

# Mathematical Values Inculcation: A Perspective of Islamic World Views

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## **Abstract**

The emergence of the need of education of best quality by many world nations brought the idea of values inculcation in the attainment of this noble objective. Therefore, this paper examined Islamic universal mathematical values inculcation model in mathematics teaching and learning. Comparison between Islamic universal values and the values in the context of mathematics contents delivery were examined. The study employ mixed methodological techniques for its data analyses which include: Structural equation modeling (SEM) and qualitative approach. A purposeful sampling technique of n=509 mathematics teachers respondents were used for the study. The authors also argue that for effective mathematical contents delivery should be one that advocates values inculcation. Suggestions were made on effective Islamic universal values inculcations in mathematics teaching and learning in encounter.

**Key words:** Mathematics; Values; Inculcation and Islamic world view.

## Introduction

The inculcation of values in the attainment of quality education generally and mathematics education in particular cannot be over emphasized. This was because value based system of education guaranteed human and national development tendencies. Value can be seen some things worth valuing and it could be inform of ideas that we believe are important or some things that we rate highly important. Examples of some of these values are: helping others; having fun; being honest; good health; love of family; beauty; education; liberty; justice; money and so forth (Rokeach, 1973).

The general perspective of the terms 'values' can be referred to as something of interests, pleasures, likes, desires, goals needs and many other kinds of selective orientation (Rokeach, 1973). It may be viewed as a conception, explicit or implicit distinctive of an individual or characteristic of a group, of the desirable which influences the selection from available modes, means, and ends of action (Kluckhohn, 1951).

Accordingly, values have three dimensions: cognitive, affective and directive. The cognitive dimension refers to value as an internal code or mechanism that enables us to distinguish between good and bad, right and wrong and that constituting the grounds for decision-making process and the final course of action, (Kluckhohn & Strodtbeck, 1961). In addition to that, values function as a standard which assists individual in decision-making to formulate judgments and to select the most sound, acceptable and appropriate course of action (Grundstei, 1991).

The affective dimension refers to values as an expression of human needs which create a specific mode of conduct or end-state of existence and it project the state of desirability and human aspirations that are activated by human needs and predispositions. The directive dimension implies that values provide direction and guidance in resolving conflicts or dilemmas, and in coping with needs or claims for social and psychological defences of choices made, (Rokeach, 1973).

Therefore, these assertions indicated that the amalgamation of cognition, affection and direction generates a comprehensive and inclusive notion of value. Values can be classified into subsets or clusters: for example, basic values, moral values, social and political values, spiritual values and other more specific values. Basic values include: survival, caring, comfort, dignity, freedom, knowledge and self-respect. They are universal ends in themselves, and are rooted in human nature, (Beck, 1993).

Basic values represent the ultimate life-goals that people have and in order to promote these ultimate life-goals people need various intermediate or instrumental values that function as a means of attaining the fundamental or basic values. These instrumental values include moral, social and spiritual values. While moral values are the subset of values which include among others: carefulness, responsibility, courage, self-control, reliability, honesty and truthfulness (Beck, 1993).

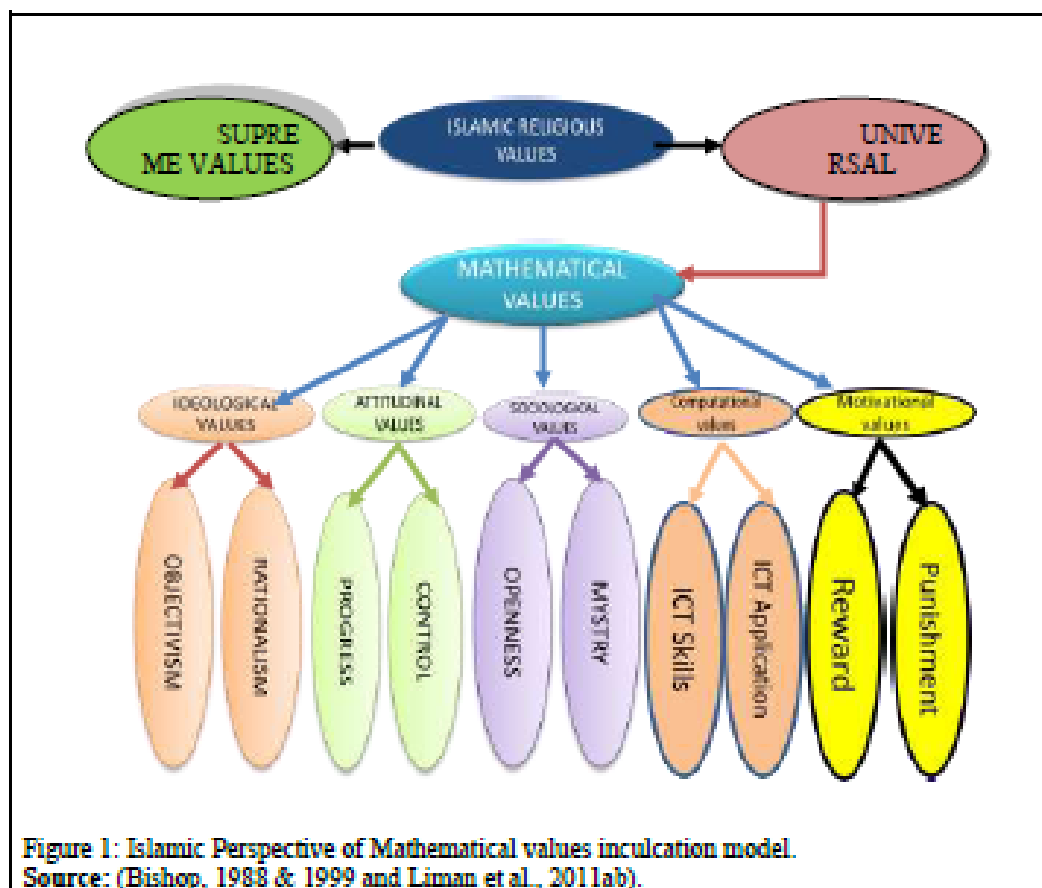
Spiritual values include awareness, breadth of outlook, integration and gratitude, while social and political values include peace, justice, cooperation, sharing, loyalty, solidarity and tolerance. These diverse values are interconnected and ordered within a system that provides a frame for their ongoing interactive relationship and for weighing them against one another, (Beck, 1993).

