modernization and global influence means that even this small idyllic kingdom faces its share of complex challenges. Like most countries undergoing dramatic growth in an increasingly global world, Bhutan must thread the needle of moving along with the irreversible forces of modernity, while still recognizing itself when it comes out on the other side.

But this moment in Bhutan's history also makes it a fertile landscape for the cultural, scientific, and philosophical exchanges that grow out of monastic science education. This landscape offers a strategic opportunity to cultivate fruitful dialogues between Buddhist monastics and Science for Monks and Nuns (SFMN) community of western educators. In turn, these conversations can inspire and build bridges between the Bhutan's monastics, who hold the keys to Bhutan's ancient traditions, and the new generation of Bhutanese youth, who are evolving within the context Bhutan's movement into the modern world.

These opportunities are explored in detail by the monastics interviewed in this report. The monks and nuns (and faculty) articulate a strong interest in exploring the interface between science and Buddhism and want to forge these connections in a way that can also help address practical and pressing issues in their community. As we shall see from these conversations, there are many reasons to believe that investing in monastic science education in Bhutan has the power to advance an understanding of the connections between science and religion, spark fruitful cross-cultural dialogue, and inspire intellectual humility in western science.

Before moving on, there is one more quote by Lama Ngodup, which cuts to the heart of the aspirations and challenges of Bhutan at this moment in its history. Perhaps it is worth reading and holding lightly as we go on to describe the course and share the insights and vision of the monks, nuns, and faculty who participated in this workshop.

“When you have a society that is rich, preservation of one’s culture is essential. At the same time we can’t get too orthodox or we get closed in. This is even more challenging with a small country, because a smaller country can be easily influenced...And as much as Buddhism is sublime and profound, we also can’t let it drop down to a level where it is required. Buddhism can become a phony religion if it’s not taught properly to the young generation. So how do we develop while preserving our identity? Rushing into anything without taking precautions is very risky. And I’m not even sure what development means sometimes. If development is something for the good of the people, to give mental peace, are we getting that from having a good road, a metro system, or more big businesses? Or is it making us run fast forward to catch up with the world. In which case some will never get to that speed and they will be left behind. And when that happens there is so much stress and frustration, and then the depression comes. Sometimes I have more questions than answers.”

## **II. The Anatomy of the Leadership Workshop**

The SFMN Leadership Workshop in Bhutan (July 15-29, 2019) was the first meeting in a proposed three-part series.<sup>2</sup> This cohort included 35 participants (34 monks and 1 nun) and is especially noteworthy because the majority of the participants are already serving as leaders in a national program instituted by the king, in which fifty monks were assigned to different government schools to serve as youth mentors and philosophy, language, and life skill teachers. The king’s goal for the program is to explore methods for preserving Bhutanese identity, traditions, and wisdom while also building important bridges between the Central Monastic Body<sup>3</sup> and Bhutanese youth.

The fact that nearly all the participants are already engaged in leadership positions working with and serving youth has powerful implications for this leadership series. We polled the monastics to determine the number of students they reach each year and the results totaled nearly 30,000, which is a meaningful percentage Bhutan’s adolescent population. What’s more, these teachers serve in 18 of the 20 national districts in Bhutan, indicating a broad national reach both numerically and geographically. All of this points to a particularly significant impact potential for this cohort.

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<sup>2</sup> Three previous SFMN workshops were organized in Bhutan, but not as part of a leadership institute.

<sup>3</sup> The Central Monastic Body (or Zhung Dratshang) is a government religious organization of monastics across Bhutan that accounts for approximately half of Bhutan’s monks and nuns.

This workshop highlighted three content areas. The first half focused on foundational chemistry, taught by Sophia Oller, a high school chemistry teacher from San Diego, CA. The chemistry component was designed to build a scientific framework for the monastics, beginning with atoms and molecules, and working up to an introduction to reactions, proteins, and cells, all of which was necessary background for grasping the subsequent neuroscience lessons. The mode of instruction for this component was brief translated lessons, reinforced by hands-on inquiry activities, including building a household battery powerful enough to light multi-colored LEDs, science theater to act out the interactions between neurotransmitters and receptors, and capturing the carbon dioxide released in biological reactions inside of water balloons.

Once the foundational chemistry was introduced, David Presti from the University of California, Berkeley began teaching the neuroscience component of the workshop. This content explored the basic structure and function of the brain, the science of the senses, the effects of drugs on the brain, and a deeper dive into the functions of neurons and neurotransmitters. David's lessons were reinforced with hands-on inquiry activities like constructing "brain caps" showing the regions of the brain, eating magic berries to explore the experience of taste and perception, and calculating the speed of neural transmission through a human daisy chain.

The last session of each day was dedicated to leadership training led by SFMN director Bryce Johnson. In these sessions, the monastics explored the qualities of great leaders, laid the foundation for what it means to be a leader, explored how the role of a leader can be much broader than most people believe, and designed short Buddhist lessons, which they eventually taught to their science teachers.

As a powerful supplement to the science content, Berkeley psychiatrist Kristine Panik led two sessions on mental health education that were exceptionally well received. Following the lessons, the monastics asked Kristine a series of questions about how western mental health fit into their own traditional beliefs and how it might be applied in their monasteries and communities. The enthusiasm and interest in these brief sessions definitely suggests that it might be worth considering including some form of mental health education in future SFMN workshops.

### III. Research and Methodologies

While our investigation of the SFMN Leadership Workshop was carried out with a spirit of openness and curiosity, there were a few important questions that we used as guides of inquiry when we spoke with the participants of the workshop.

