



Science meets Dharma

Continuous Science Classes in Tibetan Exile Monasteries

Status Report of the Project

September 2013

Abstract

The unique character of “*Science meets Dharma*” lies in the fact that science is being taught to monks and nuns within their own monasteries on a continuous basis (five times a week). Following a suggestion of His Holiness the Dalai Lama, the Project was started some 12 years ago by the Tibet-Institut Rikon (Switzerland), focussing on 8 monasteries of the Gelugpa Tradition in South India. Experience has shown that monks and nuns are personally interested in getting acquainted with Western science, and the Project has contributed considerably to the growing acceptance of science classes by the monastic authorities.

Stimulated by a series of discussions and observations made in May / June 2013, the present status report sums up the experience of *Science meets Dharma*, giving due emphasis to the fundamental change in the project’s concept after 2011. This review results in a number of recommendations concerning the future implementation of science teaching in Tibetan monasteries. Foremost among these recommendations are the following:

- ✓ In order to overcome the serious shortage of Tibetan teachers, assistant teachers, instructors and tutors, which at present is seriously hampering science teaching within the monasteries, efforts must be made to recruit suitable monks and nuns and to train them gradually to assume a teaching role;
- ✓ In order to acquaint monastic students with the spirit of Western science, teaching should be focused on exploring and observing nature by means of experiments undertaken by the students themselves. Only few, but well-chosen examples from different fields of science should be taught, the purpose being to elucidate Western ways of scientific thinking, not simply to encourage memorizing of scientific facts.

The Tibet-Institute Rikon, Switzerland, through its Project *Science meets Dharma*, is ready to undertake new efforts in the above two directions and to cooperate with any other institution striving towards the respective objectives set by His Holiness.

Overview

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1. Introduction: The Mission and the Goal of *Science meets Dharma*

In 1998, His Holiness asked the Tibet-Institute Rikon to initiate a project with the aim to bring Western Science to Tibetan monks and nuns in India. Subsequently, the so-called *Science meets Dharma* – Project was started in 2002 in eight monasteries in Karnataka.

The Project's Mission can be described in the following context:

Tibetan Buddhism, in the past 50 years, has opened itself considerably to the Western world. Among other reasons, this is a consequence of the rising number of Tibetan Refugees all over the world, but especially in India. Thus, Tibetan laypeople are forcibly living in a modern globalized world, but still are – luckily! - very much attached to their own traditions. They are caught in the tension between a modern technical world and their Buddhist culture. At the same time, monks and nuns, too, even though living in monasteries, are more and more exposed to the globalized world. After having finished their monastic studies, they often go out into the world, which is dominated by the Western way of living and reasoning. They are no longer protected by a closed environment, neither in their monastery nor in their homeland. They are challenged to live in and to cope with people and systems dominated by Western rationale.

On the other hand, Western science is about to realize its own limitations, because it is mainly built on models by which - for many centuries - it had seemed possible to explain all phenomena of nature's behaviour. This assumption does not hold true any longer, as - e.g. in quantum physics - the propagation of light cannot be described in a single way, but needs two seemingly contradictory models to be understood (Dualism: electromagnetic wave against photons). In the West, therefore, awareness is slowly growing that (hitherto unknown) ways of reasoning and conceptualizing might be necessary even for scientists, in order for them to understand reality. Would Buddhist Philosophy possibly offer a respective new stimulus?

Thus, the over-all mission of *Science meets Dharma* is to contribute to the necessary pre-conditions for a stimulating dialogue between Buddhist Philosophy and Western Science. His Holiness has personally formulated this idea by the following words:

"It seems to me that Western science and Eastern philosophy can join together to create a really complete and full-fledged human being. (.....) What in fact interests me is what is beyond matter and awareness, what really is important and what makes us what we are."

The Dalai Lama (1999): *The Path to Tranquility: Daily Wisdom*. Penguin. p 106

It was in such a perspective, that the following **two project goals** were formulated for *Science meets Dharma*:

- To enable Tibetan monastics to dialogue among themselves as well as with Tibetan laypeople not only on traditional topics, but also on problems arising from their common social, economic and technical environment. How is it possible to realize Buddhist values and Buddhist spirituality in a globalized world?
- To also enable Tibetan monastics to enter into dialogue with non-Buddhist people from the West and to jointly reflect on the problems threatening our globe. What can Science and Dharma jointly contribute to promote world peace, to alleviate suffering and to preserve life and beauty on our globe?