Conclusively, mathematical values usually referred to those affective qualities which mathematics teachers' poster and promote through schools' mathematics teaching and learning. These values usually tend to stay longer than the normal procedural

mathematics teaching and learning (Bishop, 1988 & 1999). The Figure below gives the Islamic conceptual model for values inculcation model in mathematics teaching and learning.

#### Conceptual Frame-work of Islamic Mathematical values inculcation

There were several dimensions and conceptualization of values in mathematics teaching and learning, for instance, Bishop, (1988 & 1999); Bishop & Clarkson (1998) and Liman et al., (2011a,b). But this study developed a conceptual Islamic frame-work for mathematical values inculcation. Figure 1: shows the conceptual Islamic model for values inculcation in mathematics teaching and learning.



#### Previous Study

There were numerous researches conducted on mathematics values, such as Krathwohl, Bloom and Masia, (1964); Raths, et al., (1987); Tomlinson and Quinton, (1986), on affective aspects of mathematics education. Burston, (1981); Fasheh, (1982); McLeod, (1992); Thompson, (1992) and Sosniak, et al, (1991) on the social and cultural aspects of mathematics education. Bishop, (1988; 1991; 1999; 2002); Davis and Hersh,

(1981) and (1986); Joseph, (1993) and Wilson, (1986) made tremendous contribution on the affective domain and values education generally.

With regard Krathwohl's (1964), analysis of the affective domain of Bloom's well-known Taxonomy first introduced the ideas of 'values' and 'valuing' as important educational objectives in the area of mental cognitive development of individual and that analysis suggested five levels of response to a phenomenon in an increasing degrees of commitment and these were: (i) Acceptance of value (ii) Preference for a value (iii) Commitment (iv) Conceptualization of a value and (v) Organization of a value system. These values concurred in contrast with Islamic universal values in the sense that Islam advocated the concept of likeness and sincerity of purpose in whatever worthy of doing. For instance, in one of the Prophet (P.B.U.H) Hadith said that, the actions of any one of you in doing any things will be judged according the intention.

Raths, et al., (1987) drawing an analogy from the oft-quoted book, offer seven criteria for calling something a value. They said (p.199) unless and until something satisfies all the seven criteria namely: (i) Choosing freely (ii) Choosing from alternatives (iii) Choosing after thought (iv) Prizing and cherishing (v) Affirming (vi) Acting upon choices and (vii) Repeating. We cannot call it a value, but rather either a 'belief' or 'attitude' or something other than a value. In Islam Allah (SWT) said, "There is no compulsion in religion. Verily, the right path has become distinct from the wrong path" (Qur'an, 2: 256). Therefore, their assertion concurred with Islamic belief.

In relation to values education generally, the work of Tomlinson and Quinton (1986) was particularly important since it moved the discussion from earlier reliance on the work of Kohlberg (1984) and associates into the mainstream subject curriculum. They argued strongly that when considering this area due attention should be given to three elements namely: (i) Aims or Intended outcomes (ii) Means or Teaching/Learning Processes and (iii) Effects or Actual outcomes. This is also similar to the saying of the Prophet Muhammad (P.B.U.H) that the action of any one of you is judge according to his intentions (Al-Bukhari, 1997).

Buxton (1981); Fasheh (1982) and McLeod (1992) separated the field of research on mathematical values into studies of beliefs, attitudes, and emotions. They asserted that ideas about both beliefs and attitudes towards mathematics were related to values held by both mathematics teachers and learners. In Islam believing on a thing enables valuing it. For example believing in the ones of Allah (SWT) and the Prophet Muhammad (P.B.U.H) enable one to imbibe and practice the religious obligations and the traditions of the Prophet (P.B.U.H)

Sources such as Davis and Hersh (1981) and (1986) and Joseph (1993) asserted that mathematical values inculcation proved helpful, even though they do not address values directly. Wilson's (1986) review whilst pointing out the paucity of writing and research on values in mathematics teaching also discussed on two values in mathematics teaching and learning which include: a respect for truth, and the authority of mathematics. In contrast to Islamic values, the concept of truth and authority were regarded as an (*Amanah*).

Another area of concern which this study needs to be addressed is the introduction of two additional constructs which seems to be of importance in the course of values inculcation in mathematics teaching and learning. As such, the conceptualized values

inculcation model founded by Bishop, (1988) will be extended by these two constructs namely: motivational and computational mathematical values respectively.