At a foundational level, it was important for us to really get to know this cohort of Bhutanese monastics. What was important to them? Were they already involved in some form of public service? If so, what was that service? Did they work with Bhutanese youth? What did they see as Bhutan's pressing needs? How did they see themselves serving their communities in the future? What did they hope to take away from a workshop like this, and how could we help them fulfill their visions for service?

We also wanted to get a clearer sense of the advantages of investing in monastic science education within a small country like Bhutan. Was it possible to use Bhutan's size to leverage more influence? What were the benefits of working closely with leaders like Lama Ngodup who had established relationships with influential decision-makers in the government? Could we scale successful projects in Bhutan to other places in the world like Nepal, and beyond India?

We were also curious about why these monks and nuns themselves felt it was important to learn science. How did they see this work fitting into their broader vision for service and leadership in their country? Did they believe science had the power to help bridge the generational divide? What role could science play in helping Bhutan preserve her history and traditions as she moved into the 21st century?

Lastly, it was essential for us to understand what the monastics thought the west could learn from Buddhism. Did they feel that the modern world had something to gain from their ancient wisdom, traditions, and way of life? Did they see our scientific worldview lacking in some meaningful way? How could the western worldview grow from a dialogue between science and spirituality?

Given this focus, I labored to explore these questions through a diverse set of lenses. I conducted seventeen 30-60 minute interviews with monastic workshop participants. The selection of interviewees arose from a combination of requesting volunteers, seeking students who appeared more assertive and open to sharing their thoughts and ideas, and a few random selections to ensure a good cross-section of the group.

In addition to my conversations with monks and nuns, I also interviewed most of the workshop's affiliates, including workshop organizer Lama Ngodup, both of the English-Dzongkha translators, all three of the western science teachers, a Bhutanese tourist guide, and one of Bhutan's senior most government officials, the Minister of Home and Cultural Affairs. I also had many informal conversations with a broad cross section of monastics, Bhutanese lay people, and Bhutanese youth, all of which resulted in a nuanced and multi-faceted picture of the immediate and potential impact of this work.

Lastly, I also interviewed the western faculty who designed the workshop in order to get their perspectives on the value of an East-West dialogue in Bhutan, what science can learn from Buddhist values, and what the overall value of monastic science education in a Buddhist country like Bhutan.

#### **IV. Classroom Observations**

The most essential voices in this story are the monastics whose aspirations and leadership potential are the focus of this work. But before turning to their impressions and ideas, it is necessary to share some observations of the classroom in order to portray the powerful atmosphere and energy that the monks, nuns, and teachers created.

First, it is vital to relate the visible delight the monks and nuns radiated as they explored the natural world. Occasionally, I would watch the videos of the lessons with the sound turned off just to see if the delight still came through. Inevitably it did—the monastics were clearly thoroughly enjoying the process of learning science. Several tell-tale signs permeated the lessons. My favorite was the synchronous deep-bellied “Wowwww!” that filled the room whenever the monks witnessed the denouement of one of their experiments. Another giveaway was the appreciation that the monastics showered on the instructors both inside and outside the classroom. This gratitude reached a crescendo when the workshop came to an end. I watched the same monks return to the same teachers over and over again to give thanks and ask for one more picture with them.

It is also important to convey the way the monastics used their experimental instincts to innovate and explore. In a very real way, they behaved like natural scientists. Whenever a group completed the instructions for an activity, they pushed it farther, started designing new experiments, and tweaked their experimental variables. For example, the monks created batteries from copper pennies, zinc washers, and vinegar, and then used these batteries to light multi-colored LEDs. Within seconds of experiencing the awe of the first illuminated LED, they started experimenting with bigger batteries, invented new methods for maximizing the voltage output, and built encasements to stabilize their new unwieldy designs. On another occasion, one of the teachers realized she forgot to bring a funnel and quickly improvised by fashioning one from paper, only to discover that half the groups had already built their own funnels by the time she got back to the group.

But perhaps the most meaningful classroom observation was the genuine empowerment that arose in the monastics as they experienced their first glimpses of scientific literacy. We watched as the shyest monastics started teaching each other new concepts, predicted new phenomena, and engaged in debates over why an experimental result was happening. We watched them ask a never-ending stream of questions as they attempted to probe deeper into what they were learning and synthesize it into their Buddhist understanding of the world and personal lives.



Together these observations tell an important part of this story: *Independent of the potential for leadership and service that this work might bring, there is something about monastic science education that in and of itself adds meaning and value to the lives of these monks and nuns.*

## **V. Research Findings**

In this section, I present the discoveries from our interviews with the monastic participants and the western faculty in two subsequent parts. One of the more revealing takeaways of this section is that the responses of both groups largely reinforce the ideas shared by the other, creating a rich and mutually supportive set of findings.

### **Part A. Monastic Findings**

After transcribing the monastic conversations and sorting through the emerging themes, it became clear that it would be helpful to organize the major discoveries around the questions that guided the investigation. In this spirit, each guiding question(s) is followed by the major findings uncovered from the respective responses. Then each finding is supported with a collection of quotes taken from the interviews. These conversations resulted in such a rich collection of responses that the voices speak for themselves.

#### **How do you personally see yourself serving Bhutan as a leader? If you had money and extra time, what project would you do to make Bhutan (or the world) a better place?**

*Finding 1. This monastic community sees a great opportunity to serve by connecting with the younger generation, sharing their Buddhist teachings, and preserving Bhutanese traditions in a rapidly changing world.*

"I consider the youth to be the future generation who will run the country and continue the practice of our traditional values. This is our responsibility to teach them. If we don't boost the younger generation we could lose the future of Bhutan. This is why we have to put our feet down and build the next generation, otherwise we will continue to go down. This is true of all nations."

