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Viable Buddhist Contribution to Universal Learning for Global Development

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Abstract

Challenged by global learning crisis, UNESCO has justformulated its recommendation to build a consensus toward universal learning. This framework promotes a paradigm shift which includes modification to Bloom's legacy three-pronged learning domains to become newly configuratedseven domains. By this strategy, UNESCO surely hopes to be able to achieve aims in education for the 21st century, and thus to meet global development agenda.

Regardless the shift,however, the efficiency of educational system has been regularly measured against the progress of society vis-à-vis the strength of the society's human resources. The efficiency is assessed by the number of schools established, the size of workforce, the job market, and the probability of the economy becoming stagnant or making progress, and ultimately the society's welfare. In

this scheme, schools are factories producing workers who will in turn secure and generate welfare for the society. It is obvious thatthiskind of assessment isonly tied to physical measurements of welfare. They are computed on the assumption that materialachievements support mental progress and welfare, and that these rational calculations are correct and valid, while in fact this assumption may be unjustifiable as physical prosperity does not guarantee mental development or happiness. Consequently, if such scheme continues, education itself then may silently function as a hidden enemy to global development agenda. It may sustain the crisis and defeat the goals by nurturing imbalances instead of fostering peace and global welfare. Therefore, what all along has clearly been missing in,or even repressed by, thescheme is the counterbalance, i.e., the spiritual learning. Otherwise, by consciously adopting spiritual learning besides regular and secular learning, holistic education may assist the society producing spiritual welfarecomplementary to physical wealth.

Perhaps contrary to stereotypes, Buddhism can actually offer not only an alternative paradigm but also a concrete working model by which a society can make a balanced progress, physically as well as spiritually.A starter and yet a viable prototype deemed ready for further and additional enhancements to create such a system comes from the *Gaṇḍavyūha Sutra*.This scripture is in full display and completely available from 460 reliefs depicted on the wall of Borobudur temple in Indonesia. Then, in contrast to the prevailing modelin which science is constantly in warfare pitted against religions, this scripture advocateslearningof all kinds of secular practices as well as spiritual knowledge for the purpose of obtaining higher attainment as thesesubjects serve complementarily. Such Buddhist scripture, too, exemplifies that teachers may include females, males, merchants, professionals, politicians, divinities, ascetics, and renunciants from all walks of life or spiritual paths.Those considered Buddhists even make up only 25% of all teachers listed in this exemplar.The diversedteachers,learning subjects, and practices emphasize the idea that various achievementscan be obtained via many paths and that an achievement does not belong exclusively to just one particular method or spiritual school. Rather than provoking contradiction and disparities, the diversity as well as integrated approach in the model engender integrity and stimulate harmony and wellbeing.

The Issue

In attempt to address global learning crisis UNESCO puts forward its recommendation to build a consensus toward universal learning. By this attempt, UNESCOmust have presumedthat this formula will help the world achieving universal primary education, which is one among eight goals of the MDG, besides eradicating poverty, promoting gender equality, etc. All of these are not only global issues but also interdependent. UNESCO in factsays that poverty is a key factor keeping children out of school other than gender inequality.[1] But then, what is the cause of modern day poverty? One answer to this question usually blames the kind of structural adjustment policies imposed by IMF and World Bank.[2]

Regardless, if poverty is really the key factor in generating learning crisis, the question, of course: how would UNESCO itself address this issue? One answer is supposedly Goal 8: Develop a global partnership for development. However, as again indicated by the report, aid money is declining overall, and moving away from the poorest countries.[3] In such a case, how should poor countries deal with poverty? This is not answered by the report directly, but in a paper called Strategy Paper by UNDP a poverty-specific mechanism has been introduced by the support of banks, including World Bank.[4]

One could immediately perceive the vicious circle going around the UNESCO program. When we look into transformations undergoing in schools in the following section, it would be clear that UNESCO has been dealing only with symptoms, as the real problem is hidden in learning processes in modern education, the main factory that produces imbalances and prevents holistic prosperity from occuring. As such, the current program would inherently prevent UNESCO from achieving the goals. Subsequent section will exposerelentless warfare of religion and science being the leading causetoward excessive glorification of reason (hence physical prosperity) and unwarranted treatment against spirituality in education.Finally, this papers attempts to suggest an alternative route through which everyone could potentially participate and tackle the global issues systematically.

Modern Education

Modern education has hugely impacted learning a religion in the modern era. Learning a religion has shifted from sitting close to a spiritual guru to sitting on a classroom bench at school. At least three transformations at school have shaped the way we perceive, study, and practice religion.

First, the school itself has slowly but surely been transformed into a more and more structured and formal learning institution, standardized, and usually coordinated by the government and is attached to the progress of a society.

Second, one measure which is now frequently employed to gaugetheprogress of a society is the rate of illiteracy in that society.[5]The smaller the illiteracy rate, the larger the wealth of human resources or progress in that society. Changes in the illiteracy rate are tied to the efficiency of the educational system. In the modern world this is often measured by, among other things, the number of schools established, the degree of students' aptitude, or the rate of students passing final examinations. These are also ways to calculate the size of the workforce, the job market, and the probability of the economy becoming stagnant or making progress, and consequently the society's welfare. Thus, schools are manufacturers producing workers who will in turn secure and generate welfare for the society. But,in general, all these are physical measurements of welfare. They are computed on the assumption that physical progress and welfare support mental progress and welfare, and that these rational calculations are correct and valid.

Third, in the colonial period, the colonialists administered the educational system of their colonies. In the post-colonial era, the more developed countries' educational systems have almost automatically become models for developing countries. One may perceive that recently the educational system of the United States of America has increasingly influenced global education. However, not everyone is aware of the fact that the U.S. educational system is founded on a set of assumptions and specific rules. One such rule is the separation of church and state, which can be traced back to a series of religious and

political conflicts in Europe many centuries earlier.[6]

These transformations are reflected in a statement in one recent UNESCO report. It says that education is known to have benefits for national development, individual prosperity, health and social stability.[7] To enhance these benefits, UNESCO recommends a change in the taxonomy of educational domains, from Bloom's legacy three-pronged learning domains to a new set of seven domains.[8] Within this new taxonomy, student's learning of anything related to religion is set within the social and emotional domain, or within its subdomains of moral values and ethical values.[9] Illustrative outcomes from these subdomains are, for instance, students are able to demonstrate awareness of self in family and community, and develop pro-social behaviors.[10] These outcomes are in every way consistent with the name of the domain. But, even though it is probably very subtle, the tone is secular and the reference is unlikely spiritual but toward physical prosperity.