Motivation plays a vital role in mathematics teaching and learning and students' achievement; it is intimately linked to the ways students think, feel, and act in schools mathematics learning. At the current situation of high demand of mathematics literacy one of the fundamental challenges in mathematics teaching is convincing students that serious effort in study of mathematics as a subject will be rewarding and learning mathematics can also be an enjoyable experience. Motivation in Islam is one of the Islamic values which across of segment of human lives. Allah (SWT) repeatedly mentions in the Holy Qur'an about the rewards and punishments for those who belief in His entity and who goes astray.

There were evidences from researches on students learning in general Pintrich and Schunk, (2002), and mathematics and science education in particular, for example, Fennema, (1989) and Schoenfeld, (1992), revealed that students motivation, affect strategies and beliefs about knowledge discipline and that significantly influence the learning and performance of students in mathematics.

Furthermore, researches had proven that students' motivation and related outcomes in mathematics teaching and learning are sensitive to the characteristics of the learning context, which include teachers' instructional practices as well as school and classroom climate (Ames, 1992; Anderman & Maehr, 1999 & Eccles, et al., 1989). The figure 2 below depicts the hypothesized Islamic model for values inculcation in mathematics teaching and learning.

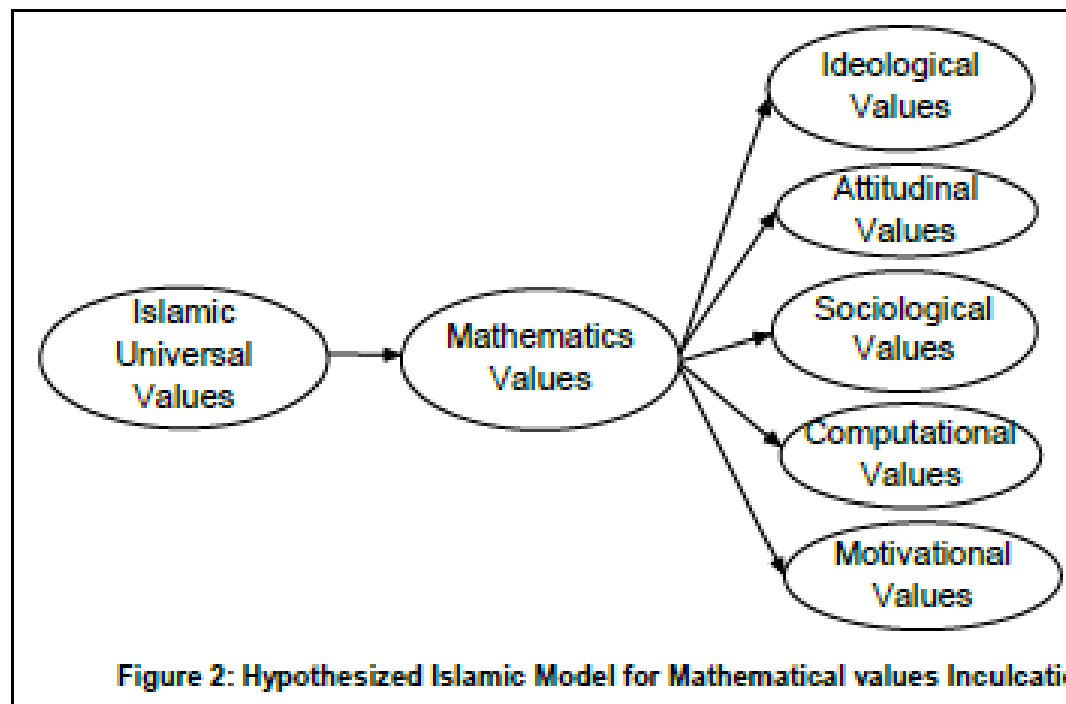


Figure 2: Hypothesized Islamic Model for Mathematical values Inculcation

### **Research Questions and Hypotheses**

The study will answer the following research questions and hypotheses based on the underline hypothesized Islamic model for mathematical values inculcation in order to understand and confirm how Islamic values are inculcated in mathematical content delivery.

#### **Research Questions**

Q1: Do the hypothesized universal Islamic mathematical values inculcation model adequately support the data?

Q2: What are the main differences between Islamic religious values and contextual mathematical values?

Q3: What are the areas of similarities between Islamic religious values and contextual mathematical values?

Q4: What are the ways of inculcation of Islamic universal values in mathematics teaching and learning?

#### **Research Hypotheses**

H1: The hypothesized universal Islamic mathematical values inculcation model will support the data.

H2: There is a difference between Islamic religious values and contextual mathematical values.

H3: There is an area of similarity between Islamic religious values and contextual mathematical values.

H4: There are different ways of inculcation of Islamic universal values in mathematics teaching and learning.

### **Qualitative Framework for Islamic Religious Values**

The concept of values in Islamic religion was sub-divided into two categories namely: supreme values and universal values. Supreme Islamic values referred to those values attributed to the unity of Allah (SWT). This includes: believing that there is God worthy of worship except Allah (SWT) and the Prophet Muhammad (P.B.U.H) is His last messenger of Allah (SWT). Therefore, each of the believers believes that Allah is the One and Only and the Sustainer, there is no deity worthy of worship except Him and there is no Lord except Him. There were many verses of the Holy Qur'an which stress the need for one to be a believer. For example, Allah (SWT) said in His Holy book that, "Each one believes in Allah, His Angels, His Books, and His Messengers. (They say,) 'We make no distinction between one another of His Messengers'" (Qur'an, 2: 286). While the Islamic universal values were those values which are universal in nature. Examples of these types of values include: being trustworthy, justice, equity, respect, kindness, love and among other Islamic universal values. These values were expected to be part and parcel of Muslim lives and should be practiced in all human transactions either between Muslims or non-Muslims counterpart. Mathematical values were themselves a subset of Islamic universal values. For instance figure 3: gives an illustrative outlook of Islamic religious values, Islamic supreme values, Islamic universal values and mathematical values.

