

# Theory of Knowledge Paper Outline

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10. Is knowledge in mathematics and other Areas of Knowledge dependent on culture to the same degree and in the same ways?

## I. Personal Stance

- A. Yes, knowledge in mathematics and other Areas of Knowledge is dependent on culture in the same way(s), but not to the same degree, with a few noteworthy exceptions.

## II. Abstract

Mathematics has proven to be highly accurate from the time it began to be studied and put to use. However, knowledge from mathematics can be derived only if the cultural setting encourages it, and only if an understanding of the core mathematical principles aids in the development of the culture. This makes mathematics more dependent on culture as compared with other areas and fields of knowledge. Although knowledge in other areas of knowledge is also dependent, to an extent, on culture in the same ways as mathematics, the degree of dependence is found to be much lesser than that of mathematics. This puts the relationship between mathematics and culture in a different light. Cultural needs bring about an interest and curiosity to develop mathematical knowledge, and even though this is the case with other fields, the extent to which these fields are dependent is not as large as it is in mathematics.

## III. Body

A Early mathematics and actors that gave rise to the birth of mathematics.

- i. Was culture a factor?

B. The birth of modern mathematics.

- ii. To what extent was culture responsible?

C. Does culture provoke interest and curiosity? If so, how and why?

D. Do cultural differences have any effect on the development of knowledge? What about mathematics in particular?

E. Is there any one culture that is mathematically superior? Was there one in the past?

F. To what extent does culture hamper the study of certain fields of knowledge? For instance, the study of genetics and the science of cloning is highly discouraged by certain cultures. Discuss.

G. What brought about the need for studying cultural anthropology? Anthropology is

dependent on culture in the same way mathematics is. But to what degree is this dependence?

- H. Other areas of knowledge such as the sciences are more evenly spread out across cultures than is mathematics. Since the degree of dependence is more with respect to mathematics, this creates small pockets of mathematically-intelligent cultures.
- I. There are even certain cultures that are permanently termed to be mathematically illiterate. How does this link with the aspect of cultural dependency?
- J. Do the specific culture's practices and beliefs have any effect in the amount of knowledge they gain from the different areas of knowledge?
- K. There are different types of cultures. How does this variety affect fundamental knowledge gaining?

<http://www.qvctc.comnet.edu/brian/typcult.html>

- L. The dependence of culture on knowledge is less evident in the current world, mostly because knowledge and information are shared so openly among the various cultures in the world.
- M. In the pre-medieval world, when cultures were more diverse and split, this dependency was easy to note. If cultures stayed separate from each other with no mutual interaction in-between, would one culture become mathematically superior than the rest because of their beliefs and practices?
- N. Would mathematical development break down if culture did? The answer to this question may provide an insight into the degree of dependence between the two.

#### IV. Examples

- A. Historical background of a culture determines the extent to which mathematics relies upon it.
- B. For example, a more architectural oriented culture is likely to have a developed set of mathematical principles.
  - i. When the Mogul emperor Shah Jahan decided to build the Taj Mahal, his architects and engineers had to first study the mathematics behind domes, and also had to have an elaborate knowledge on the various conic sections.
  - ii. The ancient Babylonians had a better understanding of mathematical principles. Even the Greek mathematician Euclid is indebted culturally to the Babylonian civilization.
    - a) Their cultural and geographic setting required them to tame rivers and the devastating floods caused by them. This incited a need to engineer canals, which couldn't have been possible without a knowledge of mathematics. Culture therefore spurs mathematical knowledge.

<http://home.echo-on.net/~smithda/babylonians.html>

iii. The Egyptian culture had the practice of burying the dead in tombs, which were in a giant triangular-like structure called a pyramid. The building of pyramids needed an in-depth understanding of geometry. On the other hand, if the culture simply practiced burying the dead 5-foot under the ground, they probably wouldn't have any urgent need to understand and develop their mathematical knowledge.

C. Art is an exception to the argument. Drawing, painting, sculpturing and other forms of art are highly dependent on culture. They are dependent in the same way as mathematics is. Necessity, beliefs, practices and curiosity.

#### V. Conclusion

Knowledge in mathematics and other areas of knowledge are thus dependent on culture for their improvement. Although knowledge in other areas of knowledge are dependent in the same ways as is knowledge in mathematics, the extent and degree to which mathematics is dependent on the cultural setting and habits is far greater.

#### VI. Possible Sources

- A. Dozens of articles available on the Internet relating mathematics and culture.
  - B. Chapter 6 of 'Man is the Measure' perhaps.
  - C. 'What is Mathematics' hand-out by Keith Devlin.
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