Among some thoughtful and earnest scientists in the contemporary scientific community there is a growing awareness of the necessity and great potential of collaborative thinking and crossing disciplinary boundaries in search of solutions for the complex problems of today’s world. Likewise, seeing the need for strengthening multidisciplinary research and teaching in response to a growing disenchantment with the fragmented nature of western education, some of the most progressive academic institutions in America have begun to introduce interdisciplinary programs and centers into their establishments. The recognition of the need for bridging disciplines is brought about by several factors. One of them is the fact that the range and complexity of contemporary social and scientific challenges have remarkably increased. Global problems such as finding cures for contemporary diseases and preserving natural resources represent challenges that transcend the boundaries of individual disciplines. Therefore, understanding these problems and providing practical solutions require multidisciplinary research and receptivity to cultural and intellectual exchanges. It is becoming evident that scholars and scientists who are willing to engage in collaborative initiatives and those who are trained across disciplinary boundaries are ones who will be able to bring about intellectual renewal and scientific advances.

If one looks at the integrative Buddhist education of classical India, one finds that already in the early centuries of the Common Era, Indian Buddhist scholars were cognizant of the importance and promise of multidisciplinary education. They operated
on the premise that multidisciplinary projects do not have to weaken individual disciplines but can serve as springboards for fundamental disciplinary advances. They also gave equal value to the humanities and sciences, since both employed similar methods of rational inquiry (yukti) and were concerned with all aspects of human life and human flourishing.

For Indian Buddhists, the ideal of multidisciplinary education has its expression in the Buddha Śākyamuni himself. Indian Buddhist narratives of the Buddha’s last and former lives celebrate not only his spiritual qualities but also his intellectual and practical abilities and his knowledge of a wide range of subjects. These were derived from his comprehensive and multidisciplinary education, that which was available at that time for a young kṣatriya. In the Jātaka stories we come across references to the Bodhisattva, the Buddha to be, mastering all branches of learning, including medicine, which he studied in the famous medical school of Taxila. The Lalitavistara extols the young Gautama for his proficiency in eighty-six disciplines of the humanities and sciences. As one reads these narratives, one is given the impression that the Buddha’s highest achievements, that is, his spiritual realization and omniscience, were in part due to his intellectual skills developed through his extensive, cross-disciplinary training. In the Vṛkṣaḥyakti (or the Sūtravyākhyayuktyopadeśa), Vasubandhu states that the Buddha’s teaching is called comprehensive because it demonstrates his proficiency in every field of knowledge. Western scholars have themselves pointed out that the Buddhist teaching of the Four Noble Truths seems to be based on a medical model and have taken it as an indication that Śākyamuni must have had some familiarity with medicine.

Although Buddhist multidisciplinary education developed to the greatest degree in the monastic schools of the Mahāyāna, some Buddhist Pāli sources attest to the fact that respect for multidisciplinary learning can be traced back to an earlier period. They also show that multidisciplinary training was not a privilege of the Buddha alone. For example, the Milindaśāna mentions the wide scope of Nāgasena’s learning, which included secular and religious subjects. Jātakas point to the well-integrated and

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1 Jātaka, IV, 171.
3 Milindaśāna, IV, 3, 26.
comprehensive education offered in the schools of higher learning in Taxila, where students were encouraged to expand their knowledge and practical experience through various types of field research and even post-graduate travel abroad. Moreover, since early Buddhist monks in India were expected to make their own robes and oversee constructions of buildings, already in the earliest Buddhist monastic communities arose a need for monks’ practical training in different crafts and technical disciplines, which were added to the monks’ religious training. Thus, the inception of the many-faceted Buddhist education in India was most intimately related to the inception of the Buddhist monastic order and the practical needs of the Buddhist monastic community. However, in the early period, the scope of crafts and disciplines that were taught and allowed in Buddhist monasteries was limited. Some early Pāli texts even refer to the creative arts, some crafts, and scribing as vulgar fields of knowledge (tiracchāna-vijjā), which should be studied only by lay people.4