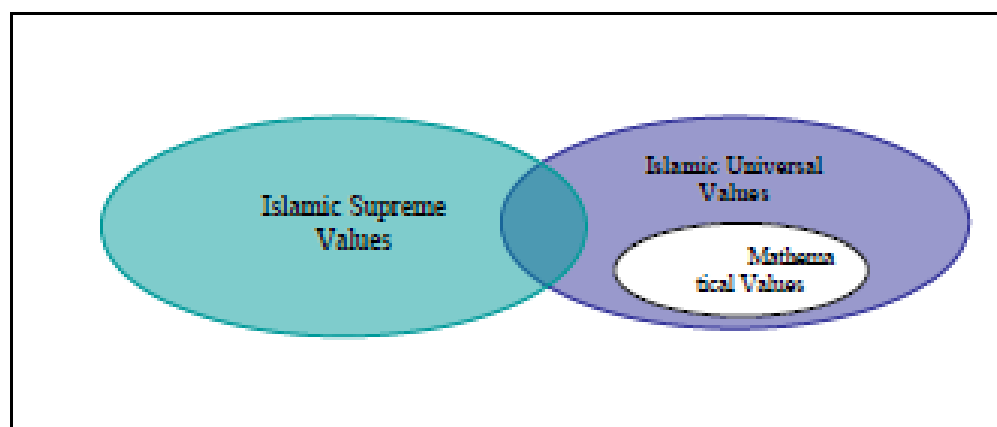


Figure 3: Relationship between Islamic Religious Values

From figure 3 above we can vividly see that Islamic religious values (IRV) is a bigger umbrella where Islamic supreme values (ISV) and Islamic universal values (IUV) emerges. While mathematical values were found to be the proper subset of Islamic universal values (IUV). Mathematically this relationship can be interpreted as, let  $\mu$  denotes the set of Islamic religious values (IRV), let ISV denotes the set of all Islamic supreme values, IUV denotes the set of all Islamic universal values and MV denotes the set of all mathematical values containing in IUV. Therefore, the following relationships hold good.  $\mu = (ISV \cup IUV)$ ,  $ISV = (\mu - IUV)$ ,  $IUV = (\mu - ISV)$ . Another description on the classification of Islamic religious values can best be presented by the following diagram.

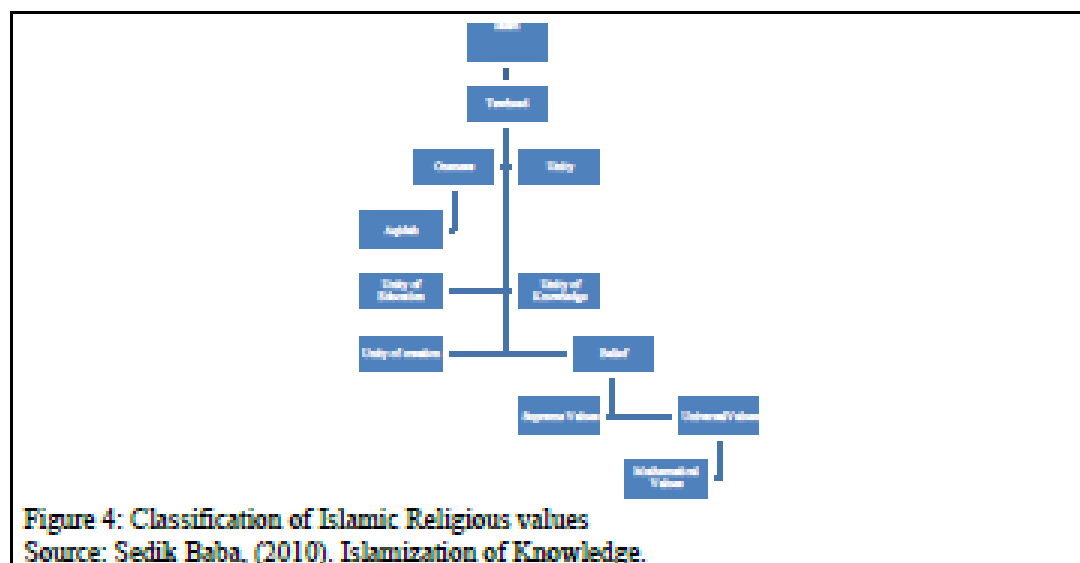


Figure 4: Classification of Islamic Religious values  
 Source: Sedik Baba, (2010). Islamization of Knowledge.

## Methodology

### Population and Sample size

The population of this study comprised all secondary schools mathematics teachers in the North-Eastern Region of Nigeria with population figure of 1145. The researcher sampled  $n= 509$  respondents for this study via a purposeful sampling technique. Furthermore, 3.5% margin of error and 95% confidence interval and online sample size calculator were used for the determination of sampling adequacy of this study (Krejcie & Morgan, 1970). Table 1 depicts the criterion for the sampling adequacy of required sample size for this study.