2. The Project's First Phase: The Key Responsibility to Organize Science Classes in the Monasteries is in the Hands of Expatriate Teachers

The first project phase covered the period 2001 to 2011. During this time, selected monks and nuns from eight monasteries (in Mundgod: Drepung Gomang, Drepung Loseling, Gaden Shartse, Gaden Jangtse and Jungchup Choeling; in Bylakuppe: Sera Mey, Sera Jey and Tashi Lhunpo) have been attending daily science classes during two hours. Western teachers, supported by Tibetan or Indian instructors, were dealing with basic subjects in mathematics, physics, chemistry, biology, earth-sciences and sometimes in English. Over 10 years, a total of 39 western teachers were serving, each of them 6 to 24 months, and a maximum of four were present at the same time. In both places, Mundgod and Bylakuppe, two classes were running with an average of 25 students each. They were considered optional and were offered during the monastics' free time at noon, two lessons a day, five days a week. All together, during the project's first phase, some 300 nuns and monks got a four-years science education. In Mundgod as well as in Bylakuppe, a Geshe acted as coordinator, managed the local project office and served as a liaison person with the monastic authorities.

The first project phase of *Science meets Dharma* was conceived as a pilot study, its purpose was to find out how science could be taught to monks and nuns who had almost no previous knowledge in the respective subjects. Were they interested? Could they follow the lectures? Would they adjust to the scientific way of reasoning? Another key issue was the development of an appropriate curriculum fitting into the framework of 4 years of study. Many bilingual (Tibetan – English) scripts and worksheets were produced. And finally, much attention was given to appropriate teaching methods. As a result of all these efforts, *Science meets Dharma* today disposes of a vast experience not only in the choice of appropriate topics for study, but also in the didactics needed to teach them.

Science meets Dharma had (and still has) no intention to provide students with anything like “full knowledge” in any scientific subject. Rather, we carefully chose typical examples to give students a lively idea of how Western science proceeds. For this reason, special focus was always given to practical scientific experiences in the classroom or within the monastery precincts, i.e. to the arrangement of simple experiments, to the observation of these experiments and to their subsequent analysis. Although memorizing certain facts, figures and formulae is obviously necessary, *Science meets Dharma* puts more teaching emphasis on the experiencing and understanding of scientific methods and reasoning. This – in our view – is one key condition for a fruitful future dialogue between East and West.

3. The Project's Second Phase: The Monasteries Take over Full Responsibility for Organizing Science Classes

During the year 2011, it became evident that the time had come to change and adapt the concept of the Project. Important objectives of the first phase had been reached, and genuine interest of the monasteries in science teaching had become evident. Based on the advice of the two project coordinators (Geshe) of Mundgod and Bylakuppe, *Science meets Dharma* and the monasteries agreed that the responsibility for running science classes would hitherto rest with the monastic authorities. They would be searching and paying the teachers, would provide the classroom and facilities and offices, and they would arrange science-teaching as a part of their monastic curriculum. In the longer run, science classes were to

become compulsory for all monks and nuns of a certain level, and no expatriate teachers would play any major role any more.

The new project phase started in January 2012. Within 5 months, all eight monasteries had adopted and adapted to the new frame. In the beginning, *Science meets Dharma* was supporting the respective authorities to find teachers. Also, during the first year, the finances to cover the teachers' salaries were provided by the Project. These transitional measures made it easier for the monasteries to gradually take over their new responsibilities.

Of course, this transition was greatly facilitated by important decisions taken among the Gelugpa monasteries. They intend to fully integrate science as a regular subject within the monastic curriculum. The respective teaching should run over six years. Four out of these six years would coincide with the last four years of regular monk/nun monastic studies, finishing with an internal exam. Two more years of science studies would coincide with the first years of Geshe education, ending with an external exam, which would be the same for all students of all Gelugpa monasteries. It is planned to have daily science classes of one or two hours duration over 6 days per week. The curriculum will be developed by the Library of Tibetan Works and Archives.