However, physical prosperity does not guarantee mental development or happiness. Thus, what has been missing all along is the method by which religious teachings are cultivated. The method, e.g., pray, or meditation, is a different set of learning experience requiring prerequisites, which cannot be offhandedly substituted by learning in conventional classroom learning settings. In other words, even when moral and ethical values are mentioned, secularity is more of the dominant factor and is upheld at the cost of spirituality.

If current scheme continues, education itself then may silently function as a hidden enemy to global development agenda. It may sustain the crisis and defeat the goals by nurturing imbalances instead of fostering peace and global welfare. Therefore, what needs to be introduced is the counterbalance, the spiritual learning. By consciously adopting spiritual learning besides regular and secular learning, holistic education may assist the society producing spiritual welfare complementary to physical wealth. In order to do this, it is important for us first to realize the undercurrent which forces the imbalances to thrive.

Warfare of Religion and Science

This section selects three studies performed by Francis Galton,[11]

Hajime Nakamura, and Ian Barbourwhich implicitly favor reason for applying scientific or scholastic methods while touching on religious methods (for details, see the Appendix). They are case studies showing how religions and their methods are continued to be misunderstood and undermined unjustifiablywhich in turn affect our education and global development.

Francis Galton, whowas one of the pioneers in applying statistical thinking to religious issues, tried to demonstrate that religion is ill-founded with Statistics.[12] Galton asked, "[A]re prayers answered, or are they not?" and thencontinued by testing the efficacy of the prayer "Grant her in health long to live" using mean age data calculated from statistical data on the duration of life of thousands of Britons, which had been provided earlier by another British scholar, William Guy.[13]After the analysis, Galton inferred that prayers recited in churches in England at that time did not effectively lengthen age. He claimed that his inference was trustworthy because he examined large classes of cases and was guided by broad averages.[14]

Indeed, we understand that the intent of "Grant her in health long to live" prayer must have been to increase the longevity of persons whose lives were prayed for, but how could one determine that the mean age of classes of Britons is indeed the right measure by which prayer could be ascertained as efficacious or not? Quite the contrary, we suspect that it is probably impossible for us to determine that the longevity of persons is solely, effectively, and causally produced by the prayer alone when prayer and longevity are not in fact in one-to-one relationship. Instead, we can conclude that longevity is in causal relationship with as many factors as life itself can offer. In other words,when prayer is not wholly and deterministically responsible for the longevity of persons being prayed for, how could one validly determine and infer whether the prayer was efficacious or not?However, clearly, the more important conclusion is that we cannot as a practical matter apply any statistical tests when we cannot reasonably establish the necessary assumptions, such as randomness, out of the observed phenomena. Then, when no statistical test can be justifiably applied, it is useless to squabble over an invalid analysis or its conclusion.

By the same token we may question the method used by Hajime

Nakamura in establishing the historical biography of the Buddha by devaluing traditional biographers' narratives or sources. Instead,those traditional narratives or sources should be treated as a challenge to modern scholarship to reconsider the tools on hand. To assume that modern scholarship has acquired all valid tools for examining and analyzing traditional sources and thereby is complete and superior to traditional methods is not only presumptuous but also misleading. Modern scholarship on Buddhism generally still relies on end products, like textual and visual materials, and has yet to deal with, to figure out, and to catch up with the very process or method employed by the Buddhists themselves in generating those end products.

Perhaps it is time for us to recognize a new paradigm wherein objects in the religious realm do not necessarily belong to logical or material domains, or even static models. Accordingly they are not always suitable for logical analysis and inference. The vulnerability of logical analysis and inference can be seen from the following sentence.[15]

> "God is Almighty and therefore God can create a stone so big so that God cannot lift it up."

The truth table of symbolic logic can show a logical fallacy in this statement and at the same time the limitations of logical analysis. In other words, this statement cannot be utilized to prove that God is limited, but instead can be used to show the limitations of language and logic in discussing God or Godhead or those which are absolute. Thus, imposing logical analysis on this matter—as was usually done by rationalists—can only lead us to nowhere as we go farther away from that which is revealed by the spiritual realm.[16]Not until this situation is understood properly can we make decent progress in religious studies in school, bridge the gap between scholastic and practical environments, and diminish imbalances in treating religion and science.

Viable Buddhist Contribution

We are living in the modern world. The teaching of Buddha was

spread to all corners of the world as a result of colonialism, at a time when religion and science were at war, when Buddhism was considered rational (and non-theistic) and viewed through the cultural lenses of the West,[17] when rationality was exalted and science was perceived as superior to religion or, contrarily, when religion was seeking a status equal to science. In this arena, a number of publications have attempted to analyze the problem and to formulate a way out.[18]Some have already pointed out the significance and superiority of spiritual methods of comprehending the ultimate truth, but the supporters of scientific and scholastic methods seem still to regard their arguments as mere apologetics. However, as shown above,it is clear that the scientific or scholastic methods that praise reason so much are not capable of finding the ultimate truth in all fields.

There is now an opportunity to change the paradigm while UNESCO is building a consensus toward universal learning. Buddhists may offer a contribution by showing a way to tone down the clash between the two warring domains and to put bridges to let people from the other side of the fence know how or where to cross over. From the Buddhist perspective, the offer may come from the *Gaṇḍavyūha Sutra*, which contains an account of Sudhana's meeting with one of his teachers, Indriyeśvara.[19]His teaching confirms that secular sciences—as we call them now—were not considered a separate domain which was outside the boundaries of religious or spiritual path, or vice versa. Instead, secular sciences were considered part of religious practice and doors to the highest spiritual enlightenment. In addition, Sudhana is the protagonist who studies all knowledge and practices in order to obtain the highest Buddhahood. Teachers of Sudhana,called the *kalyāṇamitra*s, are fifty twoin number and come from all walks of life. This group of *kalyāṇamitras*consists of members of different spiritual schools known at that time, and includes boys and girls, merchants, ascetics, monks, bodhisatwas, up to Śiva Mahādeva (see Tables 1 and 2).The diversity of *kalyāṇamitra*sin the *Gaṇḍavyūha Sutra*emphasizes the idea that perfect enlightenment can be attained via many paths and that this kind of enlightenment does not belong exclusively to just one spiritual school.[20] The narrative from this scripture is displayed completely in four hundred and sixty panelsof reliefs on the walls of Borobudur. This complete display is the oldest and only one in the world.Though, we can imagine that there are quite a number of steps

to prepare and to make this offer applicable in modern education. Further studies are necessary as the details on how to delineate the model shown in the *Gaṇḍavyūha Sutra*into a program adaptable and practical for today's educational environment are beyond the scope of this paper.