Population Size (1)	Confidence = 95% Margin of Error (2)				Confidence = 99% Margin of Error (3)			
	5.0%	3.5%	2.5%	1.0%	5.0%	3.5%	2.5%	1.0%
400	196	265	318	384	250	309	348	391
500	217	306	377	475	285	365	421	485
1,200	291	474	674	1067	427	636	827	1119
1,500	306	515	759	1297	460	712	959	1376

Source: The research advisors (2006).

### Research Instrument

A self constructed 7-point likert-type scale survey measure of values inculcation in mathematics teaching and learning was used in the data collection of this study. The first section is on demographic information of the respondents. The second section consisted of 42 items measure cutting across the five hypothesized dimensions of values inculcation in mathematics teaching and learning which include: ideological, attitudinal, sociological, computational and motivational mathematical values respectively. The 42 item measures were used to obtain the teachers' responses on the nature of values they inculcate in their mathematics teaching and learning.

### Data Analysis

#### Descriptive Statistics

The major analysis of this study is to test the casual relationship in the hypothesized model. Prior to these analyses, descriptive statistics is examined to determine the stability of the data. The information below provides detail information regarding the sample and the variable distributions of the study. In terms of gender, the proportion of male and female were found to be dissimilar in the sense that majority of the mathematics educator responded to this survey were male. Male mathematics teachers comprised 301 of the respondents (59.1%) leaving 208 female mathematics teachers (40.9%) responded to the survey questionnaire. Table 1: shows the distribution of gender for the survey. Table 2 gives the profile of respondents according to gender.

Table 2: Profile of Respondents for the study (Gender)



Characteristics	Item	Frequency	Percentage
Gender	Male	301	59.1%
	Female	208	40.9%
Total		509	100%

#### Testing Structural Equation Modeling (SEM) for Values Inculcation Measures

The hypothesized 5-factor dimensions for values inculcation in mathematics teaching and learning was validated using AMOS graphic window (version 16). It was used to assess the factorial validity of the model. The fit statistics showed that the model did not fit the data. ( $\chi^2(855)=1889.230$ ;  $P=.000$ ;  $\chi^2/df=2.210$ ; CFI=.859; TLI=.851; IFI=.860; GFI=.850; RMSEA=.049; SRMR=.045). The results also suggest for a revision of the model since there were few cases of cross-loaded indicators, some of which showed big error variances (Byrne, 2010; Hair, et al., 2010; Sahari, (2011); Hu & Bentler, 1999). Figure 5: shows the initial structural equation modeling for values inculcation constructs in mathematics teaching and learning among secondary schools mathematics teachers in the North-Eastern Region of Nigeria.

