Integration of Islamic Spiritual Values with Mathematics Teaching

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Abstract

The purpose of this study is to explore the integration of mathematics with Islamic spiritual values in learing mathematics atIslamic-based junior high schools. This research follows a qualitative study with the help of case studies to learning mathematics in twoIslamic-based junior high schools (MTs / SMP) namely MTs Negeri 1 Banyumas, and SMP Al-Irsyad Al-Islamiyah Purwokerto, Banyumas Central Java, Indonesia. The collection of data involved in-depth interviews, observations and document reviews. Data collection was completed by using snowball the technique. After the data were analyzed inductively, interactively and simultaneously, they were then described and interpreted in proper manner. The results revealed that the integration of mathematics with Islamic spiritual values has positive impact in shaping a better life of the Muslim youths. Such integration accelerates the slogan called Islamization of science for the greater interest of the Muslim ummah.

Keywords: Mathematics, Integration, Islamic spiritual values, Islamization, Science

Introduction

The concept of Integrative Learning has becomea buzz in this age of globalization.The term Integrative Learning refers to a method of education which motivates students to explore the inter- and intra-disciplinary connections among their curricular and co-curricular practices. Integrative Learning assists students in making connections within their majors or fields, between their curriculum and cocurriculum, or between their academic knowledge and practice (Huber, Hutchings, & Gale, 2005). This process of integration can be used in teaching Islamic values along with conventional scientific learnings to create a Muslim generation of youths with multidisciplinary knowledge (Anas, Alwi,Razali,Subki& Bakar, 2013).

Traditionally, it is obligatory for the Muslim ummah to explore and master the different branches of knowledgethat start with gaining the knowledge of Fiqh (Islamic Jurisprudence), Aqida(Islamic faith) and Akhlak (morals). The adequateunderstanding of the Islamic knowledge coupled with the modern knowledge can lead to the achievement of an integrated knowledge that fits into Islamic requirements (Anas, et al., 2013). Meanwhile, the very concept of education from Islamic point of view is that the purpose of education is to inculcate goodness or justice in human beings (Attas, 1993). It is evident from the sayings of the Prophet Mohammed (pbuh) that God taught him to be a man of all the noble virtues. There are plenty of evidences found in his hadiths which stresses on acquiring and spreading the knowledge to attain piety. For example, Abu Hurairah reported the Prophet (pbuh) as saying: If anyone pursues a path in search of knowledge, Allah will thereby make easy for him a path to paradise; and he who is made slow by his actions will not be speeded by his genealogy (Sunan Abi

Dawud- 3643). Ibn 'Abbas also narrated that the messenger of Allah said: 'One knowledgeable man is more formidable against the Shaitan (Evil) than one thousand devoted worshipers (Sunan Ibn Majah- 222). In another hadith narrated by Abu Hurairah, the Prophet said: "The best of charity is when a Muslim man gains knowledge, then he teaches it to his Muslim brother." (Sunan Ibn Majah-243).

However, some proponents of secularismand modernism argue that knowledge is collective and free from any particular value. They further argue that knowledge is not influenced by the values of any culture or community. For example, Hoodbhoy(1991) said that knowledge is not associated with some belief. Likewise, AbdusSalam (in Hashim&Rossidy, 2000) stated that knowledge is not universally influenced by some belief. Meanwhile, these neutral propositions of those secularists were objected by the then Muslim thinkers massively. For example, Kirmani (1989) argues that modern knowledge does not offer anything neutral or free from values but ironically the western society and culture narrowly set its priorities and worldview. Sardar (1988)also argues that body of knowledge developed by the westerners is deviated from the ethics and morality that the religion of Islam concerns the most. He furtherargues thatsuch knowledge andthe school of thoughts associated with this are designed in a way that protects the western interest only.

Scholars within the Muslim world believe that the widespread adoption and exercise of western knowledge base promote secularists' ideas in to the education system of Muslim nations which eventually accelerates massive loss to the Islamic Identity of the Muslims. Therefore, they propose that the integration of Islamic knowledge and the knowledge of the west needs to be promulgated among the new generation of Muslims so that they can lead a modern life based on the sacred principles of Islam (Anas, et al., 2013).Some scholars further caution that Muslims should be careful enough in appreciating this science revolution led by the Jews as it propagates secularist sentiments and endanger the spirituality that Muslims possess for their religion (Kifli&Razak, 2005). They suggest that look science from Islamic point of view so that they can overcome this endangerment and return to purity (Rahman, 2003).