All this represents an enormous challenge for the monasteries. Therefore, during the second phase of the project, the Tibet-Institute Rikon has decided to assist the monasteries to the best of its possibilities. At the moment, *Science meets Dharma* offers support in the following areas:

- Recruitment of qualified teachers
- Coaching the teachers, especially those with little or no teaching experience
- Organizing and financing short term teachers' trainings (Crash courses)
- Provision of course contents and appropriate teaching materials
- Acquisition of visual aids and instruction in their use
- Development of teaching plans that conform to the needs and physical limitations of the individual monasteries
- Development of appropriate forms of quality control and achievement monitoring

4. The Present Situation: Its Promises and Challenges

The promises for the integration of science into the regular monastic curricula are great: As already mentioned, Gelugpa monasteries have jointly decided to introduce science as a regular subject. The six years science education concept is planned to start in summer 2014. A respective curriculum is presently being drafted at Emory University, focussing – as we hear – on subjects like quantum physics and neurology. Teaching will be assumed by expatriate scientists in annual workshops of several weeks duration.

On the other hand, a conference on education held in Dharmasala (14. - 17.5.2013) and attended by all Traditions (Gelugpa, Nyingmapa, Kagyuepa, Sakyapa, Bon) has decided to start introducing Western science into the monastic education in the near future. In a first step, the respective monasteries plan to have science introduction workshops of few days duration only. In the meantime, a more thorough curriculum should be developed. Regular classes would start later.

However, the major challenges faced at present by the monasteries of all Traditions are stemming from the lack of suitable teachers, assistant teachers, instructors and tutors who are willing and capable to provide continuity of science studies throughout the year. Recent experience shows that – in principle - Tibetan bachelor students can fill this gap for a maximum of one year. Their number is small, however, and after their teaching experience they want to go back to finish their studies with a master degree. On the other hand, to find teachers “on the market” is almost impossible, because outside the monasteries a much higher salary is paid. Thus, the lack of teaching personnel at various levels is a major threat to all present efforts aiming at introducing science classes in the monasteries. Without such personnel, the continuity and solidity of science education in the monasteries cannot be assured.

5. Conclusions and Recommendations: Train Monastics to Become Science Teachers!

It is obvious that *Science meets Dharma's* most important conclusion from the above paragraphs can only be: Give high priority to the training of teaching personnel capable of assuring the sustainability of science studies within the monasteries. But before we go into this, a more general remark is necessary:

His Holiness and Heinrich Harrer: A Model Teacher-Student relationship

When asking ourselves, what the key skill of a science teacher at a lower level is, and what the ideal relationship between a teacher and his beginning student should be, we inevitably think of the words of His Holiness, who wrote the following:

"My fascination for science began with technology, and indeed I saw no difference between the two. When I met Harrer, who was much better with things mechanical than anyone..."
"Inspired by my success in dismantling watches and repairing projectors, I got more ambitious."

The Dala Lama (2005): The Universe in a Single Atom. New York: Morgan. p 21

And we conclude: A good teacher (like Harrer) is a guide through the adventure of physical explorations and disciplined reflection. In a fruitful teacher- student relationship, both parts must be inspired and thrilled by discovering the treasure house of natural phenomena. And-most importantly: It is the success in initial simple experiments, which creates and nourishes the curiosity and the endurance necessary for ever more profound studies and understanding.

It is in such a perspective of teaching and learning that *Science meets Dharma* – at this crucial stage of the Project - formulates the following conclusions and recommendations:

5.1. Tibetan Teachers' Training must be High up on the Priority List

To recruit, train and coach considerable numbers of science teachers for leading and animating science studies within the monasteries is one of the most important tasks of the hour. All concerned institutions, Tibetan as well as non-Tibetan, should join hands in establishing a medium and long-term concept and programme for Tibetan teachers' training. This is a key condition for the sustainability of all efforts to introduce science in the monastic curricula.

5.2. Train Monastics to become Science Teachers!

The future science teachers in the monasteries have to be monastics themselves, because not enough teachers are available on the open market, who are willing to work for only INR 3500 as decided by the above mentioned conference of education in Mai 2013. The one great advantage of monastic teachers will also be their greater capacity to support and to bridge the gulf between Buddhist philosophical and Western scientific reasoning.