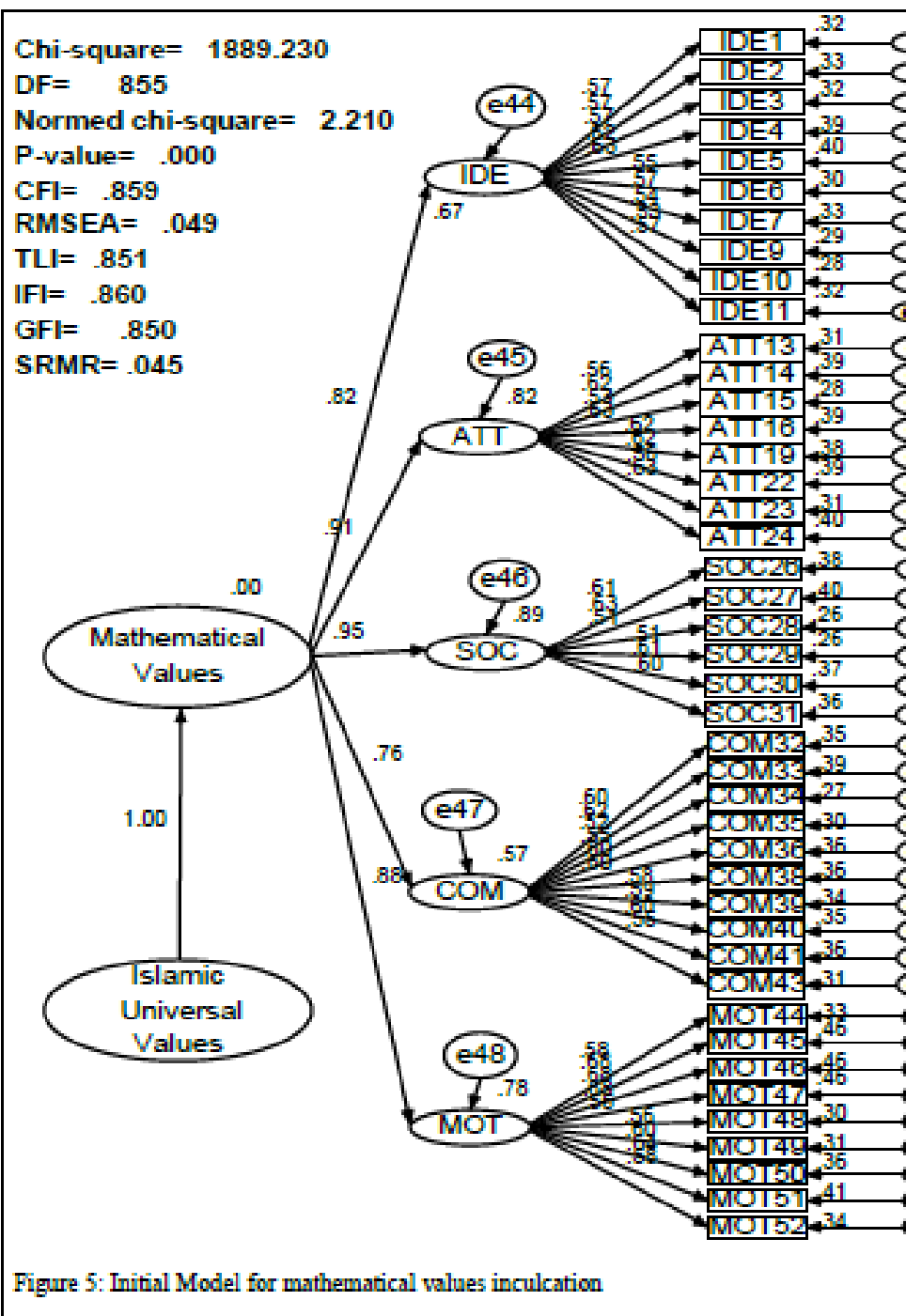
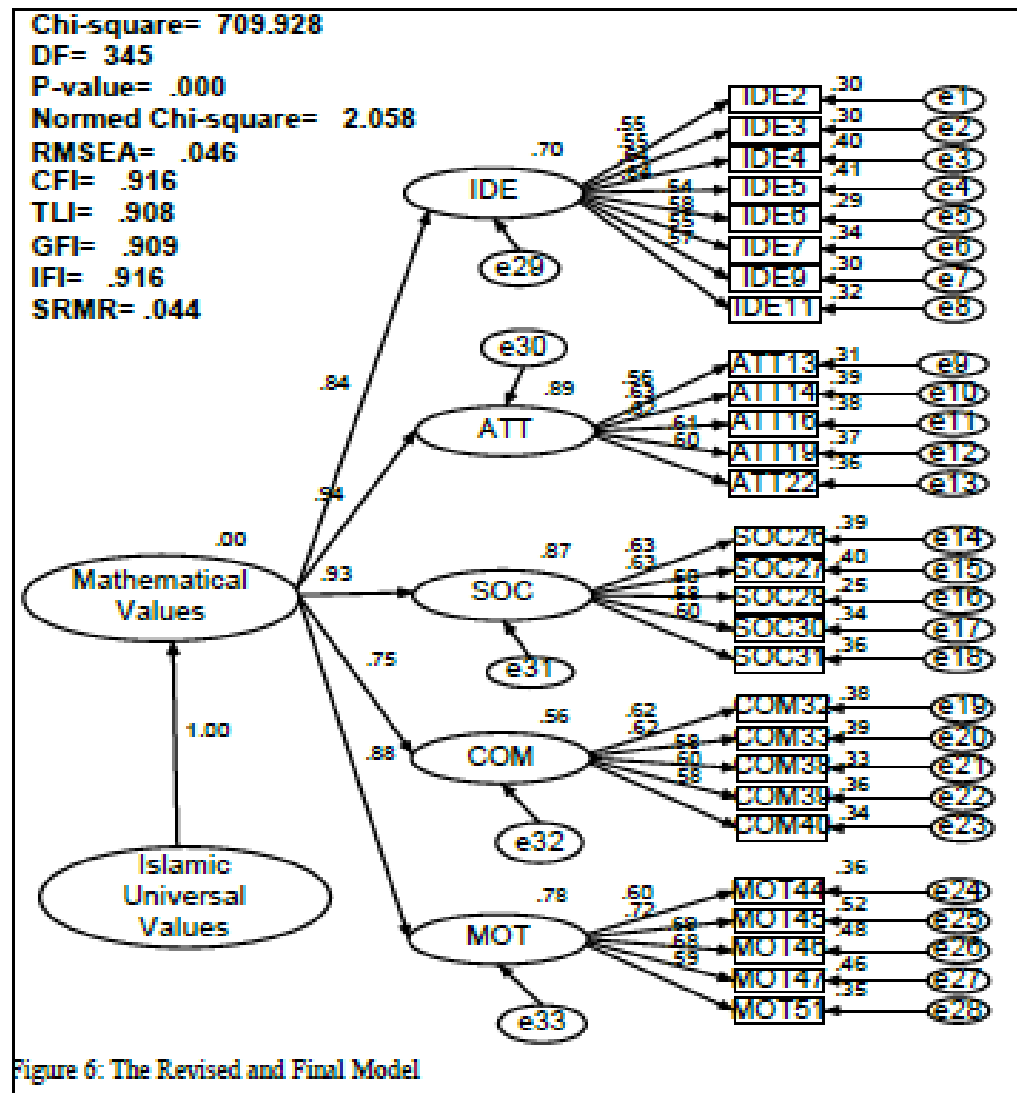


Figure 6: presents the final 28-item five-factor dimensions model analyzed using path measurement model analysis for values inculcation in mathematics teaching and learning among secondary schools mathematics teachers in the North Eastern Region of Nigeria. The analysis showed that the revised and final model was consistent with the data. ( $\chi^2$  (345) =709.928;  $p$ =.000;  $\chi^2/df$ =2.058; CFI=.916; GFI= .909; TLI=.908; IFI=.916; RMSEA=.046; SRMR=.044). The direction and magnitude of the factor loading were substantial and statistically significant (Hair, 2010 & Kline, 2011).



### Testing the Hypotheses of the study

*H1: The hypothesized Islamic universal values inculcation model will adequately support the data.*

The analysis in figure 5 and 6 revealed that the hypothesized Islamic universal values model for the values inculcation in mathematics teaching and learning adequately fitted the data. The revised model fit statistics indicated model fit with Normed Chi-square statistics = 2.058; RMSEA = .046; CFI= .916 and SRMR =.044.