As the Buddhist monastic educational system was developing over time, it became more diversified and more centered on the significance of interdisciplinary study. At the time of the emergence of the Mahāyāna Buddhist monastic schools, the study of the five fields of knowledge (pañca-vidyā-sthāna)—namely, linguistics (śabda-vidyā), logic (hetu-vidyā), inner knowledge, or Buddhism proper (adhyātma-vidyā), medicine (cikitsā-vidyā), and the creative arts (śilpa-vidyā)—became incorporated and mandatory in Buddhist monastic education. Mahāyāna monasteries were the first Buddhist institutions to offer educational opportunities to the monastic and lay Buddhist communities and to non-Buddhists as well; and they were the first to provide them with both secular and religious education. This must have been of great significance for Buddhist communities, because in the Indian Buddhist world, educational opportunities did not exist apart from monasteries. In pre-Mahāyāna Buddhism, Buddhist education was entirely monastic in terms of its content and available only to those who entered the Buddhist monastic community. In fact, the inception of the Buddhist educational system was closely tied to the inception of the Buddhist monastic order, as it arose from the need for the instruction of monastic novices.

4Samaññaphalasutta of the Dīghanikāya.
However, with the advent of the Mahāyāna, general, multidisciplinary education was extended to the entire Buddhist community. Mahāyāna monastic universities in many ways resembled the earlier famous schools of Taxila, which were the first educational institutions in India that offered both religious and secular education and that accepted students of different backgrounds from all over the Indian subcontinent. Thus, the later development of organized public educational institutions in India may be attributed to Mahāyāna Buddhism, since for a long time, education in ancient India was imparted by individual teachers within their own homes.

There are two main reasons for that shift in their educational stand. One reason is Mahāyāna Buddhism’s recognition of the Buddhist lay life as a viable way of life in the pursuit of spiritual awakening (bodhi). The other reason for the Mahāyāna’s strong emphasis on multidisciplinary education lies in the ideal of a Bodhisattva way of life. The goal of all Buddhism is to eradicate ignorance. In early Buddhist communities, attention was given almost exclusively to the elimination of spiritual ignorance, whereas Indian Mahāyāna Buddhism seemed to be concerned with the eradication of every kind of ignorance. As some Mahāyāna texts attest, a Bodhisattva was encouraged to gain proficiency in all kinds of knowledge in order to attain the Six Perfections and assist others in every way needed. Thus, in Mahāyāna Buddhism, proficiency in the knowledge of diverse disciplines was considered indispensable for both the pursuit of one’s own and others’ pragmatic, mundane ends and for the pursuit of spiritual realization. As some Mahāyāna texts attest, a Bodhisattva was encouraged to gain proficiency in all kinds of knowledge in order to attain the Six Perfections and assist others in every way needed. In the Mahāyānasūtrālaṃkāra, it is explicitly stated that a Bodhisattva who does not undergo training in the five fields of knowledge in no way attains omniscience. He trains in them for three reasons: to challenge his own preconceptions and the preconceptions of others, which are to be defeated in debate, that is to say, to assist others and to gain knowledge for oneself. The same text tells us that the study of linguistics and logic enables one to engage with others in a dialogue. One studies medicine and creative arts to

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assist those who desire so, and one trains in the inner science in order to gain knowledge for oneself.

Moreover, mastery of the five fields of knowledge was considered to be one of the characteristics of Buddhahood itself. In the *Vyākhyayuktī*, Vasubandhu states that the Buddha’s teaching is said to be comprehensive because it demonstrates his proficiency in every field of knowledge.

The five fields of knowledge can be classified into two main categories: those that deal with empirical, conventional reality and those that refer to ultimate reality. For example, linguistics, logic, medicine, and the creative arts deal with conventional reality, whereas the inner science deals with both conventional and ultimate realities. On the other hand, as it is demonstrated in the eleventh-century esoteric treatise, the *Kālacakratantra*, knowledge of each of the five branches of knowledge can represent aspects of both conventional and ultimate. As one looks into the contents of this tantric treatise, one finds that its inquiry into the natural world utilizes knowledge of the diverse disciplines of Buddhist science, disciplines analogous to astronomy, embryology, physiology, pharmacology, psychology, philosophy, and so on. This fact indicates that the scope of scientific knowledge in tantric Buddhism included a wide range of natural and cognitive sciences. Thus, within later Buddhist works, all aspects of the natural world became legitimate fields of Buddhists’ scientific investigation, and knowledge of them became a significant component of the Buddhist teachings as a body of verifiable truths.

