

Implications of Some Philosophical Views of Mathematics and Mathematics Education for Teaching

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Introduction

Mathematics and Mathematics education play significantly in the evolvement of different cultures of teaching and learning, school and society and human relations. This paper enlists some of the known philosophies evidently applied in mathematics/mathematics education that has in one way or another might have implications in teaching. Preferably, I will talk more about its contributions and importance in the field of teaching mathematics as one of the core courses in any levels of education as observed in the Philippines. In the previous readings and with the help of our beloved professor, we learned the different implications of mathematics/mathematics education and definitely opened our eyes towards embracing the true nature of why learning and knowing all these things matter. In one aspect, this can definitely lead us to understanding more about the history of mathematics/mathematics education and how it relates to our teaching and learning. As an educator in mathematics, it is equally important to understand and note the implications of mathematics/mathematics education for teaching because this will help us enlighten greater things and expanding our horizon in teaching and learning. Above all, it will guide us on some of the weaknesses and strengths of these things. And we will also be able to note some of the frequently used philosophies in mathematics/mathematics education. On the other hand, those philosophies which are not that common to mathematics teaching and learning. I think, by looking into these different philosophies, we might be opening doors for the birth of the new philosophies in mathematics/mathematics education to be used in teaching. In my wildest dream, this philosophy can be of perfect match of today's generation for mathematics/mathematics education. Something that can be added significantly to the literatures of philosophies in teaching.

Important aspects on some implications of philosophies of mathematics/mathematics education for teaching will be highlighted and will be discussed in details in this academic paper. Onset part of the paper talks about the evident philosophies in mathematics and its implications to teaching and the later parts of this academic writing will be about the opposing details and critiques of these philosophies such as their strengths and weaknesses in mathematics teaching. Some of the discussions will be about the questions, "What are something good in these philosophies?", "Are there lapses that might be observed and get rid of from these philosophies?", "Are these philosophies contain more strengths than weaknesses?" and "Are there other specific philosophies that are mostly applied for teaching mathematics and does it really guarantee good cause?".

Essential Components of Philosophies in Mathematics and Mathematics Education

The birth of forms of mathematical knowledge and mathematics education is evidently growing in the present era, this includes tacit knowledge such as knowledge in particular, language and rhetoric in mathematics (Ernest, 1999). This development might include the embracing of the social context of mathematics and its real applications in society and school. One might understand that something is better understood when connected to its social scenario and context. This is an opposing term of the absolutist view in mathematics such that this only talks on the fixed truth about concept of mathematics and denying the fallibilist view. This paper highlighted about the rhetoric of mathematics which means being able to express effectively the language of mathematics to audience and be able to communicate well.

Another essential knowledge and information is about the work of Ole Ravn Christensen with his paper entitled, “Order of the world or order of the social- A Wittgensteinian conception of mathematics and its importance for research in mathematics education”, where in his paper he elaborated and talked about the two contrasting philosophies of mathematics and mathematics education and also the interconnectedness of the two. Platonism and Wittgensteinian stands on mathematics are the major highlights of the academic paper, one argues the other and the other argues the other one. According to Plato as cited by the Christensen in the paper, Platonism conception of mathematics is merely that it is already a pre- existing in nature and world. It is already in there somewhere that were already present and one could possibly discover and uncover its essence and be able to use its concepts to real world endeavors of the human beings. It is therefore the task and common sense of the people to get to discover all that pre- existing knowledge about mathematics that were hidden somewhere around us and from our natural world. Furthermore, those people who do mathematics such as those scientist, math experts, math educators and mathematicians and even math enthusiasts’ learners are on the journey of unfolding about those pre- existing mathematical truths and reality and be able to discover those things. Those hidden aspects of mathematics formed as a basic structure and formation of natural world and seen as an important aspect of human discovery once discovered. Hence, it is hidden but merely formed and structured as the very important aspect to make the world follows an orderly fashion as it should be. As asked by Hersh and cited by Christensen, “What is mathematics really?” he means that, it is just a normal conception to think that mathematicians are normal to be Platonist on weekdays but not during weekends. In its sense would mean mathematicians would go everyday busy about uncovering truths and reality, they are eager to know important concepts that may be discovered and can be used significantly in the society and people.

On the other side of the game, let us have now a completely different mathematics philosophy which is an opposing philosophy of Platonism- a Wittgensteinian’s view about mathematics. “The mathematician is an inventor, not a discoverer” (Wittgenstein, 1978) as cited by Christensen. As such based on the concept and philosophy of Platonism that mathematics is pre- existing, in this philosophy would argue on this that it is merely on the making and inventing of such math concepts through social processes which happens naturally in the real setting. Mathematicians and other scholars who are geniuses in their fields invented these concepts because these are ultimately useful and important to us such as the invention of meter as the unit of length, we got to be used to it due to its significant contributions in our daily

endeavors and living. As elaborated in the paper of Christensen that a meter in Paris would mean the same thing as a meter in other parts of the world. In its essence, A Wittgensteinian's view about mathematics is a powerful tool to understand how socially structured is our nature and universe about mathematics. Due to countless inventions of the math concepts everyone is enjoying right now, it definitely helps our lives be better and satisfying to live in. With the advent of technology advancement such as tech products nowadays which most people have, let there be more praises to those inventors behind.

While these two contrasting philosophies of mathematics gave such insights on how they completely differ from each other, they seem to be in harmony with the belief that mathematics is more absolute than being fallible as being described in the paper of Christensen. For Platonism, it is somewhere out there which is waiting to be discovered and it is already there before we know them, on the other hand according to Wittgensteinian's view of mathematics, it is absolute because a thing would be used for a certain purpose in a particular place and would also serve the same purpose in the other places such as a meter would be used generally in the same purpose throughout the planet that is used for measuring.