Appendix

Efficacy of Prayer

Galton's article titled "Statistical Inquiries into the Efficacy of Prayer," published in 1872,attempted to measure and show the efficacy of prayer.[21]Following Galton's analysis, many experiments—including some that utilized the placebo effect—deployed more developed statistical methods to verify similar phenomena. But, what does this mean? Is the truth discovered by the scientific method more valid and thereby irreconcilable with religious truth? Are religion and science truly incompatible domains of knowledge?

Galton,who mastered quantitative method, must have easily impressed upon people his prowess at numerical and statistical thinking and at the same time the futility of prayer. However, this is deceiving, because hidden from his demonstration are numerous underlying assumptions which must be met before a statistical inference can be derived validly.[22]

A statistical analysis similar to what Galton did needs to be subjected to further scrutiny as to whether it is truly capable of verifying the efficacy of such prayer, and whether the data fit the causal model of praying phenomena that involve God.[23]In other words, are mean age data valid and reliable measures for the efficacy of prayer or the actions of God? Do the data satisfy the requirements or assumptions underlying the statistical test being utilized? Are the sample and the effect large enough to justify a sound conclusion? In his article Galton did not seem to take seriously into account the fact that the samples from which the duration of life data was drawn were not balanced, even though the data provider, William Guy, had given an early warning that "some of the averages are deduced from too small a body of facts." And neither did he pay attention to Guy's conclusion

out of a series of analyses that "The duration of life among the upper classes varies with their rank, being lowest in the highest, and highest in the lowest rank."

The problem in statistical analysis is even more interesting when God is believed to be involved or to have a role in the efficacy of prayer. In such a case, we are forced to inquire whether or not God acts randomly in response to prayers. How could one be able to know or prove convincingly whether God acts randomly or not? This would remind us of Einstein's famous quote, "God does not play dice"[24]and the polemic following this exchange. Due to all these problems, the integrity of Galton's statistical analysis is questionable.[25]

Historical Biography

In modern scholarship, the life story that views the Buddha as a historical person and simultaneously a being of divine origin becomes something akin to a legend, or a hagiography, instead of a historical biography. That kind of legendary account receives much less credence among scholars and is regarded as suspect. In fact, modern scholarship can hardly accept it because the reliability and validity of such a life story are questionable, and its objectivity is considered unverifiable. We can imagine that modern scholarship would be very uncomfortable claiming the validity of the Buddha's divine origin. It has very limited tools for examining or verifying such things. Scholars would rather simply quote traditional biographers or sources about a mythical event, or, to be even safer, use a historical approach.[26]

However, applying modern scholarship only to select historical material to discover the historic Buddha Gautama and to claim that this is truer and more verifiable than mythical material embedded in the sources is by itself invalidating the very approach one is trying to uphold. While at a glance the historical approach suggests objectivity, the selective process performed on the data to merely pull the historical material out of the sources is definitely purposive and consequently subjective. This purposive sampling of data damages the integrity of the source data. Such data collection does not support real data reliability and validity because the approach forces the investigator's

view of what data are considered reliable and valid on the data. This approach also may neglect some important information provided by the sources and does not allow the data to speak for itself.[27] The reconstructed historical Buddha can only go as far as the investigator allows since it depends on one's definition of historical data and myth. The resulting picture does not look very much dissimilar to the alleged fantasies of the traditional biographers. Thus, the fact that traditional Buddha biographers record a divine nativity should not necessarily be considered fiction.

Model and Paradigm

When Francis Galton coined the term "psychometrics," he considered measurement and numbers the foundation of science.[28] Later Lord Kelvin expressed a similar view.[29] From this elevation of measurement and numbers grows a belief that the quantitative method is superior to any other methods. In fact, the so-called scientific method is very much connected with or at least relies heavily on quantitative methods (lately associated with statistical methods), which are considered precise, repeatable, and thus productive of more objective and valid results. Though later on objectivity is corrected by intersubjectivity, quality is yet to rise to the acquired status gained by quantity in the domain of science. Anything based on quality is frequently viewed as inferior, unscientific, unreliable, thus not to be trusted, or even untrue. In other words, to call something reliable and valid, one must be able to prove it by quantitative test and analysis. Such ideas burst forth amid fast growing mathematical thinking, especially in the field of statistics, around the end of the nineteenth century.

Nonetheless, when Galton claimed such importance for measurement and numbers in science, he may have not realized that this by itself was a problematic statement. It is true that to properly perform a quantitative analysis of a certain property or object one needs numbers and measurement. However, to state that we only know something when we are able to say it in numbers and measurements is both false and naïve, because not everything is measurable. There are certainly things that can be measured, but there are also things that cannot be measured at all, and yet they exist and we have ways of knowing about them. In mathematics, zero and

infinity exist by convention but are immeasurable.[30]

Also, when Galton introduced his psychometrics, the statistical method was still in its infancy. Only many decades later did statisticians devise multivariate analyses.[31]While data entered into these multivariate analyses are in most cases numerical quantities, it is not always appreciated that, to obtain a meaningful result, qualitative judgement and determination may intrude into the final steps of the quantitative analysis.[32]

The intrusion of a qualitative process into statistics does not necessarily mean that a qualitative method is behind the quantitative method. Butit does suggest that, as with any method or tool, the tool of statistics is not without limitations.[33]Extending the applicability of a certain tool beyond its limits may boomerang. Knowing where or when to employ a given tool to achieve the intended result is as important as knowing how to use a certain tool. This is also applicable to religious methods. A map of different tools and their applicability is especially needed for overlapping areas where religion meets science. It is necessary to see the boundaries of the scientific method and the religious method, as well as their linkages.

Noteworthy studies that deal with methodological parallels between religion and science have appeared recently. Ian Barbour's study is particularly important.[34] Barbour summarized his findings in two diagrams, one depicting the structure of science and the other depicting the structure of religion.[35]A copy of each appears below.