"There are other [lay] teachers teaching values too, who are proficient in teaching strategies, and have a western education. They will say that drugs are not good many, many times but the students do not really receive it from them. It is not as powerful as when we say it. There is still some trust between the youth and the monks. I think we are helping them and building this trust."

"To solve these challenges we need to get to the grassroots. These teachers are grassroots actors who are going directly to our youth. This is our hope for Bhutan. If things get really good at the grassroots level then there is hope."

“It is very important to have camps and teaching sessions that will bring people together to teach lessons that have its origin in Buddha dharma. We can also use social media like WeChat. I have a group where they ask a lot of questions about the Buddha and daily life. Social media is a platform to spread those values.”

“We have to strategize how we offer Buddhist values to our students. The youth have a lot of doubts about faith. We need to convey knowledge in a way that they can receive it.”

*Finding 2. The monastics want to serve as agents of change for mental health, environmental preservation, and other concerns that have arisen as a result of rapid development.*

“I often talk about suicide and the importance of a human life, and how difficult it is to have a human birth, how many causes and conditions need to be just right. There are so many difficulties that need to be overcome to get a human birth. Transmitting this information to students is helpful. And sharing how few human beings there are compared to the rest of life. It is like a speck of dirt in your nail. I would like to present this information to the youth.”

“In my monastery some of my friends already have depression. So I would like to learn some methods for how to help them with their depression.”

“If I was assigned a position to help my nation, I have been thinking from a very young age about how to manage waste, how to reuse waste in a proper way like reusing cushions. I would also like to address how to deal with preservation of forest. I would take care of ecology and teach students this education of ecology and preservation.”

“There are certain environmental issues. Because of industrial development and because of solutions from industries there are things like global warming and air pollution. This is a threat. There is also a degradation of biodiversity, cutting down trees, shortage of waters. All of these are problems that I see.”

*Finding 3. There is a variety of projects that monastics would be excited to engage in if they had the time and money to carry them out successfully.*

“If I had the time and money I would do something similar to what we are doing here. I would run my own science workshops. But with monk teachers. There could also be some kind of school system set up where Buddhism and Science can be taught together, comparing and contrasting them.”

“When I was studying at a young age we had a monastery in my village that was destroyed by a fire. If I had the money I would love to complete my studies and rebuild that monastery and build a meditation retreat. That is how I would like to contribute to others.”

“If I had a pocket of money I would love to buy religious items and volumes and offering it to monasteries who are maybe falling behind to give support. They could be used by the young monks.”

“If I was the king, my main project would be education. Right now many of our parents did not experience education like this generation. So they are not getting the importance of education from their parents and they are not really getting the importance from the teachers either. So I would work to educate parents and teachers and students so that we can transmit our values to the next generation. This work that we are doing in workshops like this can be very helpful in this regard.”

**Why is it important for the monks and nuns of Bhutan to learn science? How can learning science help you to contribute in the ways that you have mentioned?**

*Finding 1. Science is a powerful tool for building bridges between the monastic and modern communities. This is because science education creates entry points into the educational world of youth while also challenging the perception that monastic education is antiquated.*

“Learning science will bring a completely new dimension. For example look at the current situation. When we see lamas and monks we just see their traditions. Especially for lay people, whatever a lama or monk says, it feels purely religious. They might listen out of faith, out of respect, but they don’t really believe. But if the monks are equipped with scientific knowledge and values, they can teach Buddhist values through these concepts and connect better with the younger generation. This can change the perspective of the monastic community.”

“The youth study science, biology, and chemistry, so if I study science and biology then I can try to explain Buddhist philosophy with chemistry and biology. It is actually very related to Buddhism. Not necessarily *similar* to Buddhism but related. I can explain philosophy through these science teaching methods. It will be a great benefit to us and to students too. Because nowadays young students are very confused about Buddhism.”

“I have been studying Buddhist philosophy for the last thirty years. But now that I have been studying science I can contribute and explain what I have learned in a practical way to my students.”

“Bhutan is an example to the rest of the world in terms of its development process we are engaging in: Gross National Happiness. We already have those positive development goals as a national policy, but if we add to this science, then it is like two hands working together to contribute to Bhutan’s future.”

“When we have these kinds of skills and knowledge and science background people start believing in you and trust you because you can help in many new ways and so it can be an effective tool to serve the community.”

*Finding 2. The questions asked by the monks/nuns in the workshop question box demonstrate that they have a desire to advance the interface of science and spirituality in a range of domains. They express a huge range of interest in topics, from the nature of life to the formation of the universe. They are inquisitive and excited by many topics, especially those that deal with questions connecting science with consciousness and human experience.*

**The following is a selection of monastic questions that highlight these interests:**

“The smell from a Juniper tree - is it just a perception of the people or is there really smell in the tree itself?”

“From Buddhist perspective - every single thing is the combination of four elements. Does science agree with that?”

“Is mental illness a feeling?”

“In science, where does the feeling come from when one is sleeping and when we are having a clear awareness?”

“Could you explain the difference between brain and mind?”

“Do bones have feelings?”

“How do we know photon exists? Did anyone see a photon making seven trips around the earth in one second?”

“Tell me if there are [scientific] tools to see if we can produce peace and end suffering.”

“What do scientists think when religions look like enemy to science? What is the best solution to solve this?”