*H2: There is difference between Islamic religious values and contextual mathematical values.*

The qualitative analysis between Islamic religious values and contextual mathematical values revealed a distinctive nature of the Islamic religious values. The analysis showed that there were two categories of Islamic religious values namely: the supreme values and interactive/universal values. The supreme values referred to the ownership of the unity of Allah (SWT) and believing in the messenger ship of the Prophet of Muhammad (P.B.U.H). It was also encompasses: Tawheed; Aqida; Unity of Education; Unity of Creation and Unity of Knowledge. While the Islamic universal values or interactive values referred to those values of relationships between individual and groups, Muslims and Non-Muslims counterpart. Example of these values include: trustworthiness, respect, honesty, equity, transparency, justice and among other Islamic universal values and these values were found to properly contain mathematical values.

*H3: There is area of similarity between Islamic religious values and contextual mathematical values.*

The qualitative analysis (figure 3) also revealed that there exist areas of similarity between Islamic supreme values; Islamic universal values and Mathematical values. For example, the analysis showed that Islamic religious values were a bigger umbrella where Islamic supreme and universal values came from. On the vein we have seen in also in same figure 3 that mathematical values were proper subset of Islamic universal values. Mathematically, Islamic religious value (IRV) =  $\cup$  {Islamic supreme values (ISV) and Islamic universal values (IUV)}.

*H4: There are different ways of inculcation of Islamic universal values in mathematics teaching and learning*

The qualitative analysis revealed that there are numerous Islamic values which fall under the category of interactive or universal values which Islam admonishes each and every Muslim to poses them for the harmonious existence of all mankind. These values which include among others are: Trust, Justice, Competency, Verification, Peace, Equity, Modesty, Respect, Tolerance, Patience, Perseverance, kindness, love, compassionate, unity, cooperation/collaboration, Punctuality, Precision etc. Therefore, the analysis on the strategies and approaches to the inculcation of these values in the teaching and learning of mathematics can be viewed in the following section.

Embedding the concept of truth in the course of mathematics teaching and learning can also be done through comparison between the theoretical mathematics teaching and learning and the real or (practical) mathematical concepts application in order to establish the agreement that existed between mathematical quantities. For example, in teaching factorization of algebraic expressions:

$$\text{Expand, } (2x + 2y)^2 = 2x^2 - 3y^2 \dots \dots \dots *$$

*Solution :*

$$(2x + 2y)(2x + 2y) = 2x^2 - 3y^2$$

*Distributing the first bracket on the second or otherwise we get*

$$2x(2x + 2y) + 2y(2x + 2y) = 2x^2 - 3y^2$$

$$4x^2 + 4xy + 4xy + 4y^2 = 2x^2 - 3y^2$$

*Collecting the like terms, we get*

$$4x^2 - 2x^2 + 4xy + 4xy + 4y^2 + 3y^2 = 0$$

$$2x^2 + 8xy + 7y^2 = 0$$

The final result of the expansion shows the degree of the agreement between the variables of some quantity  $x^2$ ,  $y^2$  and  $xy$ . By so doing, the learners of mathematics can figure out by themselves the degree of accuracy of mathematics as a schools subject and from there mathematics teachers could be able to link it with the concept of truth in Islam.

The concept of justice/equity/fairness can be inculcated in mathematics teaching and learning through the following ways: first, mathematics teachers should be just and fair in dealing with their students. Students should be treated equally without any partiality or any degree of preference and students learning mathematics should be given equal opportunity in terms of freedom of questioning and appropriate answers should be given to students and it should be free from any ambiguity. Mathematics teachers' should give to each and every student the mark he/she deserves in terms of assessment achievement scores. Mathematics teachers should have the fun of demonstration on the basic laws and principles governing the mathematical conceptual operations. For example, when mathematics teacher is teaching algebraic linear equation in one variable say,  $2x + 4 = 10$ . This linear equation has two sides separated by an equality sign ( $=$ ), so in finding the solution of this equation, we proceed as follow:

$$\text{Solve, } 2x + 4 = 10 \dots\dots\dots i$$

$$\text{Solution } 2x + 4 = 10$$

*Subtracting 4 from both sides of \dots\dots i*

$$2x + 4 - 4 = 10 - 4 \dots\dots\dots ii$$

$$2x + 0 = 6 \dots\dots\dots iii$$

$$2x = 6 \dots\dots\dots iv$$

*Dividing both sides of iv by 2*

$$\frac{2x}{2} = \frac{6}{2}$$

$$x = 3$$

Therefore, from the above solution, mathematics teacher can be able to inculcate the value of justice/ equity / fairness through such a demonstration of whatever happens to one side of the equation should equally be done to the other side of the polynomial

above. Through such a processes and indeed other practical application to the real life phenomenon such as through weighting scale of certain quantities of solid or liquid substances will be an added advantage to the understanding of the teaching and learning of mathematical concepts.

Mathematical competencies could also be demonstrated in the course of mathematics teaching itself by having different and diverse techniques, procedures and methodologies that could help in aiding the understanding of mathematics learning. For example, when solving simultaneous linear equations in two variables, mathematics teachers should be able to master all the three techniques leading to the solutions of these systems of equations. Techniques or methodologies like elimination method, substitution method and graphical method of solutions should be at finger tips of mathematics teachers. Mathematics teachers can inculcated the values of verification through mathematical theorems such as Pythagoras theorem, Sine and cosine rules of trigonometry functions, proof of the Quadratic equations by completing the square method etc, using these techniques mathematics teachers could be able to embed the concept of information verification to the group of mathematics learners.