The scope and manner of the study of the five fields of knowledge in Mahāyāna monastic schools are known to us from the records of Chinese scholars and pilgrims in India, such as Huien Tsang and I Tsing, who visited India in the 7th century CE. During their stay in India, some of the most renowned and largest Buddhist universities in India were Nālanda in central India and Valabhī in western India, which was not a Mahāyāna university according to Huien Tsang. Nālanda was the largest Buddhist university of all time; by the 7th century CE, it had eight colleges with 300 lecture halls, 1,500 instructors who were in charge of 10,000 students and 100 lectures per day. According to Tibetan accounts, Nālanda also had a grand library, occupying three large buildings, one of which

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had nine stories. Nālanda and the later Vikramaśīla, which had six colleges, each with 108 instructors, became international centers of higher learning, and their fame spread throughout Asia. Due to the reputation of their high academic standards and multidisciplinary approaches, with a wide range of secular and religious subjects, these two schools attracted foreign students and scholars from China, Tibet, Korea, and Java. They received rich endowments from the kings of domestic provinces and foreign countries, which, in turn, provided free tuition, lodging, food, and clothing for monk-students, whereas lay students had to subsist on their own. All students, monks and lay students, had to reside within the monastery.

The great *panditas* of these two universities, such as Śāntarakṣita, Padmasambhava, Kamalaśīla, Sthiramati, Jñāna Śrī Miṭra, Dīpaṃkara Śrī Jñāna (Atiśa), and others, who were famous throughout Asia for their wide range of knowledge and skills, made remarkable contributions to the development of Buddhist monastic education in Tibet and China, where they visited at the invitations of kings and ministers.

The Buddhist monastic universities also taught non-Buddhist systems of thought as they used to accommodate not only the adherents of different Buddhist schools but also non-Buddhists, who held views that were incompatible with their own. Their receptivity to crossing disciplinary boundaries and bold willingness to engage in collaborative thinking along with those of differing views are the features that made these two Buddhist universities grand at their times and modern even for us today. They demonstrated that it is possible for an educational institution to maintain its religious or secular identity while avoiding either a spirit of sectarian exclusiveness or a spirit of superiority.

According to the accounts of the aforementioned Chinese pilgrims, even the general, primary education in Indian Buddhist institutions was of a multidisciplinary nature. Education began at the age of six with the study of the Sanskrit primer called *Siddham*, or *Siddham Astu*, which was completed in six months. Soon after its mastery, at the age of seven, a child was gradually introduced to the treatises (*śāstra*) of the five fields of knowledge. A child first continued to study Sanskrit by reading the second book, the *Sūtras* of Pāṇini and other grammatical works. At the age of fifteen, a young student
began his secondary education by studying more specialized works on the five fields of knowledge. For example, for the area of linguistics, a high school student studied the *Kāśikāvṛtti*, a famous commentary on Pāṇini, and different works on composition. Under the subject of logic, he was taught to draw valid inferences by studying Nāgārjuna’s *Nyāyadvāratarkaśāstra*, and the study of inner science was focused on Buddhist metaphysics as presented in the Vasubandhu’s *Abhidharmakośa*. The field of medicine was an equally mandatory subject in secondary education. From earliest times, Indian Buddhists considered good health to be an indispensable condition for effective study, meditation, and spiritual progress. In view of this, basic knowledge of medicine was seen as imperative. In secondary education, the subject of medicine was arranged in eight sections dealing respectively with the treatment of inner and outer sores, bodily diseases, illnesses caused by evil spirits, medicines for counteracting poisons, pediatrics, the means of rejuvenation, and methods of invigorating bodily limbs. The subject of creative arts included the diverse branches of fine arts, architecture, engineering, and other practical skills. These Chinese accounts indicate that already a general, preliminary education included both secular and religious learning and training in theoretical and practical subjects. Thus, it was designed to provide the solid basis necessary for further specialization in the five fields of knowledge in the Buddhist monastic universities.

In the monastic institutions of higher learning the scope of the five disciplines mentioned previously was expanded to include some other areas of study. The subjects of mathematics and astronomy-cum-astrology were two of the additional subjects that were to enhance the study of the five main disciplines, especially medicine, creative arts, and the like. Chinese records mention the astronomical observatory and clepsydra at Nālanda, which, according to Huien Tsiang, gave the correct time for all of Magadha. Likewise, for the benefit of lay students who sought high government posts and other learned professions, subjects such as law, polity, administration, and secular Sanskrit literature were taught as well.

One question that may still linger here is: “Why did Indian Buddhists choose the aforementioned five fields of knowledge as the five main disciplines of study and not some others?” We have found one brief answer from Maitreya’s *Mahāyānasūtrālaṃkara*,
but there are also other possible answers that may emerge if we look at least briefly at each of the five fields of knowledge.