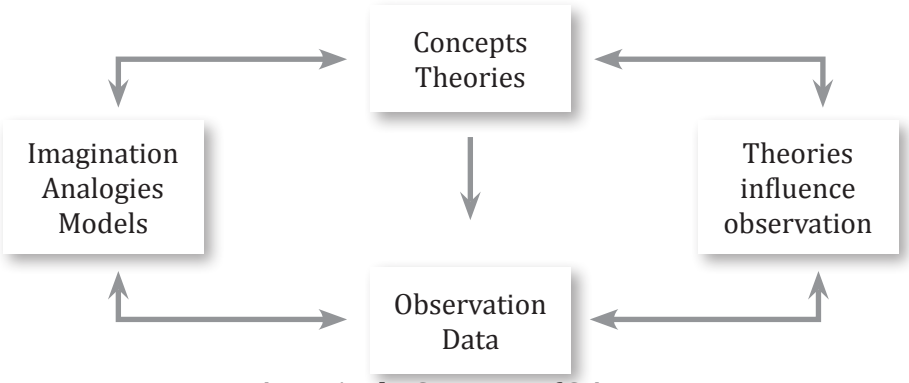


Figure 1: The Structure of Science

In the structure of science, Barbour suggested that there is logic in testing theories but no logical reasoning in creating theories from data. In other words, there are no rules for leaps of creative imagination and no recipes for making original discoveries.

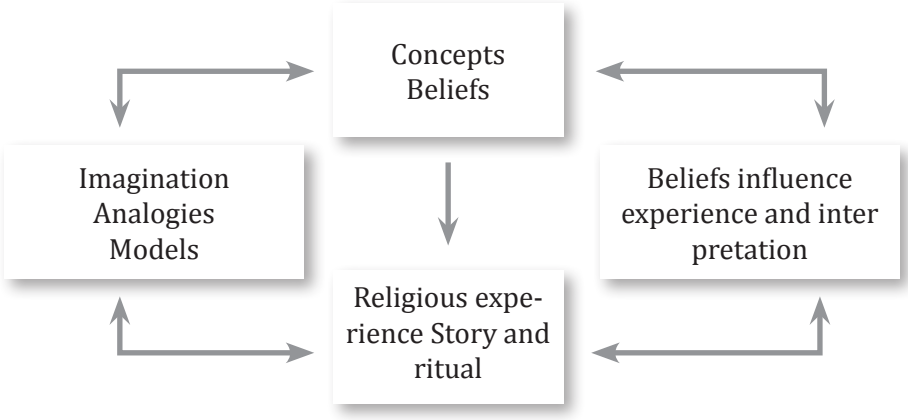
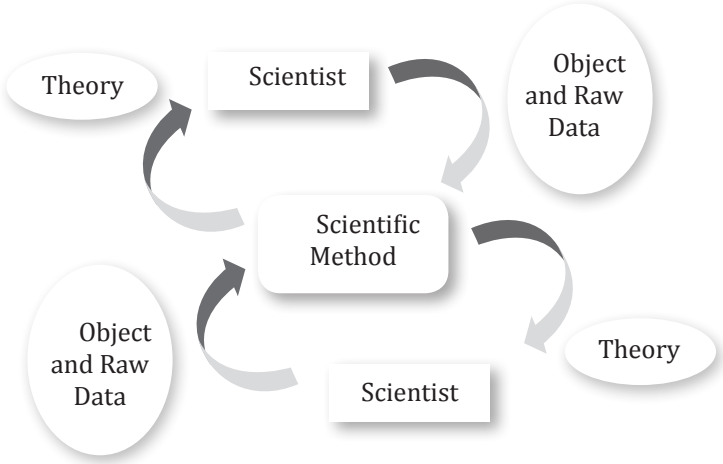


Figure 2: The Structure of Religion

Then, in the structure of religion, he suggested that testing of religious beliefs is problematic (shown by a dashed line).

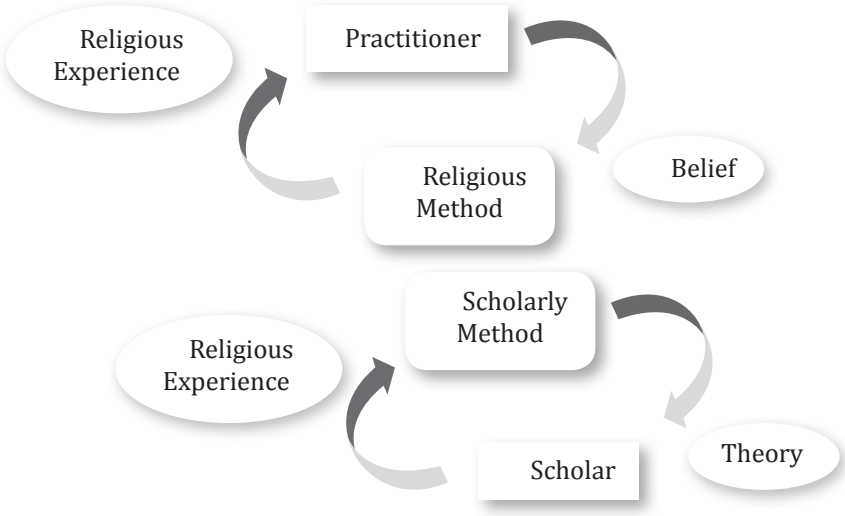
If we instead apply systems analysis to processes in the structure of science, we obtain the following map.



This map shows that a scientist can use the scientific method (as a process) to observe an object perpetually and to process raw data

(as input) to build a theory (as output). In turn, a theory can drive subsequent scientist(s) to repeat and verify previous observations by inputting a set of new data and perhaps developing an enhanced theory. By this iteration, science develops and grows.

Perhaps, in order to assume the status and dignity of a science, the field of religious studies copies scientific processes. The raw data are religious experience, story, or ritual. By using the scholarly method, scholars attempt to develop theories that can explain religious phenomena. While this procedure looks justifiable, unfortunately it is grossly misleading. Religious experience, story, or ritual, are products (output) of the religious or spiritual method (process). When we apply the scholarly method to verify or test religious experience, etc. (thus also functioning as input), we are applying a different process which is not necessarily repeating the method used by a practitioner. In other words, the scholarly method fails and is unable to fulfil the replicability requirement suggested by the scientific method. The following map shows these two different processes.