“Does science believe that the mind can see?”

*Finding 3. Learning science through a progressive, hands-on and practical approach models for monastics how to teach Buddhist philosophy in new and engaging ways.*

“This program is very helpful to the monks. Many of the things we teach are at the theoretical level. We have these things explained but it is not at the practical level. What science provides us is the practicality, the functional level, how we bring things into

practice. I think science can very much supplement the Buddhist perspective. If science is blended with Buddhist ideas, I think it is going to change the whole world. I really believe that.”

“There are differences between traditional teaching and what Science for Monks and Nuns is teaching. This instruction is very important student-centered teaching. This is very very important because the students will not fall asleep. Traditionally there is only lecture and that doesn’t much help.”

“When it comes to teaching the youth it will be an advantage to teach monks and nuns science. In Buddhism it is more or less play of the mind, you contemplate things. But in science you can say something definitive. It is decisive. In Buddhism we might all be drawing a different mental picture. But in science it is one clear answer.”

“The Buddhist teaching style is the master sitting on the throne and teaching to his disciples. This teaching style also needs to change. So learning these new methods will teach us new ways to transmit our own teachings. One example is keeping a question box. In the monasteries there are some shy kids who would not even dare ask a question. So keeping a question box is helpful. This is something we can take back to our monasteries.”

*Finding 4. Learning science helps monastics better understand the principles that govern the process and evolution of their environment and allows them to be stewards of the planet and educators or communicators about the value of nature.*

“It is very important because Bhutan is currently in the process of development. We are growing in terms of human capacity and infrastructure development. So learning science will help us make better choices. We will no longer choose something that is harmful for our environment. So learning science will impact our health, and our environment, and many other things. It will help us understand the content of things, like what is in our mineral water for example.”

“If you consider all the matter in the environment around us, science is important to determine what is good and bad for the environment, what materials make up one thing or another thing. That science knowledge can help. It is important to provide this knowledge to my students.”

“I think science education will really help because once there is a foundation of science it helps us see Buddhist philosophy more clearly. So if one can use science to learn interdependence more deeply then we see how interdependent we are in with the environment. For example that there is this exchange of oxygen and carbon dioxide between plants and humans that makes us depend on each other. Who wants to hurt the environment when you understand how interdependent you are?”

*Finding 5. Science and Buddhism go hand-in-hand since they are both paths to truth. Learning science actually strengthens and reinforces the Buddhist practices of the monastics.*

“Everything around us is made of small tiny things called atoms. This idea of gathering small tiny things together to build a big things is very much a Buddhist practice. This is interdependence. Through science we obtain a greater understanding of these Buddhist practices.”

“There is an importance in the connection between science and Buddhism. It helps students see things as they really are. It was kind of fun for me to study science.”

“Like milk and sugar to coffee, science brings taste to Buddhism. And it improves our teaching skills. And makes us better teachers for the next generation.”

“In Buddhism, there is also science. They both have medical studies, carpenters, architects, and many other livelihoods, so it is complimentary.”

*Finding 6. Science training provides a holistic education to monastics. By blending science with a Buddhist education there is a teaching of “the whole monk” so to speak. It satisfies an element of their education that has been missing and is empowering.*

“This kind of training gives a platform for the participant to get exposed to all sorts of things, leadership training, sharing discussion. A platform to learn, relearn, unlearn. It’s not only a philosophy, but it’s also hands on. It is the holistic development of the person.”

“I missed this experience to learn these things from an early age, these hands-on experiences, but at least now I can learn them and transfer them to my students.”

“Whatever we do we should have that holistic view. If we hold onto that holistic view we can address problems in a holistic way and understand ourselves in a holistic way. A holistic person has a grand view.”

“It really helps because in Buddhism there is less practical aspect and more theory. Science is practical, hands on. So this will help us understand the Dharma. It is also convenient to explain Dharma to students through these practical aspects. Science will help me build my skills into a development of a whole person and as a result I can be a good leader.”

**Why is Bhutan an exciting, valuable, and productive place for monastics to connect with science? What advantages does Bhutan have for the success and productivity of workshops like these?**

*Finding 1: The modest size, political independence, and unity of vision of Bhutan means that investments in education have the power to transform the country. It also means that meaningful change is possible to come with broad political support.*

“The advantage of this program being held in Bhutan is that we are a small country and small community. So we can make a greater impact on society quickly. We also have a very intact and preserved culture and tradition. And since Bhutan is independent there is easy access to change. In India and Nepal there is also an ability to make an impact but not like in Bhutan. It is more complicated in those countries. There is a lot more going on there.”

“Here, in Bhutan, we are talking about an independent country. We can set rules that work in the best interest of the country. We are fortunate that we are not a protectorate inside of someone else’s country like the Tibetan community in India. Here, if an idea is good for the country, you can do it. We are not quite as constrained by government or bureaucracy.”

“We all take pride in preserving our culture. And if we have access to a scientific culture we can do that even better. The motivation and intention are already here to maintain our culture. So this work is an enhancement of an intention that is already there. Here, change has the potential to happen quicker, especially with the monks already being teachers in the government schools.”

“In other countries you donate money and the population is so huge you may never actually see that money. In Bhutan you can ensure that every dollar is seen and valued by real people. It also means that it takes less money to have a bigger impact.”

“Here in Bhutan we are in a small place where if something is working right, you can expand it and grow it to other areas of the population.”

“The difference between the neighboring countries and Bhutan is that Buddhism is still prevalent in our country. We also have this constitutional monarchy and our ecology is still intact. Because of these things it is a peaceful and convenient place to work from any angle you look at.”