In the context of Indian Mahāyāna Buddhism, knowledge of Sanskrit was clearly the foundation of all other studies, and Sanskrit grammar received great attention. In the Indian Buddhist context, the study of Sanskrit grammar was seen as conducive to the attainment of the four specific types of complete knowledge (*pratisaṃvid*):

1) the complete knowledge of the principles of Dharma (*dharma-pratisaṃvid*),

2) the complete knowledge of the meaning (*artha-pratisaṃvid*),

3) the complete knowledge of the language, that is, words and their etymologies (*nirukti-pratisaṃvid*),

4) the complete knowledge of one’s own intelligence or eloquence (*pratibhāna-pratisaṃvid*), a competence in one’s own eloquence and ability to intelligently understand texts and instructions.

The high standard of literacy was based on the view that expertise in scholarly language is a foundation necessary for a firm footing in all other disciplines. It is the standard that should be promoted in our educational institutions today. We find that in many of our academic institutions, the majority of undergraduate students are not fully literate, especially among students majoring in sciences, who tend to avoid classes in the humanities in order to evade the pain of writing papers. Although intelligent and familiar with the narrow and specialized language of their main field of study, they are often unable to adequately express their ideas in written or oral form. They do not know how to present and support their arguments. Sentences in their written compositions are frequently unintelligible due to the staggering amount of grammatical errors. As they progress to the graduate level of education and as their concentration on a narrower area increases, so does their inability to engage in the open-minded and intelligent dialogue with those who are outside of their narrow field of specialization. In this way, our contemporary societies are left with scientists and scholars who are incapable of making themselves intelligible to each other, let alone engaging in collaborative research.
We also learn from Chinese and Tibetan records that in the Indian Buddhist world, those who wished to pursue graduate and post-graduate education at Nālanda or Vikramaśīla and who were coming from other monastic schools were subject to a rigorous entrance examination, conducted by the appointed examiners, called the “gatekeepers” (dvāra-panḍita). The “gate-keepers” were renowned logicians, experts in debate, who guarded the way to higher university studies, and the gates of entrance were the schools of debate. Each of the six colleges of Vikramaśīla had its own “gate-keeper.” During the Huien Tsang’s visit, the president of Nālanda was Śīlabhadra, a famous logician of that time. This implies that only students who already had a solid training in the field of logic were qualified for the entrance examination and to engage in debate with the greatest logicians of their time. The fact that only two or three out of ten students passed the examination shows how strict that examination was.

In Buddhist monastic education, the mastery of logic was regarded very highly and was an integral part of every field of study. Logic was the subject studied not only by those specializing in the areas of logic and philosophy but also by young scholars pursuing specialization in linguistics, medicine, and so on. For example, a higher specialization in the Sanskrit language included the study of the treatises that deal with inference and inductive arguments or with treatises that deal with both grammar and philosophy, like the Vākyapādiya or the so-called Pei-na (Skrt. Veḍa or Beḍa). Many of the greatest Indian Sanskrit grammarians were also logicians or philosophers. Likewise, some of the greatest Buddhist logicians and philosophers at Nālanda were specialists in Sanskrit, who composed works on Sanskrit grammar. Some of them are Dharmapāla, who was one of the presidents of Nālanda, Candragomin, Candrakīrti, Sthiramati, and others. The fields of language, logic, and philosophy, especially epistemology, were recognized and treated as most intimately interrelated. As Fritz Staal rightly pointed out, unlike Western logic, Indian logic was always closer to grammar rather than to mathematics.10

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1 He wrote the Varnasūtravrtañāma, a commentary on Candragomin’s grammatical work.
2 Candragomin wrote a commentary on Pāṇini.
3 Candrakīrti also wrote a commentary on Pāṇini.
Although Indian Buddhists held the view that true, ultimate reality lies beyond the reach of language and is inexpressible in concepts, they regarded full proficiency in linguistics and logic to be essential for developing an intelligent theory. They also believed that the conceptually constructed universals of syllogisms could lead one to knowledge about reality. Since early times, the Buddhist system of education in India strongly emphasized the efficacy of debate and discussion as a valuable pedagogical method for refining one’s understanding, testing given ideas, anchoring one’s knowledge, and developing keen intelligence, along with the ability to swiftly draw valid inferences and conclusions.

