Epistemic Terrains and Epistemic Responsibility in Mathematics Education

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ABSTRACT

The main problem with mathematics and mathematics education is that if we mix the two then we will be placed in one of two camps; absolutism or fallibilism. Present research study tried to explore the problematic aspects of the functions of mathematical knowledge. It tries to address the bounded epistemic restriction and paradoxes to mathematics education and to draw attention to epistemological double standards and masked subjectivities in this domain. The finding of the study reflects that making sense of one's world requires thinking so mathematics education process involves thinking numerically, geometrically, algebraically, statistically, and systematically which in turn involves problem solving, logical thinking, thinking creatively, and making connections. It laid an emphasis on the role of relativism in mathematics.

Key Words: Epistemic Terrains, Epistemic Responsibility, Mathematics Education.

INTRODUCTION:

Like all bodies of knowledge mathematics knowledge is premised on a set of claims to truth. Traditionally ,theories of knowledge tend to be derived from the experiences of uniformly educated articulate and epistemically positioned adults who introspect retrospectively to review what they must once have known simply and clearly .an example of it is Locke's tabula rasa model and Descartes radical doubt model. Descartes demand the centrality of human reason. He believed that this more objective, rationally ordered and controllable society would evolve from mathematics, this view give mathematics as a hope of the world.

Over the time objectivity became the centre of mathematical knowledge and it underwrites all forms of social and intellectual life. But with the emergence of logic of natural argumentation within educational theory and practice and with the introduction and consolidation of simultaneous instruction and modern classroom system, society

was provide a more secure rational foundation for attaining knowledge and making progressive change.

Thus an objectivist position of mathematics knowledge which implies the existence of mathematics as an autonomous practice, independent of individual or consensus opinion and social context rejected.

Usually it was believed that those who spoke in the name of mathematics came to possess a certain power, and everyone does not have the power or ability to attain mathematical truth or knowledge. During earlier time there exist practices of social inequality in mathematics, as Walkerdine (1988) has noted, to ensure that the mathematics of various others on account of their nature was excluded. Gender, race, ethnicity and a host of other determinations became a primary organizer of cognitive regulation. Prior to nineteenth century female as a biological entity were not considered subjects with distinct natural rather than god driven attributes. It was primarily the work of Darwin (Walkerdine, 1988) which created the female mind and body as a new object of scientific gaze and which lead to the development of doctrine legitimating what was able to count as "female nature". It was considered that new ideas have no emergence without wider social imperatives. Interventionary measures in mathematics associated with wider practices of social inclusion (see Fennema, 1990; Forgasz, 1997; Leder, 1992), and the validation of the experiences of others previously associated with underclass status in mathematics (Becker, 1995; Boaler, 1997; Burton, 1995; Damarin, 1995; Ministry of Education, 1992) have remapped the epistemic terrain. Arguably these measures to some extent have set the parameters of what can be said and done with respect to school mathematics, and mathematics schooling has become a site embracing former marginalized modes of classroom participation. An epistemic space is opened for previously masked subjectivities, one which envelops rather than transcends particularity and locality. Lyotard's (1984) point concerning the importance of local narratives sits comfortably within this project. Lave's (1988; 1990) theory of knowledge production moves the epistemology question from a privileged subjective specificity towards the multiple character of social realities and knowledge. Challenging cognitivist psychology's central processor model of thinking, as well as mainstream theories of transfer, she provides an approach to the generation of knowledge which relies on social context rather than abstraction. Laying bare the social and political contexts which circumscribe the production of mathematical knowledge, Lave's analysis argues for the constitutive role these contexts play in the

creation and validation of mathematical knowledge. It stands in opposition to ideas which blur vast differences within the learning experience and situated practice theory asserts the socio-political investedness of knowledge-production activity. Insisting on the variability of the experiences and practices of cognitive agents from which knowledge is constructed, Lave claims that knowledge then is derived out of the specific human interests of cognitive agents, and is more relational than transferred, caught up in the ongoing connections between people, settings, and activities. If mathematical learning is to be understood through a network of relations between people and settings, then conceptual knowledge, activity, culture and social relations become interdependent. The theory calls for an acceptance of the production of mathematical knowledge or mathematical problem solving as structured activity defined by the learning practices themselves, always interwoven with socio-cultural necessities and meanings.

PURPOSE OF THE STUDY

Mathematics as a school subject always considered as a dull and monotonic subject by most of the people and mathematics teaching is also as a counter –productive activity. This subject is feared and disliked by most of the learners as a school subject which produce a negative self-image and disinterest in the learners.