*Finding 2: Bhutan has grown to become an integral part of the world, so investing in Bhutan means investing in the betterment of the world.*

“I feel Bhutan is not isolated, Bhutan is a part of the world. Whatever contribution is given to Bhutan is a contribution to the world. They are funding the betterment of the

world by funding a program like this. I don't know if this is true or not but many countries seem to look up to Bhutan in terms of ecology and gross national happiness goals. We feel proud at times but there are also challenges."

"Buddhist practices are about benefiting all of life. The role of Buddhists is always to help. So this kind of workshop is a tool to help all sentient beings, to help the environment, to help animals. These workshops give us the tools to be better Buddhists, to serve not only for Bhutan but all sentient beings and I can transfer all these tools to the upcoming generation."

**What challenges and barriers make it difficult to implement your vision for leadership and service? Can you think of anything SFMN can provide to help overcome these challenges?**

*Finding 1. Lack of time and education are barriers to implementing leadership projects.*

"The biggest challenge is time. Also since I never went to public school to study science, English that is another challenge. In order to achieve my vision I need also need to understand the western perspective. This is a challenge."

"One challenge is a lack of literacy. In order to communicate and pass the message this is a basic foundation. If we had basic literacy skills, reading and writing skills, it would easier to communicate."

"Monastery has their own way of doing things. Our monastery is designed to help community from the perspective of ritual especially. So these services are already there. But time can also be a barrier because monks need to do their own studies so they may not be able to break away to help in the way they might want to. But the good news is that these studies are only for about ten years. So after a certain point they can be of service to their community."

*Finding 2. Access to high quality teachers and resources is also a limiting factor.*

"I would like to start my own science and Buddhism workshop but finding good teachers would be the biggest challenge. And there would be a need for someone who knows both sides of the world very well. Both about science and Buddhism."

"I have a school. It is a government certified school. It is a rather new school and I do all the administrative management by myself. I put things into place. If I had more money and time I would streamline the administrative processes and get better teachers. And in order to have good teachers we need to be able to pay them."

"High-quality teachers are very necessary because the best curriculum in the world is nothing without a high-quality teacher. So the role of good teachers to bring curriculum to life is very necessary. In Bhutan, teachers learn a survey of general ideas, and when



you go into a teaching profession you are trained in your specialization. But I'm not sure if this helps because I think there needs to be improvements in this education. Sometimes it is not as deep as it could be."

**What can scientists learn from Buddhism? Have you noticed any needs in western culture? How can Bhutan's traditions and wisdom provide guidance in our modern world?**

*Finding 1. Despite the stunning and rapid advances in science, the modern world continues to be unhappy and disconnected.*

"I read about billionaires with huge amount of money and still they are unhappy. Of course we need a certain amount of money, but how much do we need? Buddhism can help answer some of these questions."

"In terms of all those substances and physical developments, sciences will always be more than Buddhism. Buddhism will never be able to contribute to those things. But in Buddhism there is a focus on contemplation and looking inside. This is where real happiness comes. So if science picks up just a little of this "looking inside" it could benefit them."

"One thing the scientific world can learn more about is mind. That is the missing part. If you want to travel from Paro to Thimphu you can do it in a few hours. This is amazing but what is missing is the peace of mind over that journey. This aspect of the dharma world is missing."

"If Buddhists collaborate with scientists and there is a scientist with a Buddhist mind then the destructions would go down and science would be used in a more beneficial way to the world."

*Finding 2. The west can learn a lot from Bhutan about the value of community and connection.*

"I think for instance if you go to a western country even if you are a next-door neighbor you don't actually get to talk and you don't get that sense of culture. But here in Bhutan we share things and are concerned about each other and take care of each other. Our culture is often more connected. Especially if someone dies, so many people will come and help, even financially. Hundreds of people. That kind of culture in a busy world like the western world can be very helpful."

"If we particularly go to rural Bhutan the social bonding is very good. In a traditional way, Bhutan is designed to support each other. There is a tradition where people help each other to do agriculture and construction and cultural events and festivals that are conducted in the villages. Especially if the someone in the village is sick or if someone dies then everyone in the villages comes together to offer financial and physical support. I'm not sure if the west can learn something from this because the west is

often driven by individualism. It would be very helpful if the west could learn something about this in Bhutan.”

**What challenges does Bhutan face? How can you use science education and Buddhism together to help address practical and pressing issues in your communities?**

*Finding 1. Monastics are concerned that the flood of new ideas and external influences that come with modernization puts Bhutan at risk of losing touch with her traditions, values, and national identity.*

“There are two challenges here. One is the decline of culture and tradition. Not all is lost but at the moment the cultural is in decline. The youths are not taking any further interest in culture.”

“Because of the development of Bhutan all of the values we have inherited are being impacted and are in the process of decline. This is why the upcoming generation is imitating the west with material things. All of these external influences, the internet and social media are going to impact these values.”

“Bhutan is growing at a fast pace, and along with that many people are visiting Bhutan and bringing new ideas, and because of growth there is a bringing of material things. I feel sad about a lot of those influences.”

“There is a problem with juvenile crimes and drug use. I think these are serious concerns. When they say “I’m modernized” they mean this only in terms of physical appearance and not how they have to be inside. The most recent example is the Korean wave. Every young boy and girl wants to look like the Korean actors and actresses. I try to tell them that no matter how much you want to look like a Korean, inside you have to have Bhutanese values and traditions. You are not actually going to turn into a Korean person. So you will have no identity actually!”