Mathematics and Mathematics Education for Teaching

In this paper, it will highlight some of the interconnections between mathematics and mathematics education and teaching. I think, this could be a major discussion most especially to us who are in the teaching positions in the Department of Education (DepEd) where we are undeniably fighting and striving for the good for our delivery of knowledge and understanding to our students. This talks about the implications of some philosophical points of these two disciplines to teaching such as here in the Philippines. What may stand or manifest with a good teaching in mathematics comes surely with the underlying philosophical views which has corresponding strengths and weaknesses. As enlisted in the prior part of this paper, we have the Platonism and Wittgensteinian's points of view where they each comes with the pros and cons and how they perceived each other. They both have unique standpoints; one is about being so absolute and the other one is on about the product of social construction that with its uses determine its essence. I think, it is good to be known of these philosophical standpoints because this may help us in one way or the other way when we talked about enhancing teaching in mathematics. One may argue about the philosophies in teaching that "there is no such philosophy that can be used or applied best in teaching mathematics despite of the many philosophies available"; yes, that is definitely true and we all know that in our experiences as a school teacher but at least through these philosophies available could help us guide and may be perceived as a holy bible for teachers. And the best thing that I could surmise this is, the essence and effectivity of these philosophies might only depend on how we utilized them to a particular school, subject or discipline, group of students and teachers. This might be the same with what we totally agreed on our learnings in Principles of Teaching that "There is no such thing as an effective teaching strategy, to make your teaching very effective and worthwhile will just depend on its utilization and the teacher using it".

Another area of argument is about the questions raised in the book ICME-13 Topical Surveys by Paul Ernest, Ole Skovsmose et.al., "Why the philosophy of mathematics education?"

What does it offer? What is the purpose of teaching and learning mathematics? What do we value in mathematics and its teaching and learning? Why do we engage in these practices and what do we hope will be achieved? These questions might be considered as a guide why there is a need to do mathematics and apply philosophical views on this. I think the very first thing to ask about is “What is mathematics?”, “What are the histories behind mathematics?”, “What were those factors that had influenced in the discovery of this major discipline?” before going through the aforementioned questions above. Indeed, we have to know much the deeper roots and meanings of mathematics, what really is mathematics. If we know all these beforehand, we might be able to give answers on the purpose of the philosophies of mathematics and its importance and what can it offer to us and to the society. Another thing, what are the essential components of mathematics in relationships to teaching and learning? There may be essential aspects where we could handle and teach well mathematics to the students. Why teach mathematics? is another important thing because you have to be well informed and be aware of what you are going to render to the students as you teach mathematics. And definitely that may have an underlying philosophy when you deliver knowledge and skills about mathematics. The bottom-line of all these thoughts is about knowing roots and meanings of mathematics beforehand before going into such philosophies and tools to effectively deal with mathematics.

Interesting arguments and debates have risen whether to go with or not to go with the Platonism conception especially in mathematics and mathematics education. Traditional Platonist assumptions had been challenged with Van Bendegem who represented a small but growing group of philosophers of mathematics who were asking questions about the nature and the purpose of mathematics such as: What are mathematicians really like? What can they really do? and What do they really do? Furthermore, Karl Marx as what he has said and affirmed that any social thinkers must start their inquiries by investigating and looking to the everyday affairs of people in society. Hence, Van Bendegem argued that the study of mathematics must be grounded in mathematical practice specifically a theory or model of mathematical practice. In relationship to teaching mathematics in school. I think both views (Platonism and against Platonism) might have an equal contribution to learners, teachers and school because there might be some instances that cannot be fully addressed with just a single philosophy, as a famous cliché said that “More heads are better than a single head”. But in the stance of most of us who are teachers in the Philippines might affirmed that we ultimately agreed on the conception that effective teaching means meaningful learnings for the students are coupled with the best teaching strategy in mind when applied such as coined from Wittgensteinian’s point of view. Which means to achieve meaningful and worthwhile learning, one must adhere to such experiential teaching and learning that is made possible through engaging to such activities where students have an equal opportunity to participate and share their ideas. According to (Braza & Supapo 2014) as cited (Guita & Tan 2018), it is known that individual knowledge is effectively enhanced and formed if learners are able of drawing ideas from their experiences and connect and apply to new situations and scenarios. Hence, cooperative and collaborative learning for instances, put emphasis on active learning through active participation by working fellow learners in engaging shared task. This is a powerful tool because students are now placed at the center of the teaching and learning process. They are given the most considerations when it comes to mathematics teaching for instance. In the same manner, Platonism plays importantly in mathematics teaching because knowledge and concepts in mathematics are absolute and constant so it does not change

over time. Our task as educators for our students is to give and teach important concepts in mathematics that are purely absolute in nature.

Summary and Conclusions

Based on the different views and conceptions in mathematics and mathematics education that I enlisted in the prior part of this article which are Platonism and Wittgenstenian's conception. Here, it is clarified that both have diverse stance as being philosophies in mathematics. There is no such thing that is most fitted philosophy in teaching and handling school mathematics, students and learning institution. What makes the philosophy good and worthwhile is through its use and how the situation drives it to. At least, we have been taught on these philosophies and we now become aware that there are really these existing mathematics philosophies where we can cuddle to and be our scripture. Personally, these viewpoints were new to me and I just known them now because I enrolled in PhD and take this subject with the best professor in the world for the record. And at some point, I could differentiate the distinctions of these and how they matter to us since we are into teaching mathematics. It is really beneficial to us where we are guided and bounded with some philosophies in mathematics so we can assure to our clientele that what we are extending to them are worth learning and effort being shared are well paid off.

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