Having perceived the urgency of initiating integrative learning models in the Muslim education system, the movement for "Islamization of knowledge" started to emerge in the Muslim Ummah. Hashim&Rossidy, (2000)state that the desire of the Muslims to get out of the suppression of dominant western civilization provoked them to go for thisepistemological revolution. The movement was later leveled as the Islamization of contemporary knowledge by the subsequent scholars. For example, Al-Attas (1993) stressed and used the term "Islamization of contemporary knowledge in his writings. Thus, this concept of Islamization was not a mere jingle without any importance. It rather carried a deep meaning to thoseMuslim think-tank who brainstormed it.

A number of researchers drew concrete attention to this direction. For example, Kuntowijoyo (2005) states that the scholarly world was benefited by the enormous development of Quran based science.He argues that the normative principlesof the Qur'an might be altered into empirical model and rationality for rationalhuman needs. Suproyogoand Bagir, (2005) states that the basic standpoint of integration of knowledge is to establish the Qur'an and the tradition of the Prophet as the prime theory of science.Al-Faruqi (1982) and Nashr (2008) state that the concept of Islamization of science is to rebuild science by providing basic values and goals which are consistent with Islam. They further state that knowledge should be built on inspirational values so that it will contribute to the development of spiritual capacities and reasoning of human beings simultaneously. Mahmud (1996) propose several

propositions that he thinks make the Islamization of science possible. He argues that the world as the object of science is not value free and it can be utilized for noble causes.Therefore, if science is utilized for better purposes, it will generate benefits to society. Though most of the scholars agree with the concept of integration, some of them caution that the process of integration should be carry out in a way that it does not just attempt to fit the Qur'anic verses with science. They state that integration is welcomed only when it generates newer forms knowledge. Bagir (2005) also states that integration is needed in a situation where the separation of these branches of knowledge create negative phenomena.

Though there has been a good number of literatures on the Islamization of science per se, the research about how the integration of mathematics can help create spiritual values is at its infancy. Dede.Y. (2006) states that mathematics is a branch of science which contains a variety of valuesand requires an innovative improvement to provide meaningful values for life. Mas'ud, Zein(2014) explainedthat the integration of spiritual and mathematic values can be carried out through interconnection referring to ontology and epistemology perspectives. Mufid, (2014) states that the principles of mathematical problem solving are developed from the context of spirituality that requires reasoning and analyzing values, for example by linking mathematics to Al-Quran. The integration of mathematics with Islamic spiritual values is an effort to integrate mathematics with Islamic spiritual values in mathematics learning.

In accordance with the direction of education policy in Indonesia as outlined in the curriculum of 2013, the issue of spirituality is a top priority. The development of spiritual attitude is expressed in the first core competency (KI-1) of all lessons.Those integrated values are suitable in mathematics as a subject to increase its benefit in human life (Kusno, 2017). Islamic spiritual values in mathematics learning are integrated with the context of teaching materials so that internalization of spiritual values runs simultaneously with the process of reasoning. However, one of the challenges for mathematics teachers in Islamic-based schools is to realize Integrative learning that involves the intellectual, emotional, physical, social, aesthetic and Islamic spiritual values simultaneously in learning mathematics. In addition to the lack of teachers' experience in implementing it, there is limited literature on integration models (Salafudin, 2015)This study is aimed at exploring about how the integration of mathematics contribute in attaining Islamic spiritual values among the studnets in Islamic-based junior high schools (MTs Negeri 1 Banyumas, and SMP Al-Irsyad Al-Islamiyah Purwokerto, Central Java, Indonesia).

Research methods

This study applieda qualitative method with the designing of case studies for two Islamic-based junior high schools namely MTs Negeri 1 Banyumas, and SMP Al-Irsyad Al-Islamiyah Purwokerto, Central Java, Indonesia.Data for this study were collected through in-depth observations, and document studies that are believed to reveal cases of integration of mathematics with Islamic spiritual values in mathematics learning. Data collection were done with snowball, meaning that research moves between one subject and another subject where each action is a step towards perfecting information. The data search ends after there were no more variations of the data or is already saturated. The data were then analyzed inductively, interactively and simultaneously, they were then described and interpreted.