*Finding 2. The monastic community sees a need to build bridges between the Bhutanese lay and monastic communities in order to stay united and preserve traditional values and customs.*

“Almost everyone sends their kids to school, which is now a western education. So the problem that the monastic community is facing is that students think these monks don’t know anything. They just pray all day. To some extent that is true. They do pray all day. So when it comes to the things that science is trying to say the monastics wouldn’t have any notion of what it is. But these monastics who are assigned to do this work with science for monks can sort of build a bridge.”

“I think the monastic body is realizing the importance of bridging the gap. If you look at these monastics most of them are sent by the monastic body to schools because they have already seen how students are moving in a different direction. Fifty monks from

around the nation have been sent to schools to teach monastic values and all of these things. And they are also willing to attend this workshops. I feel these kinds of workshops will enrich what they have studied from their monastic institutions. So this is a great opportunity.”

“Bhutan right now has survived because of the wisdom of traditions and monastics. I believe monastics can play a bigger role in preserving these. But they need to understand how other worlds have developed so that they don’t duplicate the same mistake. For example Bhutan has a high rate of suicide in terms of population and size, so all these problems are coming. So how do we address this? I think there should be lots of contributions from the monastic peoples.”

*Finding 3. The monastic community is concerned by the decline in mental health and family structures that has come hand-in-hand with modernization.*

“Suicide has been rising. The rates can be alarming. We do not have the official data, but for a country of our size it is a real concern. It might come from the pressure of competition and expectations of parents and loss of connection.”

“There is a lot of unemployment in the younger generation. There are also a lot of pressures in the workplace so they turn to alcohol and drugs to heal their depression instead of going inside themselves to find the root of their suffering.”

“Drug abuse, alcohol, suicide, environmental degradation are all challenges we face. The young people do not work in the farms like their parents so they become lazy. All those issues start there.”

“There is definitely a family problem with couples getting divorced. It seems to be happening more than it used to be. I have been out of the country for many years, but before I left I didn’t even think about it, and now suddenly there seems to be a big problem.”

*Finding 4. Educated young Bhutanese are struggling with unemployment and underemployment as they enter the labor force.*

“A big challenge is the scarcity of jobs. Because of that the youth don’t take serious interest in studies. In my opinion the way to get out of this problem is explaining the benefits of our culture, and the importance of traditions, and telling them that other countries who have lost their culture and traditions had adverse effects.”

“One serious problem is that students are coming out of schools with a strong western education and are not finding the jobs they were expecting. And they refuse to go back to farming or construction jobs. This results in depression and frustration.”

“The current belief with employment is that a government job is the only valuable job. But I want to divert from that perspective. There are so many avenues we can engage ourselves. We can be an educated farmer. This is one solution I would propose.”

“There is an unemployment crisis in Bhutan. These youth that are graduating with degrees are not getting employment. So I would like to start up business or invest in new business through which I could recruit some of the youth to help this unemployment crisis.”

## **Part B. Faculty Findings**

I had two primary discovery objectives for the faculty: 1) Get the faculty impressions on the same themes and questions I asked the monks, and 2) Answer the lingering questions that are difficult to answer from the monastic conversations. For example, what is the capacity of these monastics to act as leaders, successfully implement their visions for service, further the dialogue between science and Buddhism that started in the workshop? How likely is it that science education in small groups like these can grow and diffuse to the rest of the monastic body? While these are difficult questions to answer in a short-term investigation, it was worth getting the insights of the folks who worked most intimately with the monks and nuns. To this end, in this section the teachers share their impressions of working with the monastic participants, assess their ability to serve as leaders and scientific communicators, and explore the value of a cultural exchange between Buddhism and the west.

### **What were your impressions of working with the monks? What was it like to interact with them? How did they respond to a scientific education?**

“Being around the monastics, as you know, is a great energy. They are enthusiastic, curious, very bright, and open-minded. And that’s a really rich interlocutor to have in this kinds of dialogues. What is really impressive about them that I don’t see students do in the west, after they do what they were instructed to do, they immediately start playing around and doing other stuff. It is really exciting to watch. They really try to understand and put their attention there. One of the things the monastics are skilled at is if they are going to be there they are going to be there fully, and mindfully. It’s a really beautiful thing to have as part of this dialogue.”

— David Presti

“It’s just such a joy, a curiosity an openness and clarity and an amazing attention of them as students. I was so struck that this was the first time they were learning science and they were so attentive and absorbed so much. That’s the first part, but the joy and enthusiasm is so beautiful to be around. I feel honored to be a part of Science For Monks and Nuns because we get to be immersed in this environment. I have to pinch my selves sometimes.”

— Kristine Panik

## **What makes Bhutan a uniquely exciting, important, and productive place to invest in monastic science education?**

“Being small and being a country with Buddhism built into the government structure in a way, it allows any ideas that come from this program to be incorporated into the culture more effectively. Bhutan could be a model to the planet of how to integrate spiritual, ethical, religious principles into the educational structure that works. There are many countries now that talk about some kind of measure of Gross National Happiness, so far as I know it was Bhutan who first came up with that. So we need more of that kind of globalization of ideas.”  
— David Presti

“Whatever our main objectives are, whatever we hope to influence by the work that we are doing, I think that in a country like Bhutan we would be able to do it more thoroughly. Because of the size, and because of the very specific support that we have from figures who are very close to the top decision makers in Bhutan. So whatever our goals it will be easier to be effective here.”  
— Kristine Panik