This map explains why Barbour has difficulty in testing of religious beliefs. It also explains why the method applied by Francis Galton and Hajime Nakamura could not obtain fuller understanding of religious phenomena. Underlying this failure is a belief within scholarly circles that the scholarly method in religious studies, which is based on

logical reasoning, is superior to the religious method by which all religious phenomena are produced. This seems to be the paradigm used by Ian Barbour in diagramming his models of scientific as well as religious structures.[36]

Table 1. Names of Sudhana's *kalyāṇamitra*s according to group, number, occupation, and Sanskrit title.

Group	Number	Occupation	Sanskrit Title	Name of the *kalyāṇamitra*
Buddhists (**13**)	5	Monk	Bhikṣu	Meghaśrī, Sāgaramegha, Supratiṣṭhita, Sāradhvaja, Sudarśana
	1	Nun	Bhikṣuṇī	Siṃhavijṛmbhitā
	4	Laywomen	Upāsikā	Āśā, Prabhūtā, Acalā, Bhadrottamā
	3	Bodhisattva	Bodhisattva	Avalokiteśvara, Ananyagāmī, Maitreya
Spiritual Practitioners (**5**)	1	Sage	Ṛṣi	Bhīṣmōttaranirghoṣa
	2	Brahmin	Brāhmaṇa	Jayoṣmāyatana, Śivarāgra
	1	Viṣṇu's Devotee	Bhāgavatī	Vasumitrā
	1	Novice	Parivrājaka	Sarvagāmī

Scholars (**2**)	1	Grammarian	Dramiḍa	Megha
	1	School Teacher	Dārakācārya	Viśvāmitra
Professionals (**6**)	2	Banker or Merchant	Śreṣṭhī	Muktaka, Jayottama
	2	Seller of Perfumes	Gāndhika	Samantanetra, Utpalabhūti
	1	Fisherman	Dāśa	Vaira
	1	Goldsmith	Hairaṇyaka	Muktāsāra
Politicians (**3**)	2	King	Rājā	Anala, Mahāprabha
	1	Leader	Dharmaśreṣṭhī	Ratnacūḍa
Householders (**11**)	4	Boy (Girl)	Dāraka (Dārikā)	Indriyeśvara, Śilpābhijña, Śrīsaṃbhava, Śrīmati
	2	Young Lady	Kanyā	Maitrāyaṇī, Gopā
	1	Mother	Janetrī	Māyādevī
	4	Head of household	Gṛhapati	Vidvān, Veṣṭhila, Sucandra, Ajitasena
Spirits (**12**)	1	God	Deva	Mahādeva
	1	Earth Goddess	Pṛthvīdevatā	Sthāvarā
	8	Night Goddess	Rātridevatā	Vāsantī, Samantagambhīraśrīvimalaprabhā, Pramuditanayanajagadvirocanā, Samantasattvatrāṇojāḥśrī, Praśāntarutasāgaravatī, Sarvanagararakṣāsaṃbhavatejaḥśrī, Sarvavṛkṣapraphullanasukhasaṃvāsā, Sarvajagadrakṣāpraṇidhānavīryaprabhā

	1	Forest Goddess	Vanadevatā	Sutejomaṇḍalaratiśrī
	1	God's Daughter	Devakanyā	Surendrābhā
Total	**52**			

Table 2. Cross-Tabulationof frequencies of Sudhana's kalyāṇamitrasaccording to group and sex.

Group	Female	Male	Total
Buddhists	5	5 (8)	**10 (13)**
Spiritual Practitioners	1	4	**5**
Scholars		2	**2**
Professionals		6	**6**
Politicians		3	**3**
Householders	4	7	**11**
Spirits	11	1	**12**
Total	**21**	**28 (31)**	**49 (52)**

ENDNOTES

1 United Nations, *The Millennium Development Goals Report 2013* (New York: United Nations, 2013), 15.

2 Robin Hahnel, *Panic Rules!* (Cambridge, MA: South End Press, 1999), 52.

3 United Nations, *The Millennium Development Goals Report 2013*, 53.

4 UNDP, *STRATEGY PAPER: A Framework for Monitoring the MDGs and Sustainable Human Development in the CARICOM Region (FINAL DRAFT)* (n.d.), 3-4.

5 In 1945, the countries who founded the United Nations Educational, Scientific, and Cultural Organization (UNESCO) signed a constitution which was based on faith "*in full and equal opportunities for education for all*." Progress for everyone comes from education because it gives "*the knowledge and skills to make informed decisions and acquire better health, better living standards and safer, more sustainable environments*." The

degree of literacy is used as one measure to monitor development and progress in reaching the goal.

6 Mochtar Buchori and Abdul Malik, "The Evolution of Higher Education in Indonesia" in *Asian Universities: Historical Perspectives and Contemporary Challenges*, edited by Philip G. Altbach and Tōru Umakoshi (Baltimore, MD: The John Hopkins University Press, 2004): 249-277.The United States has the "*separation between church and state*" described by Thomas Jeffersonin his letter to Danbury Baptistson 1 January 1802. See also Alvin W. Johnson and Frank H. Yost, *Separation of Church and State in the United States* (Minneapolis: University of Minnesota Press, 2009), especially 1-16: *Chapter I: The American Heritage*. See also Donald Kagan, Steven Ozment, Frank M. Turner, *The Western Heritage: Since 1300* (Englewood Cliffs, NJ: Prentice Hall, 2009).

7 UNESCO, *Toward Universal Learning: What Every Child Should Learn*, Report 1 of 3 Learning Metrics Task Force (Montreal, Canada and Washington, DC: UNESCO Institute for Statistics and the Center for Universal Education at the Brookings Institution, 2013), 1.

8 Ibid., 4.

9 bid., 9.

10 bid., 17, 20, 97, 99.

11 Francis Galton was a cousin of Charles Darwin. But unlike Darwin, Galton adventured in human minds and numbers. He was likely the first who coined the terms "psychometrics" (in "Psychometric Experiments," *Brain* 2, 1879), and "regression" (in "Types and Their Inheritance" *Science* 6, no. 138 (Sep. 25, 1885): 268-274, then in "Regression towards Mediocrity in Hereditary Stature," *The Journal of the Anthropological Institute of Great Britain and Ireland* 15, 1886).