5.3. A Long-Term Training Programme

Monks and nuns must be enrolled, who have almost finished their regular study in Buddhist philosophy and have already a solid basic knowledge of Western science. They should get additional training in biology, chemistry, physics, earth sciences and mathematics. One important precondition is that they already speak and write English quite well. The duration of their training will take up to 5 years fulltime, depending on the previous experience of the students. They should obtain a Western (Indian) college level education in natural science. Such studies could possibly be organized and offered at the "Central University of Tibetan Studies" in Sarnath, Varanasi.

5.4. Didactics and Teaching Methodology are Crucial

Monks and nuns who already have reached college level of education in science will have to get complementary teachers' training in didactics and methodology. In such a training they will not only learn how to teach and how to communicate with students; they will, above all, learn how to organize classes in such a way that their students will have a chance to personally observe and discover and interpret aspects of nature in the same way as His Holiness has experienced it when he was a young man. Such a training could be achieved in one to two terms (semesters).

5.5. Curriculum Development

A curriculum for science classes within the monasteries must be developed. This should be done on the basis of experiencing nature through observations, experiments and analysis. What is required is not so much a bulk of memorized facts (which can be looked up in the internet anyway). Rather, the need of the hour is to impart basic skills in observation, experimentation and analysis of natural processes. Such a curriculum takes into account the following guidelines:

- Teaching is based on a few, but well-chosen and speaking examples from different fields of science;
- Practical outlook on (and experience from) daily life realities is crucial. Teachers and students are following the same path of discovering, reflecting and understanding;
- Doing simple experiments and analysing them by Socratic discussions (Western way of debating) is a core activity;
- Interdisciplinary approach is predominant: e.g. physics, chemistry, biology and earth sciences are taught in meaningful webs, not in isolated disciplines

5.6. Textbooks

Textbooks similar to scripts have to be produced. They should contain exercises to be undertaken, but empty space as well, so as to allow the students to note down their observations and conclusions of experiments. In addition, worksheets should be developed which relate to the textbooks.

5.7. Teachers' Guide

To complement all the above points, a detailed syllabus has to be developed for the use by the teachers, in order to guide and support them in the planning and in the methodological approach of their lessons.

5.8. Concluding Remark: Optional or Compulsory?

Without properly formulating a respective recommendation, we have another point in mind that seems to be worthy of careful reflection. The question is: Is it really necessary for all monks and nuns to get acquainted with Western science? As per the experience of *Science meets Dharma*, intensive study of science might be overtaxing those students, who have already difficulties with their regular traditional education. Many management- and cost-aspects of the monastic education programmes might perhaps become easier to handle, if the study of science would be viewed as an optional, not as a compulsory course.

6. Present and Future Commitments of *Science meets Dharma*

During the coming years of the second project phase, *Science meets Dharma* will concentrate its efforts in the following fields:

6.1. Training of Monastics as Interim Assistant Science teachers

In order to support the eight monasteries (named above) of Mundgod and Bylakuppe, where *Science meets Dharma* classes have been run over the past twelve years, the following two programmes are envisaged:

- Selecting and training of senior *SmD*-students in a teachers'-training-crash course to take the role of interim assistant teachers in their respective monasteries:
- Coaching of these student-teachers while at work in their monasteries.

6.2. Introducing Science in "new" Monasteries

Science meets Dharma is ready to organize and implement – upon request – science introduction workshops or study weeks in monasteries, which have not so far participated in the Project. They may be situated in any part of India or in Nepal.

6.3. Teaching Aids

Science meets Dharma will provide all existing teaching material (such as bilingual scripts and worksheets in Tibetan - English) on an Internet platform, so as to make them available to all student-teachers in the monasteries.

6.4. Curriculum and Textbook Development

Science meets Dharma – based on its 12-years experience in this field - is prepared to provide support to any project of curriculum or textbook or syllabus development undertaken by any institution working towards the same goals.

6.5. Long-term Planning of Teachers' Training

Similarly, *Science meets Dharma* is prepared to join hands with other institutions in the planning of a long-term concept for the training of monastic science teachers.

7. A Vote of Thanks

The author of the present report thanks all persons and institutions, who have assisted him with comments and suggestions, with open-minded inputs and with their personal sincere commitment for the cause. Similar contributions are always welcome.