Wilnesky (1997) terms this pattern of 'symptoms' epistemological anxiety. Basically it is found that learners do not have any fruitful way into the subject that enables them to access it meaningfully and aesthetically. The purpose of this study was to address the epistemic restrictions and paradoxes abounded to mathematics. It also draws attention to epistemological double standards, masked subjectivities and theory of situated cognition which subscribes to the view that cognition is produced in practices.

It prompts and opposition to our conventional notion of pure abstraction and maintaining that mathematical truth is attained more by fiat than 'fact'.

SIGNIFACANCE OF THE STUDY

This study is very significant as it provides an insight into the principle of universality on which all theories derived and asserts the importance of socio-political investedness on the knowledge production activity.

LIMITION OF RESEARCH

In-depth extensive analysis of qualitative data could not be made due to the limited time period.

RESEARCH METHODOLOGY

This study is a descriptive study. The data collection tool used in this study was literature-review qualitative data were noted and later these notes were analyzed and finalized. Before finalizing these were discussed to guide.

RESULTS AND DISCUSSION

Autonomous Solidarity:

Feminist critiques of epistemology have demonstrated that the ideals of the autonomous reasoners, the dislocated, disinterested observer and the epistemologies in mathematics they inform are the artifacts of a small, privileged group of educated, usually, prosperous, white men.

Their circumstances enable them to believe that they are materially as well as affectively autonomous and to image that they are nowhere and everywhere in the world, as they occupy an unmarked position of possession.

Moreover, the ideals of rationality and objectively that have guided and inspired the theories of knowledge thought-out the history of philosophy have been constructed through the processes of excluding the attributes and experiences commonly associated with femaleness and under caste, social, economical, emotional, class sensitivity and practicability.

All these convictions demonstrate that ideal objectivity in mathematics is a generalization from the subject of quite small social group which possess power, security and prestige to believe that it can generalize its experiences and normative ideals across the social order and thus producing a group of like- minded practioners and dismissing others views.

Objectivity Vs Subjectivity:

The main problem with mathematics and mathematics education is that if we mix the two then we will be placed in one of two camps; absolutism or fallibilism. Either we claim mathematics as a fixed and absolute body of objective knowledge that has certainty and an existence that is independent of individual cognition or social acceptance or we termed mathematics as a human creation, based on assumptions, experiences and conventions. In the former mathematics is discovered and in the later it is constructed. there is a problem if we regard mathematics as fallible and accept its

validity independent of individual cognition and social acceptance, then question arises from where this validity come and where does it exist?

If we move from its fallibility then it is the social and physical interaction that confers objectivity to mathematics.

Reduction to Interaction: Mathematics takes turn from the foundational basis of other form of knowledge to interaction between students and disciplines'.

Theoretical Construct to Physical Context: In this form it emphasis on the empiricability and sociability value of mathematics, rather than from theoretical concerns.

Skill Mastery to Reasoning: This shift in mathematics emphasis on the development of problem solving activity among learners rather than practices of simple templates.

Relativism and Mathematics:

In opposition to ideas which possess vast differences within the learning experience situated practice theory asserts the socio-political investedness of knowledge-production activity. Insisting on the variability of the experiences and practices of cognitive agents from which knowledge is generated, Lave claims that knowledge then is derived out of the specific human interests of cognitive agents, and is more relational than transferred, caught up in the ongoing connections between people, settings, and activities and practices. If mathematical learning is to be understood through a network of relations between people and settings, then conceptual knowledge, activity, culture and social relations become interdependent. The theory calls for an acceptance of the production of mathematical knowledge or mathematical problem solving as structured activity defined by the learning practices themselves, always interwoven with socio-cultural necessities and meanings.

Shifts in Responsibilities:

Through the process of rooting mathematics understanding in each students individual sensory experiences and ultimately in personal life we can shift the responsibility of success in mathematics from the learners shoulder to those who guide and lead the process of co-constructing knowledge.

CONCLUSION:

It can be concluded that new ideas do not emerge in any isolated sense; rather they are closely connected to wider social imperatives. Since the dawning of the interpretive turn in mathematics education many have developed a new sensitivity to experience

and cognitive agents within the practices of this discipline. In doing so efforts being made to provide a new form of social ground as well as empirical evidence for a view of mathematics knowledge as a production, creation and experiences of cognitive agents within social practices. This study gives an equal balance to all factors such as object vs. subject, political vs. social and hypothetical/deductive logic.

SCOPE FOR FURTHER STUDY:

- The findings of the study reflect a few restriction and preoccupation in mathematics knowledge. in -depth and extensive study of the qualitative data can provide more valuable and useful information on this sensitive issue.
- It is a qualitative study having scope for quantitative analysis.
- Present study can work as first hand information for further researcher in this dimension.
- Students and teachers in school practices need to be introduced to both theory and research in order to change their teaching practices.

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