“I also think it’s important to capture different Buddhist communities. In India there are differences, in Nepal still more differences. So just working with other communities I think is also a plus.”  
— Kristine Panik

“I think the main advantage is agility. Bhutan is small and is just starting to establish itself on an international level and that allows it to be more agile and responsive about what’s working. Whereas India is a billion plus people and have very entrenched ideas about education and relationships between monastics and lay people. Also here, Buddhism is super integrated in everyday life and in the government, so it makes sense to work with monastics here because there is more of an immediate connection between what you are teaching how it could be used in monastic leadership. Also, everyone here seems to know everyone else, and if you’re just starting to build a program that’s the kind place you want to establish it in before you try it in a bigger more complicated area.”  
—Sophie Oller

## **Why do you think monastic science education is important?**

“It is helpful for the individual monastics to become more proficient with ideas from science because it will help them connect to the communities in which they work, which will make them more powerful influencers in the world. And again to the extent that the ideas of Buddhist ethics can be disseminated is helpful for the planet because these are good ideas. You don’t have to be a Buddhist to appreciate the benefits of interdependence. And there is a nice meshing there because everything our science is showing is that everything is much more interconnected than we appreciated in nature.”  
—David Presti

“I’m always interested to hear what the monks and nuns have to say about this question. I see how having knowledge about science given that that’s infused everywhere, I can imagine that’s valuable for the monks and nuns. I go back and forth between waiting to see what is going to happen and how what might happen to the Buddhist traditions. These teachings will evolve and we will see how these monks and nuns will take it in.”

— Kristine Panik

“Science is a method for the monastics to connect with their students and the wider public. It gives them a possible point of commonality. It gives them a common language with which they can use to communicate.”

—Sophie Oller

### **What are your impressions of the capacity of these monks and nuns to be agents for change in their communities?**

“I’ve gotten a much bigger sense of this over the last few days just by finding out how many of these monastics are actually teaching in non-religious communities. This just seems ripe with tremendous capacities to [act as agents of change]. What I’ve seen from this work in India is that most of those monastic teachers were teaching in monasteries, meaning they were teaching other monks. I’ve been impressed with how many of these monks are out in their communities and if they are out in their communities teaching and influencing and interacting with thousands of students I see the potential as being huge. And again if these are expanded and capitalized on a smaller country like Bhutan then Bhutan can demonstrate how to do this in a way that might be scalable in a more planetary sense.”

— David Presti

“My sense is that monastics, in general, here in Bhutan are respected by the community and seen as leaders within the social structure. Therefore, I would imagine that they have permission and some degree of space to effect change. On the other hand, I would think that the ability to make some kind of social or procedural change or to implement a project would be limited by access to finances and time to work on such things outside of assigned duties. I also imagine that there is a wide range of variability individually in terms of motivation and confidence. So all of that is to say that I imagine these monastics can be important agents of change given a favorable set of circumstances.”

— Kristine Panik

“In terms of what they learned, they seemed to learn a ton, and they seem very excited about it, and they are in contact with tons of youth, so in that sense there seems to be a lot of potential.”

— Sophie Oller

“Most of them are teachers so this makes more sense for them to be taking this kind of program. Those new to the workshop might have a hard time but after a couple more programs most of them will have that capacity. And they are now so excited to go back to their schools and talk to their science teachers. Before teachers thought monks didn’t

know shit about the modern world. Now these monks will go back and share what they learned and get connected to these teachers and try to explore more.”

— Karma (translator)

### **What do you think the western world and western science can learn from Bhutan and Buddhism?**

“The best example of ethics in science getting some traction was during the Second World War with the atomic bomb. The concern around this issue has maintained an active voice, but more of that is better. There is so much arrogance in science, it's like this is the one right way, its discovery for discovery's sake, ethics aside, that's another realm of discourse that we are not interested in. This has gotten us to a place on a planetary level that's not good. I mean everyone agrees that we're destroying our home. So the more we can do to move the energy in a different direction is going to be helpful.”

—David Presti

“I think this work is so much more important than people give it credit for. They think “oh a conversation between Buddhism and science how cute” and we will understand more about what's happening in the brains of monks when they're meditating and that's really cool. But it's really not capturing the most important aspects of the conversations, which are the things we've been talking about. Really expanding the way we think about mind and reality in a way that can be accepted in our scientific framework, and really expanding the way we think about our science in an ethical framework. And empowering the Buddhist community in places like this to continue to flourish in modern times. We do not want these traditions to be lost as the juggernaut of the modern corporate world countries to grow all over the planet.”

—David Presti

“I have this naive sense that if one really practices and works within the tenants of Buddhist philosophy there is an inherent morality to that and there is a sense that this can be an anecdote to depression and anxiety. I talk to people that I work with in Berkeley in terms of mediation and mindfulness and there is a sense that those meditation and mindfulness practices really help with depression. There seems to be some evidence and anecdotally it seems to be true. So I feel like we can learn a lot from monastics and Buddhist practices in terms of working with that distress.”

—Kristine Panik

“I think we could learn something from their commitment to heritage and culture. It is a commitment that does not just look backwards, also looks into the future. Like how they keep 70% of their land forested. And none of these ideas seem politicized here.”

—Sophie Oller

“I think maybe what science can learn from Buddhism is ‘science in service of.’ For example, the monks want to learn about atoms so they can learn about the brain so they

can help with mental illness. Also, I think what we as teachers can learn is how to use science itself to connect with different members of our community.” —Sophie Oller

## VI. Conclusions

Stepping back and taking stock of the monastic and faculty impressions of the workshop we can highlight several important takeaways from our research.