Case 1: The concept of Function

Burhan, Aminah (Burhan's wife) and Ilham (Burhan's son) experienced a plane crash and died on the way home from the hajj. At that time, Burhan was 45 years old, Aminah was 40 years old and Ilham was 20 years old.

1) How many family members of Mr. Burhan died?
2) How old were each of them?
3) Can you make sequential pairs, and arrow diagrams of Burhan'sfamily members who died while performing Hajj with their respective ages?
4) Related to the diagram that has been made, answer the following questions:
    a. Could there be someone who did not experience death?
    b. Was it possible that someone died more than once?
5) Pay attention to your answers in points 3) and 4). These relationships are called as functions. Based on your own opinion, can you explain what is called as Function?

Case 2. The Concept of the slope of a line

From the results of observations on the implementation of learning and field notes at SMP Al-Irsyad Al-Islamiyah, the data reveals that mathematics learning on topic of the slope of a line was carried out through the following steps:

1) Learners were initially asked to observe a standard triangle image whose tip coincides with point O (0,0) and the other right side coincides with the X axis and is parallel to the Y axis;

2) The teacher extended the side that was parallel to the Y axis as much as the coincided sides and let the X axis be constant, then he asked how the slope changes the line, and the students answered that the slope was getting down. Then the teacher reinforced that the slope was directly proportional to y;

3) The teacher extended the side that coincided with the X axis by and left the side that is parallel to the Y axis, then asked the students how to change the slope of the line, and the students responded that the slope was getting down. Then the teacher reinforced that that the slope was inversely proportional to x.

4) The teacher asked what components affected the slope of a line, then students answered the components x and y.

5) The teacher asked them again, "the slope was directly proportional to y and inversely proportional to x, how can you formulate the slope into a mathematical model?" With the guidance of the teacher, students concluded that the gradient slope line $m_g = \dfrac{\Delta y}{\Delta x}$.

6) In connection to these findings, the teacher delivered a spiritual message that the change in the slope of the line represents the ups and downs of human faith. The ups and downs of human faith are influenced by the y factor as the servant's relationship to Allah SWT (*hablunminallah*or the relationship between man and Allah SWT) which can be done through prayer, *istighfar*, fasting, repentance, and other acts of worship and the x factor as the servant's relationship to others for example playing, trading, joking and other activities. The more relationship to Allah, the more our faith rises, conversely the lower our relationship to Allah, the less our faith raises.

Results and Discussion

There are several mathematical materials in their presentations that are integrated with Islamic spiritual values:

Table 1. Mathematical Topics integrated with Islamic Spiritual Values

Schools	Topic	Integrated Islamic Values
MTs N Banuyumas	Concept of Function	The values of Faith and Obedience
SMP Al-Irsyad	Straight-line gradient	The values of Faith

Case 1: Function Concept

Based on the results of document review and mathematics learning observations on functional material at MTs Negeri 1 Banyumas, it is found that the teacher integrates the learning of the concept of function with the context of death during the performance of the hajj (pilgrimage). through a plane crash events:

To develop material forteaching the concept of function, modeling is used thinking of some imaginary figureswho died as*shahid*(one who dies for his faith) during the pilgrimage. Here, the illustration tries to show the process of death in the course of the pilgrimage as a reflection of Islamic spiritual values which resembles the reflection of function. This schematic integration of Islamic spiritual values with the concept of function is illustrated in the following diagram:

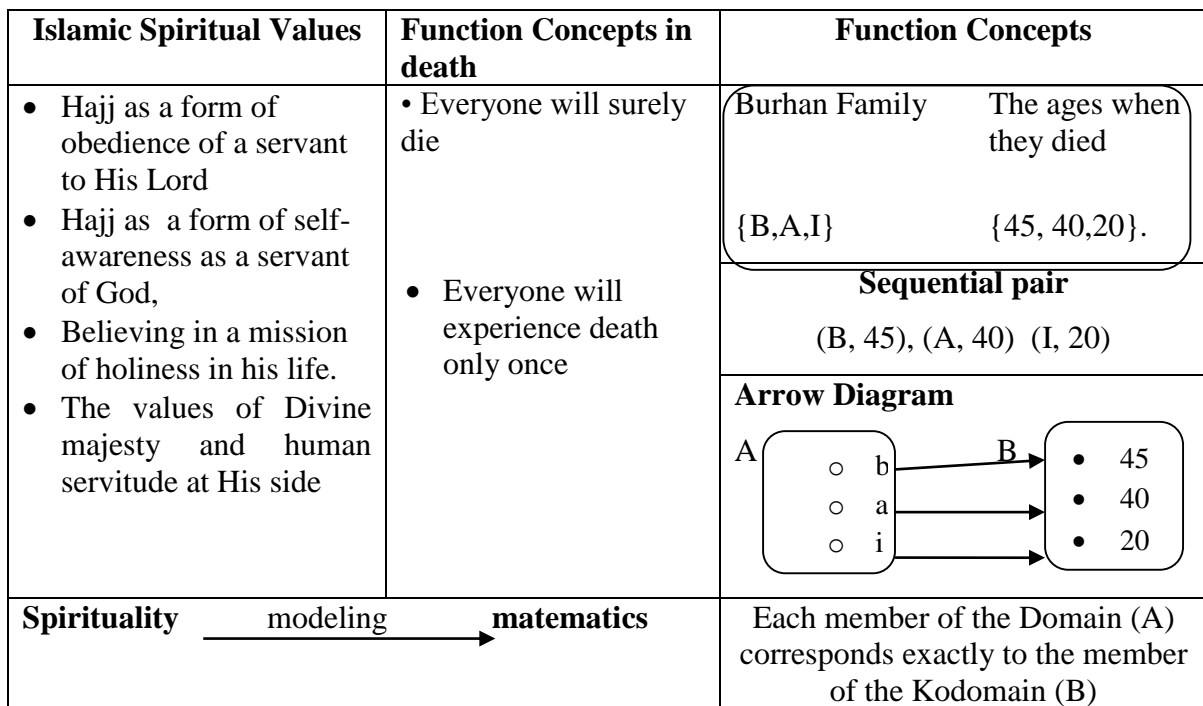| Islamic Spiritual Values	Function Concepts in death	Function Concepts
• Hajj as a form of obedience of a servant to His Lord • Hajj as a form of self-awareness as a servant of God, • Believing in a mission of holiness in his life. • The values of Divine majesty and human servitude at His side	• Everyone will surely die • Everyone will experience death only once	Burhan Family — The ages when they died {B,A,I} — {45, 40,20}. **Sequential pair** (B, 45), (A, 40) (I, 20) **Arrow Diagram** A: o b, o a, o i → B: 45, 40, 20
Spirituality → modeling → **matematics**		Each member of the Domain (A) corresponds exactly to the member of the Kodomain (B)

Figure 1: Islamization of Mathematics through the concept of function

Death events are sometimes associated with accidents during the pilgrimage show the message of KhusnulKhatimah, namely the journey of one's life which ends with pious charity. The context of death was chosen to construct the notion of function because the characteristics of a function was defined in a death event, namely the relationship between a person and his age when he dies. To be able to define the function, the students must find the characteristics as a relation, namely the existence of the area of origin (domain), the area of friends (codomain) and rules that connect the members of the area of origin with the area of friends. In addition, it

must also be shown, that each member of the domain is paired exactly with the member of the domain. To introduce the area of origin in the event, the teacher asked the students about the number of Pak Burhan's family who died in the accident. To introduce the area, the teacher asked the students about the age of Pak Burhan's family members. To ensure a relationship, the teacher asked students to relate between family members of Mr. Burhan who died with his age when he died.