Likewise, in order to learn how to fully appreciate differing theories and positions and how to critique their own positions, they had to temporarily adopt the view of the “other” in debate. For these and other reasons, it was mandatory for all students, without exception, to be trained in developing their skills in discussion and debate. Chinese records inform us that in these great monastic universities, discussions were carried on from morning till night, and students gained much of their knowledge by listening to the discussions and debates of their seniors. It was mandatory that all students, without exception, were trained to develop their skills in discussion and debate. In the case of lay students, gaining skills in debate was seen as beneficial for getting appointments in the government. Those who graduated from Nālanda had almost invariably a guaranteed job in the government. For that reason, theft of diplomas issued at Nālanda was not uncommon. The Buddha himself is invariably described in the Nikāyas as constantly engaging in discussions with his disciples and with the exponents of other systems of thought. If we are to realize a new global renaissance, the introduction of this type of dialogical training into contemporary academia may play a crucial role. This is a natural extension of the principle of saṃvāda (“dialogue”) as expounded in many other Indian works such as Vedas, Upaniṣads, and epics.

Furthermore, all students at Buddhist monastic universities were obligated to take a course in Buddhist philosophy. Students specializing in Buddhist philosophy had to know the principles of the theory and logic of their own and other Indian philosophical systems in order to test the validity of differing theories, to effectively defend their own views and refute the views of their opponents in debate. This stands in stark contrast to
higher education in the sciences today, wherein students are commonly not exposed to any philosophical or historical training whatsoever. This naturally results in generations of scientists who are philosophically naive and ignorant of history.

In Indian Buddhist education, young medical specialists had to engage in debates in order to master and test different medical theories and to develop the sharp intellect expected from a fully qualified physician. Medical students were required to gain proficiency not only in Āyurvedic knowledge but also in philosophy and in the array of other disciplines analogous to astronomy, embryology, physiology, pharmacology, alchemy, and psychology, as all of these disciplines were seen as elucidating and enhancing each other. Therefore, in Buddhist medical and other scientific training there was no a sharp split between religious and scientific education.

Although the students’ life of rigorous study was intellectually active and socially engaging, meditation was an integral part of both intellectual study and spiritual cultivation. In Buddhist monastic education, one’s intellectual study and spiritual cultivation were closely integrated. It was maintained that one’s study must be supported by: 1) analysis of the meaning of the contents of one’s subject matter, 2) by pure ethical discipline, and 3) by profound meditation. It was believed that one is unable to gain firm footing in any teachings of practice by study and analysis alone, without the practice of meditation or else with the practice of meditation alone, without study and investigation. In the Mahāyānasūtrālaṃkāra,11 it is stated:

Meditation would be useless if reality could be perceived through mere study;

and the teaching would be useless if one could practice meditation without having studied.

A lack of study implied a lack of wisdom concerning the means of mental cultivation and spiritual development. The common goal of both the study of the five aforementioned disciplines and the practice of meditation was to perceive reality in both of its aspects, conventional and ultimate, and thus to develop the highest wisdom, or the perfection of

11 Mahāyānasūtrālaṃkāra, Ch. 12, v. 3.
wisdom (*prajñā-pāramitā*). In order to gain the highest wisdom, one had first to cultivate three types of wisdom—that which arises from study, from reflection, and from meditation. Cultivation of wisdom through meditation meant putting the first two types of knowledge into practice through meditation, that is, appropriating the knowledge for oneself and making it an integral part of oneself so that one may become an embodiment of the visionary knowledge that encompasses diverse disciplines and not a mere repository of information and technical knowledge. In this way, the Indian educational system strove to produce true “renaissance men,” altruistic visionaries, who would be equipped with requisites for bringing about their own well-being and the well-being of others. Thus, the pursuit of knowledge and wisdom was indivisible from the pursuit of genuine well-being.

In conclusion, I believe it is imperative that the global renaissance to which we all aspire does not succumb to the same shortcomings of the European Renaissance. I refer specifically to the unbalanced emphasis on extrospective empiricism to the exclusion of introspective, contemplative inquiry into the nature of reality. This is not to say that such contemplative inquiry was always missing in Western civilization, but it was suppressed due to the ideological trends of the European Renaissance, which identified technological progress with human flourishing. What is needed now is not a further polarization of the outer versus inner but an integral approach to the understanding of reality that embraces diverse and complementary disciplines within the sciences and the humanities.
Bibliography