12 F. Galton, "Statistical Inquiries into the Efficacy of Prayer," *The Fortnightly Review,*no. 68, New Series (1 August 1872): 125-135.Statistics is a branch of mathematics and is part of scientific method dealing with research design, hypothesis formulation, data collection, data analysis, and inference.

13 W. A. Guy reported his British statistical age data in seven articles published in the *Journal of the Statistical Society of London* starting from 1845 to 1859, i.e., 8, no. 1 (March 1845): 69-77; 9, no. 1 (March 1846): 37-49; 10, no. 1 (March 1847): 62-69; 14, no. 4 (December 1851): 289-297; 17, no. 1 (March 1854): 15-23; 20, no. 1 (March 1857): 65-71; 22, no. 3 (September 1859): 337-361. The title of all his articles begins with "On the Duration of Life…"

14 F. Galton, "Statistical Inquiries into the Efficacy of Prayer," 126. Many theologians were upset by reading Galton's article. It added fuel to the prolonged warfare between religion and science.The war had just recently been revived by the delayed publication of Darwin's *On The Origin of Species by Means of Natural Selection*, which went public in 1859. To combat this sceptical science, George Romanes, a theologian, published a critical review in 1874 (G. J. Romanes, *Christian Prayer and General Laws* (London: Macmillan, 1874)), though we know now that its impact was hardly noticeable.

15 In his *Foreword* to Jujun S. Suriasumantri, *Filsafat Ilmu, Sebuah Pengantar Populer* (*Philosophy of Science, A Popular Introduction*), (Jakarta, Pustaka Sinar Harapan, 1984), Andi Hakim Nasoetion retold the story of how Jujun, as a college student in a class on Introduction to the Logic of Mathematics at the Bogor Agricultural University (aka IPB or Institut Pertanian Bogor), raised his hand and asked for a response to a sentence that Jujun had composed (in Indonesian): "Kalau Tuhan Maha Kuasa, maka ia kuasa membuat batu yang mahabesar sehingga Ia tidak kuasa mengangkat batu tersebut."

16 William Blake stated: "As the true method of knowledge is experiment the true faculty of knowing must be the faculty which experiences. This faculty I treat of." The *Sang Hyang Kamahāyānikan*, a Javanese Buddhist text, states that to attain understanding of ultimate reality one is to go through the science of the Non-Dual or the Absolute (*adwayaśāstra*). And to be able to obtain this knowledge one is to be free from conceptions (thinking). In other words, ultimate reality is the absolute which is beyond logic or reasoning.

17 David L. McMahan, *The Making of Buddhist Modernism* (Oxford: Oxford University Press, 2008), 3-14, shows how the Protestant Reformation, the scientific revolution, European Enlightenment, and Romanticism all influenced Buddhism when it initially emerged and spread throughout the world. See also, Donald S. Lopez, Jr., Ed, *Curators of the Buddha: the Study of Buddhism under Colonialism* (Chicago: The University of Chicago Press, 1995). And, prior to these, Gananath Obeyesekere coined the term 'Protestant Buddhism' to denote the development of Buddhism in Sri Lanka which had already been influenced by Western culture and Christianity. The term was published initially in his "Religious Symbolism and Political Change in Ceylon" *Modern Ceylon Studies* 1, no. 1 (1970): 43-63, then republished in Bardwell L. Smith, ed., *The Two Wheels of Dhamma: Essays on the Theravada Tradition in India and Ceylon*, AAR Studies in

Religion no. 3 (1972): 58-78; discussed furthermore in Richard Gombrich and Gananath Obeyesekere, Chapter 6: Protestant Buddhism in *Buddhism Transformed: Religious Change in Sri Lanka* (Princeton, NJ: Princeton University Press, 1988): 202-240.See also Stephen Prothero, "Henry Steel Olcott and "Protestant Buddhism," *Journal of the American Academy of Religion* 63, no. 2 (Summer 1995): 281-302. On p.296, Prothero described Olcott as 'The most Protestant of all early Protestant Buddhists.'

18 For example, B. Alan Wallace, *The Taboo of Subjectivity* (New York: Oxford University Press, 2000); John Bowker, *The Sacred Neuron: Extraordinary New Discoveries Linking Science and Religion* (London: I. B. Tauris, 2007); John Bowker, ed., *Knowing the Unknowable: Science and Religions on God and the Universe* (London; New York: I.B. Tauris, 2009); Karen Armstrong, *The Case for God: What Religion Really Means*.

19 P. L. Vaidya, *Gaṇḍavyūhasūtra* (Darbhanga: The Mithila Institute of Post-Graduate Studies and Research in Sanskrit Learning, 1960), 102. A provisional translation of Indriyeśvara's words: "Son of good family, because of the youth Prince Mañjuśrī I have learned various letters, numbers, and *mudra*s, and entered the door of all kinds of common knowledge (*avabhāsajñāna*), higher knowledge (*abhijñā*), and arts (*śilpa*). Thus, son of good family, I know all these sciences in the world, i.e., those related to understanding letters; knowledge of various numbers, producing *mudra*s, and arts; knowledge of elements; explanations of everything connected with sense objects; prevention of convulsions and of being possessed by spirits and ghosts; knowledge of entrance into taking up the grove of austerity far from villages, cities, and roads; knowledge of the dimensions of palaces, penthouses, windows, and their purpose; knowledge of making various instruments, mobiles, and accompanying equipment; knowledge of signs of peace or chaos, danger or safety; knowledge related to works on agriculture, commerce, or legal affairs; knowledge of all divisions and subdivisions of program, ceremonies, and proceedings; knowledge of purifying the karmic path leading to realms of misery in order to be born in realms of comfort; knowledge of worship and the collection of wholesome and unwholesome deeds, knowledge of provisions for being born in good and bad realms; knowledge of provisions for undergoing the *śrāvakabuddhayāna*, *pratyekabuddhayāna* , and *buddhayāna*; knowledge of provisions to reach the Tathāgata's abode (*tathāgatabhūmisaṃbhāra*); and knowledge of ritual suitable for a motive; I teach all to people and I make people established in practice,