To ensure that the relationship is of special nature which means that each member of the domain deals with one member of the domain, the teacher asked the students about the nature of the death that will happen to anyone including Pak Burhan's family member. Through the question whether a person experienced a death or not, the students expressly said no. This means students consciously stated that everyone must die at a certain age. Based on Mathematic meaning, each member of the domain must have a partner with a member at the domain, or in other words no domain member has no partner on the domain. Furthermore, to ensure that each member in the paired domain is exactly one in the codomain, the teacher then asked the students 'is it possible that someone die more than once?". Everyone must experience death and death is experienced by each person exactly once, so that there is a special relationship between people with their deaths, namely everyone in pairs exactly one with his death. In other words, the death event is an example of a function which can also remind humans to remember Allah. This is in accordance with what stated by Iyer (2013: 18-19) about moralizing (restructuring activities of one's social experience through rational analysis). Seen from Mathematic meaning, it stated that each member of the domain must have a partner with a member at the domain, or in other words no domain member has no partner on the domain. Furthermore, to ensure that each member in the domain of their partner is exactly one in the codomain, the teacher asks the students if there is someone who has died more than once. Because everyone must experience death and death is experienced by each person exactly once, meaning that there is a special relationship between people with their deaths, namely everyone in pairs exactly one with his death. In other words, the death event is an example of a function which is able to remind humans to remember Allah. In summary, the process of integration of spiritual mathematics in the presentation of the concept of function is described as follows:
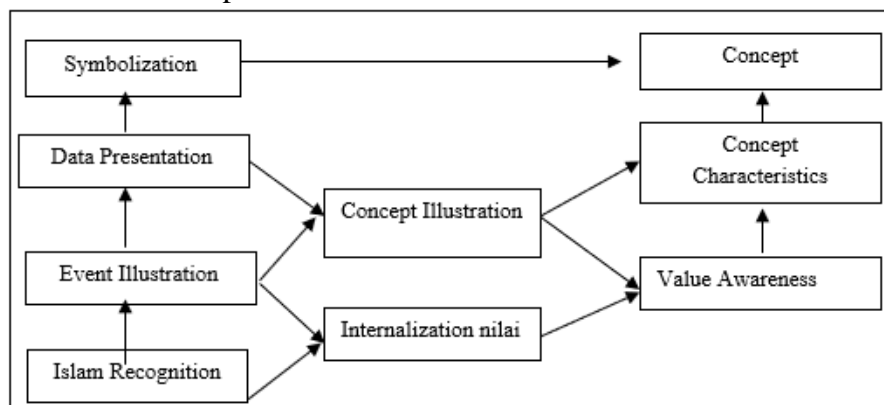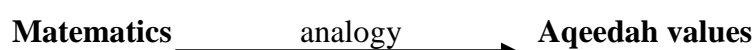

Figure 2: The process of mathematical spiritualization in the Function Concept

Case 2: Slop Line Concept

As for schematically the integration of Islamic spiritual values on topic of straight line gradient is illustrated in the following diagram:

Matematics —— analogy —→ **Aqeedah values**

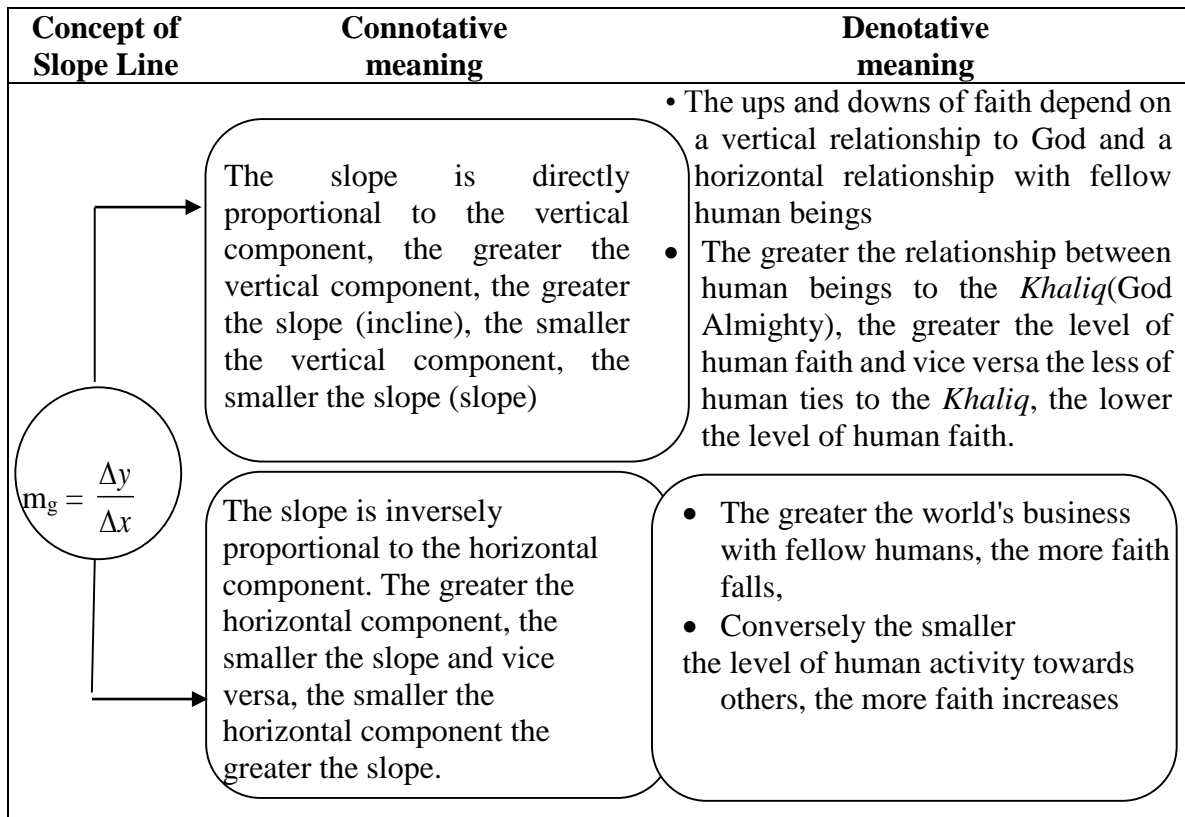| Concept of Slope Line	Connotative meaning	Denotative meaning
$m_g = \dfrac{\Delta y}{\Delta x}$	The slope is directly proportional to the vertical component, the greater the vertical component, the greater the slope (incline), the smaller the vertical component, the smaller the slope (slope)	• The ups and downs of faith depend on a vertical relationship to God and a horizontal relationship with fellow human beings • The greater the relationship between human beings to the *Khaliq*(God Almighty), the greater the level of human faith and vice versa the less of human ties to the *Khaliq*, the lower the level of human faith.
	The slope is inversely proportional to the horizontal component. The greater the horizontal component, the smaller the slope and vice versa, the smaller the horizontal component the greater the slope.	• The greater the world's business with fellow humans, the more faith falls, • Conversely the smaller the level of human activity towards others, the more faith increases

Figure 3: Islamic Mathematics on Straight Line Gradient

In addition, the use of the analogy of the ups and downs of the line gradient to explain the ups and downs of the faith has a contribution to facilitate students to digest and understand the nature of the slope both mathematically and philosophically more deeply. The process of integrating the mathematical aspects of Islam in the material of a straight-line gradient is given in the following chart:
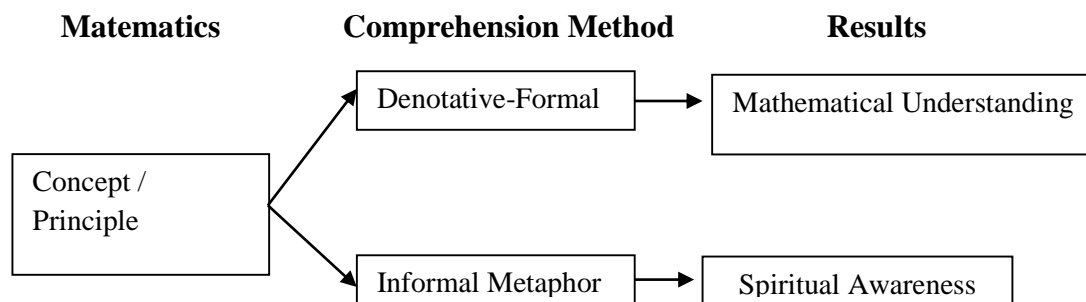
Figure 4: The mathematical process of Islam in straight-line gradient material

Conclusion

The results of the case studies show that Islamization of Science helps the Muslim students in attaining the Islamic spiritual values. It is observed from the case studies that the sample schools of Indonesia followed the integrative model of teaching mathematics which is found effective toaware the young students about the spiritual understanding from an early age. This integrative approach of learning science in general and learning mathematics in particular will come handy for the Muslim students across the world. As the literatures studied suggest that the Islamization of science has significant impact in shaping a better worldly and spiritual

life,Muslims can take advantage of this approach and put and effort to combine their Islamic and scientific knowledge together. This is how they can attaina more decent living standard and lead a life with utmost ethics and morality. This practice will also help the Muslim world produce a more spiritually qualified human capital in the field of science, technology and business.

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