**1. The monks and nuns of Bhutan see an opportunity to serve through outreach to Bhutanese youth, sharing Buddhist teachings, and preserving Bhutanese traditions.** This opportunity is already being realized in the programs established by Bhutan’s leaders, and which most of the participants of this workshop are already engaged in. Additional ways the monks and nuns feel called to serve include working towards a more holistic understanding of mental health, understanding nature and the environment, and advocating for its preservation.

**2. The workshop participants see science as a powerful tool for building the bridges between their religious and modern/lay communities.** They see science education as a strategy for creating entry points into the educational world of youth while also challenging the perception that monastic education is out of touch with modern life. They also believe that learning science through a hands-on and practical approach can show monastics how to teach Buddhist philosophy in new ways and offer more effective ways to share their insights and values with Bhutan and the broader world. Lastly, they demonstrate a broad range of curiosities and interests that advance the interface between science and spirituality.

**3. Many monastics think that science and Buddhism are woven together and fully compatible because they are both paths to truth.** They believe that learning science actually strengthens and reinforces Buddhist practice. They also see science as a way to provide a holistic education to monastics and that blending science with a Buddhist education offers a teaching of “the whole monk” so to speak.

**4. The monks, nuns, and faculty all see a real value in investing in science education and a cultural exchange in Bhutan.** The size, political independence, and unity of vision of Bhutan means that investments in education have the power to make changes with broad political and social support that can be scaled to other communities.

**5. The monks and nuns acknowledge there are some barriers to carrying out the visions enumerated in this report.** Lack of time and education are barriers to implementing leadership projects. Access to high-quality teachers and resources is another. The monks hope to develop creative ways to overcome these challenges as they continue to become more involved in their communities.

**6. Both monastics and western faculty agree that the Buddhist worldview and Bhutanese values have a lot to offer the west.** For one, Buddhism can offer a degree of intellectual humility in western scientific culture. The faculty and monastics alike also noted that although



the modern world is unparalleled in technology and scientific discovery that should help to connect people, the modern world continues to be unhappy and disconnected. They also suggest that western culture can benefit from cultivating the quality of community and connection traditionally embraced by Bhutanese culture.

## Appendix I

### Monastic feedback for growth and program improvement

The following quotes were taken from monastic responses to the question(s) of *what can SFMN do to improve workshops like these in the future? How could the program better serve the needs of the participants?*

“If you could understand more about Buddhism then it could be much more benefit.”

“The one thing is that everything is a new word. Even if it is in Dzongka it is new and rare. Maybe have a book of terms to view ahead of time.”

“I don’t know the best way to go about this but if this is science for leadership maybe you have the program focused on developing leadership skills through a scientific approach. Maybe being more explicit about how these science teachings are relevant to leadership qualities.”

“Repetition. Please have more workshops.”

“Learn the language and double the instruction time.”

“Even if the words are translated into Dzongkha, there are still a lot of new words. We are talking about cells and photons and so on. It would be helpful if we had a textbook that we could review ahead of time to familiarize ourselves with the new vocabulary before the workshop. Even if not a textbook, then at least a dictionary with the translated terms so that we could see them before the workshop. Otherwise it is quite challenging.”

“More access to these workshops for all the monasteries. I wish everyone could get this western education. We are just now sowing an apple seed and I wish it grows well, fruitfully, with beautiful flowers and gives lots of foods and everyone can enjoy it.”

## Appendix II

### Teacher feedback for growth and improvement.

The following quotes were taken from faculty responses to the question(s) of *what can SFMN do to improve workshops like these in the future? What can be done to better serve the needs of the monastic participants? How can the program better improve the preparation of teachers?*

“More nuns. To not keep repeating what I think are old...I mean if we are asking people to evolve, I think we should ask them to evolve in several different ways. Bringing women to the fore and giving them as much of an equal part in the workshops as possible.”

“I have mixed feelings about the monastics having access to their phones during the lessons. I wonder if it could increase engagement if monks had to leave phones out of the classroom, or at least if something about their use during class was discussed at the beginning.”

“This may be hard to determine, but depending on the subject matter being taught, I would want to find out in advance if there any Buddhist teachings that may be relevant (or contradictory) that could help the teacher understand or connect with the students' current mental schemas. Especially since the class is taught through translation, a word that seems neutral in English could actually be weighted with unexpected meaning in their Buddhist understanding of the world.”

“For teachers new to SFMN, it could be cool to have mentor(s) who have taught roughly the same type of class. Working with monastics who have maybe never learned science before and teaching through translation in a conference room is a unique situation that most US teachers never have had in their careers. I think connecting current teachers with past teachers so that they could share best practices, tips, and perhaps lesson sequences could be really beneficial. I would happily volunteer some of my time to help out a future teacher!”

“What if the teachers had a daily feedback session? Maybe just a quick 10-minute review of the day, before dinner or sometime, of what worked well, what could be better, and review what will happen the next day? This could be a really good practice for making each lesson as impactful as possible, especially since we had so little time with them. Just to clarify, I don't want meetings for meetings' sake, but a quick daily check-in that goes over important points for something as fast-paced and collaborative as these types of workshops could be helpful.”

## Appendix III

### A Brief Photo Essay of Monastic Discovery, Bhutan 2019



Monks examining their work after building their first molecular model.



Monks and Nuns perform the roles of the neurotransmitters Gaba and Glutamate in science theater.



The monastics sporting their new brain caps in neuroscience class.



Exploring combustion reactions.