contemplate, confirm, move, traverse, assemble, approach, elevate, grow, and make them a means, be excellent, be purified, be spotless, and make people shone forth, be clear-lighted, and extensive." (*āha-ahaṃ kulaputra mañjuśriyā kumārabhūtena lipisaṃkhyāmudrāgaṇanānayaṃ śikṣayatā sarvaśilpābhijñāvabhāsajñāna-mukhamavatāritaḥ| so'haṃ kulaputra, yāni imāni loke lipisaṃjñāgatāni saṃkhyāgaṇanā-mudrānikṣe pajñānavividhaśilpajñānānidhātutantrāṇi viṣayaprayogapratibhānakāni śoṣāpasmārabhūtapretagrahapratiṣedhakāni grāmanagaranigamapaṭṭanodyāna-tapovanāvasathaniveśanajñānāni abhiprāyaprakāraprāsādagavākṣ akūṭāgārapariṇāha-jñānāni vividhayantrarathakriyopacārajñānāni kṣemākṣemabhayābhayanimittajñānāni kṛṣivāṇijyavyavahārakriyāprayogajñānāni sarvā ṅgapratyaṅgalakṣaṇacāropacāravicāra-jñānāni sugatidurgatikarmapathaviśuddhayanugamajñānāni kuśalākuśaladharmagaṇapūjā-jñānāni sugatidurgatisaṃbhārajñānāni śrāvakapratyekabuddhayānasaṃbhārajñānāni tathāgatabhūmisaṃbhārajñānāni hetukriyāprayogopacārajñānāni, tāni sarvāṇi prajānāmi| teṣu ca sattvānavatārayāmi, niveśayāmi pratiṣṭhāpayāmi śikṣayāmi śīlayāmi dṛḍhīkaromi sārikaromi saṃtarāmi saṃbhāvayāmi saṃvartayāmi unnāmayāmi vivardhayāmi nimittīkaromi koṭīkaromi viśodhayāmi vimalīkaromi uttāpayāmi prabhāsvarīkaromi vipulīkaromi*|)." Further, Indriyeśvara listed numbers. Then, note that the expression *tathāgatabhūmisaṃbhāra* here in Indriyeśvara's passage was likely the source of the name Bhūmisaṃbhāra inscribed in the Tri Tepusan inscription.

20 The *Gaṇḍavyūha-sūtra*is not the only one which recognizes diverse spiritual paths. The *Samantamukha*chapter of the *Lotus Sutra*(*Saddharmapuṇḍarīka-sūtra*) explains that because of the power of skillful means, the Bodhisattva Avalokiteśvara is able to transform himself in order to teach the Dharma to, to save, and to help all beings in the form of the being requesting help. In other words, the teaching of the Dharma is not limited to the form or paths categorically recognized as Buddhist.

21 F. Galton, "Statistical Inquiries into the Efficacy of Prayer," *The Fortnightly Review,*no. 68, New Series (1 August 1872): 125-135.

22 The development of probability theory based on studies of chances by Blaise Pascal and Pierre de Fermat back in the seventeenth century paved the way for the growth of statistical methods. This basic theory eventually leads to some aspects of statistics which—even though are critically

important to any statistical analysis—are often neglected. Statistics requires that a number of assumptions underlying the analysis be satisfied by any set of statistical data before one can draw a valid inference. Among the most basic assumptions in the more advanced statistical method are randomness and normality, meaning that events in the phenomenon under consideration must occur randomly and that the frequencies of those events spread and distribute following closely an ideal pattern, the so-called normal distribution. The curve of normal distribution looks like the shape of a bell. Based on this normal distribution statisticians develop theoretical bases for formulating statistical tests. Consequently, these statistical tests would be applicable and valid if and only if the events being tested satisfy the underlying assumptions, randomness and normality. If these assumptions are not met, at the very least the data need to undergo some transformation or the tests need to be corrected before one can draw a valid inference, or else no tests can be applied to the collected data, much less can any valid inference from the data be drawn. Also, in order to obtain a strong and valid conclusion, the statistical test must carry enough statistical power, or else the test is unable to detect true differences or lack thereof among the sample data and thereby produces misleading results. And, even before applying any statistical tests, one needs to be certain that the data are collected using reliable and valid instruments. The reliability requirement calls for the instrument to read the same over time and place. The validity requirement raises even more stringent criteria as it demands that the instrument measure the intended parameter. For further readings, see K. D. Bailey, *Methods of Social Research*, 4th ed. (New York: The Free Press, 1994); W. G. Cochran, "Some Consequences When the Assumptions for the Analysis of Variances Are Not Satisfied," *Biometrics* 3 (1947): 22-38; J. Cohen, *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed. (New York: Academic Press, 1988); W. J. Conover, *Practical Nonparametric Statistics*, 3rd ed. (New York: John Wiley & Sons, 1998); R. Dubin, *Theory Building*, 2nd ed. (New York: The Free Press, 1978); C. Eisenhart, "The Assumption Underlying the Analysis of Variance," *Biometrics* 3 (1947): 1-21; R. A. Fisher, *The Design of Experiments* (New York: Hafner, 1966); J. P. Guilford and B. Fruchter, *Fundamental Statistics in Psychology and Education*, 6th ed. (New York: McGraw-Hill, 1978); F. N. Kerlinger and H. B. Lee, *Foundations of Behavioral Research*, 4thed. (Forth Worth, TX: Harcourt College Publishers, 2000); H. C. Kraemer and S. Thiemann, *How Many Subjects* (Newbury Park: Sage Pub., 1987); M. W. Lipsey, *Design Sensitivity* (Newbury Park:

Sage Pub, 1990); S. R. Searle, *Linear Models* (New York: John Wiley & Sons, 1971).

23 One can quickly notice that Galton employed only mean statistics and did not use advanced statistical methods to arrive at his conclusions. And yet this does not exempt Galton himself from checking the validity of his analysis. Nor does it preclude us from asking whether or not his study or those that followed him comply with some basic prerequisites for performing statistical tests. We can still ask whether or not those studies carried enough statistical power, or, whether the events observed by those studies for measuring the efficacy of prayer occurred randomly and were distributed normally, or, whether the collected data for statistical analysis really and actually measured the efficacy of prayer and not something else.

24 This is the usual paraphrase. It comes from the following passage in Einstein's letter to Max Born dated December 4, 1926: "Quantum mechanics is certainly imposing. But an inner voice tells me that it is not yet the real thing. The theory says a lot, but does not really bring us any closer to the secret of the 'old one'. I, at any rate, am convinced that *He* is not playing at dice…" See Irene Born, trans., *The Born-Einstein Letters* (New York: Walker and Company, 1971): 91.