Mathematics teachers can instill the value of tolerance in the following ways: mathematics teachers should always try to be humble modest, patience accommodating, easiness in approaching and tolerance as their personal qualities. These qualities may likely to be copy by majority of students and it may remain with them throughout their life time. In similar perspective mathematics teachers should try show to students that nothing good comes easy; there is always need for patience, perseverance, and tolerance for one to achieve success in life. Mathematics teachers should demonstrate that, through proving of mathematical theorems and assumptions which consumes time and required critical thinking.

Kindness as one of Islamic universal values can be inculcated through collaborative and cooperative learning, project based learning, team work and others constructivist approach to teaching and learning of mathematics. Mathematics teachers should deviate from the traditional methodologies of mathematics teaching and learning. They should imbibe the constructivist approaches to teaching of mathematics, whereas teachers could only act as facilitators of students learning not real key players. If these strategies are adopted the spirit of knowledge sharing and collaboration in knowledge discovery would results in building this concept of kindness in students and this type of relationship usually last longer and continue even outside mathematics classroom.

Respect as one of the Islamic universal values can be inculcated, if mathematics teachers respect and conduct themselves in accordance to the ethnic and religious values and these values should serve as their guiding principles, this is because there exist no religion that condone disrespectfulness, as such mathematics teachers could used techniques such as: orderliness, respect of mathematical theoretical principle and laws in doing their mathematics worksheet.

The concept of love, as one the Islamic value is significant to the extent that, Islam is called the religion of peace and love and Islamic guidance are based on love. The Prophet Muhammad (P.B.U.H) send to guide mankind and this guidance is born out the greatest love that Allah (SWT) through our noble Prophet (P.B.U.H) has for all mankind (Al-Bukhari, 1997). In inculcating this value, the strategies that mathematics teachers should adopt is the strategy of showing affection and friendliness between students and

their mathematics teachers. Mathematics teachers should not be autocratic or dictatorial, they should be subject of approach as well as caring, sympathy and willingness to participate accommodates students' mathematics problems at any point in time. Mathematics teachers through such strategies would gain students interest in loving mathematics and it could be, as one of their best schools subject.

Perseverance as one of Islamic universal values can be imbedded in the teaching and learning of mathematics through admonishment and encouragement of learners of mathematics. Therefore, for Muslims and indeed Islam to gain back its rightful position in the present-day modernization in terms of mathematics and sciences knowledge acquisition and discoveries. There is need for self-assurance, creative and innovative tendencies of not only mathematics teachers but also all Muslims in all fields of human endeavors.

### **Discussion**

This study evaluated structural equation path measurement model for Islamic universal values inculcation in mathematics teaching and learning. The findings confirmed that the values inculcation model is a valid and reliable multidimensional model with five latent constructs namely: ideological, attitudinal, sociological, computational and motivational mathematical values respectively, (Bishop, 1988 & 1999, Bishop, et al., 2010 & Liman et al., 2011ab). The ideological dimension was represented by eight indicators related to objectivism and rationalism of mathematical contents delivery (Bishop, 1988 & 1999 & Liman et al., 2011ab). The attitudinal dimension was represented by five indicators, which emphasized on the values of control and progress of mathematics teaching and learning procedures (Bishop, 1988 & 1999 & Bishop & Clarkson, 1998 & Liman et al., 2011ab). The sociological dimension is represented by five manifests which were much related to the values of openness and mystery of mathematical contents delivery (Bishop, 1988 & 1999 & Bishop & Clarkson, 1998 & Liman et al., 2011ab). The computational mathematical values dimension is related to the values of computer application and usage (Batusk, 2005). Motivational mathematical values dimension linked to the values of reward and re-enforcement of mathematics teaching and learning processes (Pintrich & Schunk, 2002).

Furthermore, the findings also revealed that Islamic universal model for values inculcation in mathematics teaching and learning adequately supported the data. Moreover the study also outlined the area of differences and similarities between Islamic supreme values and interactive/universal values. The findings revealed that mathematical values were proper subset of Islamic universal values. Lastly, the paper also examined a number of ways as well as strategies of inculcation Islamic universal values in mathematics teaching and learning encounter.

### **Concluding Remarks**

This study validated Islamic universal values inculcation model in the teaching and learning of mathematics in Sub-Sahara Africa North-Eastern Region of Nigeria. Furthermore, the study examined differences and area of similarities between Islamic supreme values and Islamic universal values (figure 4). This paper also pin-points the relationship between Islamic universal values and contextual mathematical values (figure 3). Lastly, the study revealed possible ways and strategies of inculcating a number of Islamic universal values in mathematics teaching and learning. The practical implications

of the findings of this study can be in the area of mathematics teachers' rediscovery and restoration of the lost glory of Islamic universal values civilization". The findings can ginger mathematics teachers on the need of rebuilding of an Islamic ideology which was based on justice, integrity, tolerance and the quest of knowledge of the classic Islamic civilization (Ahmed, 2002 & Faruqi, 2007). Furthermore, today's Muslims should learn and practice the holistic Islamic approach in teaching and learning the facts and figures about the medieval Islamic contributions to Western Mathematics and sciences. This can be achieved through researches, acceptance and incorporation of this knowledge in the teaching materials of schools and colleges around the world.



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