25 Even if we assume that Galton's data are fit for a statistical analysis called a *t-test,* the result appears to reject significant differences among the means of age data of various classes.

26 H. Nakamura, *Gotama Buddha, A Biography Based on the Most Reliable Texts,* 2 vols. (Tokyo: Kosei, 2000). In this two-volume publication, Nakamura (Vol. 1, 9) attempts "to uncover, as far as possible, the historicity of Gotama." This is done by eliminating mythical material in traditional Buddha biographies and (ibid.) "by bringing together the fragmentary description of his life contained in the oldest texts [i.e., ancient strata in Pāli and Sanskrit texts]." In the second edition (the first edition was published in 1969), he (ibid.) updates his sources by taking into consideration some additional accounts available from ancient layers in later textual sources, archaeological finds, and also Buddhist art. His approach (ibid., 15-25) employs the critical textual analysis of modern scholarship, knowledge gained from personal visits to sites connected with the Buddha, and non-Buddhist documents composed of the time of Gotama Buddha. Even though Nakamura himself does not claim to have succeeded completely in portraying the historic Buddha, his massive work collects invaluable information to add to the work of prior researchers who had already

investigated the life of Buddha before him (e.g., É. Lamotte, "La légende du Buddha," *Revue de l'histoire des religions* 134 (1948): 37-73; A. Bareau, "La jeunesse du Buddha dans les Sūtrapiṭaka et les Vinayapiṭaka anciens," *Bulletin de l'École Française d'Extrême Orient* 61 (1974): 199-274). It is important to note that the way Nakamura depicts the historical Buddha represents one view in opposition to another view that the historical facts about the Buddha cannot be separated from the accompanying legends. For a summary of these diverging views, see J. W. de Jong, "The Beginnings of Buddhism," 11-12. See also E. Conze, *Buddhism*, 34-38; É. Lamotte, *History of Indian Buddhism: From the Origins to the Śaka Era* (Louvain-La-Neuve: Université Catholique de Louvain, Institut Orientaliste, 1988), xxiv-xxv.

27 This kind of criticism comes from L. C. Damais, "Preseventeenth-Century Indonesian History: Sources and Directions," in *An Introduction to Indonesian Historiography,* edited by Soedjatmoko (Ithaca, NY: Cornell University Press, 1965), 24-35. Here Damais argued that the cause of the problem in the reconstruction of history might not always be the sources. In relation to existing documents, he maintained that there were places where studies did not make full use of the primary sources at hand. For this reason, he would like to see studies that allow the documents to speak for themselves.

28 F. Galton, "Psychometric Experiments" *Brain: A Journal of Neurology* 2 (1879): 149-162. On p. 149, he said: "Psychometry, it is hardly necessary to say, means the art of imposing measurement and number upon operation of the mind, as in the practice of determining the reaction-time of different persons. I propose in this memoir to give a new instance of psychometry, and a few of its results. They may not be of any very great novelty or importance, but they are at least definite, and admit of verification; therefore I trust it requires no apology for offering them to the readers of this Journal, who will be prepared to agree in the view, that until the phenomena of any branch of knowledge have been subjected to measurement and number, it cannot assume the status and dignity of a science."

29 S. P. Thompson, *The Life of Lord Kelvin* 2 (New York: Chelsea Publishing, 1976), 792. In his lecture on Electrical Units of Measurement on May 3, 1883, he said: "I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind."

30 In mathematics, Zero has a peculiar property. While n (any number) times zero is equal to zero, n divided by zero is indeterminate. This indicates that Mathematics too has limited power in delineating or proving things. The earliest evidence for today's symbol of zero came from the Kota Kapur Inscription in Bangka Island, Indonesia, dated to 608 Śaka, or 680 CE (see G. Coedès, "A propos de l'origine des chiffres arabes," *Bulletin of the London School of Oriental and African Studies* 6 (1931): 323-328). Then, since early on, the Buddhists have known things that are called immeasurable (*apramāṇa*), unthinkable (*acintya*), or inexpressible (*anabhilāpya*), besides those that are measurable, thinkable, and expressible. Those that are considered immeasurable are known as the qualities of divine abodes (*brahmavihāra*), which are love (*maitrī*), compassion (*karuṇā*), joy (*muditā*), and equanimity (*upekṣā*). An example of the unthinkable is the result(s) of an action (karma). In terms of physical objects, the magnitude, the age, or the dimensions of the universe, are often stated as immeasureable, uncountable, inconceivable, or innumerable (*asaṃkkhyeya*). In the *Gaṇḍavyūha-sūtra,* the youth Indriyeśvara recounts numerical figures up to a number which is inexpressible (*anabhilāpya*). All these immeasurables are so stated not because they are unknowable but because they indeed exhaust the limits of human expression, language, or thinking. In other words, not all knowledge is expressible via verbal language, for there are also things that can only be communicated via other means, hence a direct mind to mind transmission.

31 Principal component analysis, also known as factor analysis, is a useful tool for analyzing multivariable data frequently encountered in the field of psychology. Due to its power to crunch a huge volume of multivariable data into a set of manageable significant factors, factor analysis is often viewed as the queen of statistical analysis. See F. N. Kerlinger and H. B. Lee, *Foundations of Behavioral Research*.

32 This means that, even though statistical analyses are quantitatively oriented, the method is not free from qualitative processes. Galton certainly was unable to foresee this development when he maintained the dignity of science by associating it with measurement and numbers, or else he would be very much disappointed.

33 From life experience we know that a tool can be powerful and useful only when it is applied within the limits of its purpose and capacity, otherwise the result are unpredictable.

34 I. Barbour, *Religion in an Age of Science* (San Francisco: Harper & Row, 1990).

35 Ibid., 32, 36.

36 The religious or spiritual method, the primary process which produces religious phenomena, is undetected or hidden in Barbour's diagram. The diagram could easily make one overlook procedures capable of inducing insight or direct knowledge, and thereby making original discoveries. And not unlike the scientific method, the spiritual method too has features like replicability and verifiability, and certainly its own requirements and limitations. This means the quest for religious or spiritual knowledge in religious studies should not just stay at the output or, for that matter, the input, but ought to take into more serious consideration the dynamic processes, e.g., the spiritual method and spiritual technology, which generate them.

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