Realistic Mathematics & Vygotsky's Theories in Mathematics Education

Kaushik Das

Department of Mathematics, Gobardanga Hindu College, Gobardanga, West Bengal, India

https://orcid.org/0000-0002-2812-0261

OPEN ACCESS

Manuscript ID:
EDU-2020-09013346

Volume: 9

Issue: 1

Month: December

Year: 2020

P-ISSN: 2320-2653

E-ISSN: 2582-1334

Received: 06.09.2020

Accepted: 25.10.2020

Published: 01.12.2020

Citation:
Das, Kaushik. "Realistic Mathematics & Vygotsky's Theories in Mathematics Education." *Shanlax International Journal of Education*, vol. 9, no. 1, 2020, pp. 104-108.

DOI:
https://doi.org/10.34293/education.v9i1.3346

Abstract

Mathematics education is not mathematics, it makes a basic use of highly specialized kinds of mathematical knowledge. The modern world feels a crisis of proper mathematics education in any nation. Realistic Mathematics Education is a domain-specific instruction theory for mathematics. This paper introduces realistic mathematics education (RME) and Vygotskian impacts on mathematics education for learning mathematics. This article describes the development of teaching-learning mathematics & learning theories from a socio-cultural perspective. The methodology of the study is based on qualitative type.

Keywords: Classroom teaching, Learning mathematics, Mathematics education, Realistic mathematics education, Socio-cultural, Vygotsky's Theories.

Introduction

Mathematics education is worried about the development of residents who can take an interest effectively and dependably in dynamic procedures requested in our own and open lives. Mathematical education would then be able to be drawn closer as one significant road for guaranteeing the courses towards harmony and fairness in a specific network. A socio-political direction advocates for an educational program that explicitly stands up to understood and unequivocal segregations. Maths educator instruction as a field of inquiry and practice develops as a half and half between the spaces of teacher education and maths education. Practice teaching related to the Internship Programmes in two-year B.Ed. A curriculum that builds basic teaching knowledge (Das & Chowdhury, 2019). Cases that hypothetical contemplations have constrained application in the classroom or other learning settings have been various, both in mathematics education and in different fields (Alexander and Winne 2006; Sfard 1991). Mathematics teacher education as a field of inquiry and practice rises as a crossover between teacher education and Mathematics education. Pedagogical approaches to addressing the educational skills for effective classroom teaching (Das, 2019).

The availability of a mathematics teacher will make a scientific attitude to a mathematics learner. But the absence of mathematics teachers, students are kept from making scientific attitude (Das, 2019). At present, we consider which mathematical practices the students participate in and how these practices are impacted by the progressing science activity. The modern world is dependent on technology. ICT plays a significant role in better mathematics teaching in theoretical and also on a practical basis (Das, 2019). Mathematics education in the broadest sense is related to different subjects and its widespread use will suffice to mention various subjects. The applications of mathematics education in various subjects, especially enrich history, geography, fine arts, and physical education (Das, et al., 2019).

It is also true that the satisfaction of a teacher's work also depends on his teaching. The job satisfaction of female teachers is correlated with their teaching-learning process (Roy & Das, 2020). Therefore, to properly conduct teaching speech, the skills of the teacher and the teaching method need to be considered in particular.

Objectives of the Research Study

The objectives of the study are to study realistic mathematics education & socio-cultural aspects. Also, the researcher fined-out the Vygotskian impacts on mathematics education. Finally, examine the practices of the mathematics classroom.

Methodology of the Study

Method of the Study: The researchers used secondary methods of data collection for their research work. The secondary method means any source other than the primary source. These secondary study sources, like books, articles, journals, thesis, university news, expert opinion, Govt. Gazetteers, Manuals, and websites, etc.

Methodology Employed: It is based on qualitative research.

Research Materials: Government documents, Peer-reviewed journals, Books, Magazines, Online documents from some relevant and reliable internet sources.

Results and Discussion

Ideas About Realistic Mathematics Education (RME)

Hans Freudenthal (1905–1990) was a mathematician conceived in Germany who, in 1946 turned into an educator of pure and applied mathematics and the establishments of mathematics at Utrecht University in the Netherlands. As a mathematician, he made generous commitments to the spaces of geometry and topology. Later in his profession, Freudenthal (1968, 1973, 1991) got intrigued by mathematics education and contended for teaching mathematics that is significant for students and doing psychological studies to examine how students can be offered open doors for guided re-innovation of mathematics. Realistic Mathematics Education has its underlying foundations in Hans Freudenthal's understanding of mathematics as a human activity (Freudenthal, 1973; Gravemeijer, 1994). The possibility that student achieves formal mathematics information by utilizing his/her casual knowledge by methods for re-concocting under the direction of an educator (Treffers, 1991) has a huge spot in the investigations led in the field of mathematical education (for example Barnes, 2004; Beswick, 2011)

Socio-Cultural Theories in Mathematics

Individuals working in education for children and adults with special needs (for example, Donaldson, 1978; Feuerstein, 1980), in investigations of self-guideline and language development, took to Vygotsky's speculations at a beginning phase. The other key component in current socio-cultural speculations in mathematics education is crafted by Vygotsky and his colleagues. However it is somewhat harder to follow the beginnings of Vygotskian impacts on mathematics education. Forman (in press) advises us that Vygotsky's work just opened up to the world network with desalinization in the Soviet Union toward the finish of the 1950s and just gradually and progressively were interpretations made accessible. The effect of his progressive thoughts set aside some effort to develop Bruner and Wertsch being especially significant figures in that procedure (see Bruner, 1986; Wertsch, 1981).

However, that as it may, the centrality of Vygotsky's work just came to be valued by the standard mathematics education network significantly more as of late. Be that as it may, that figuring out how to peruse mathematical tasks in classroom problems, which gives the presence of decontextualized thinking, is again a specific element of the act of school mathematics for the 'fruitful' students (Dowling, 1998). It is affected by an apprenticeship into the acts of classroom mathematics that convey social capital (Bourdieu, 1979). The operators of the apprenticeship are the teacher and the texts, yet additionally, the acknowledgment or passive consent of those students who become apprenticed. Morgan (1998) broke down the composed creations of school students in their mathematics exercises as indicated by the manners by which the educators surrounded the undertaking through their utilization

of legitimate talk (what is normal by examiners), practical talk (regardless of whether it very well may be comprehended by non-mathematicians) or expert talk (what mathematicians may anticipate).

Raises two Essential Points by Vygotsky's

In the scientific ideas that the kid gets in school, the relationship to an object is intervened from the beginning by some other idea. In this manner, the very thought of a scientific idea suggests a specific situation corresponding to different ideas, i.e., a spot inside an arrangement of ideas. Our dispute that the fundamentals of systematization initially enter the child's brain by the method of his contact with scientific ideas and are then moved to regular ideas, changing their mental structure starting from the top (Vygotsky, 1962). This Raises Two Fundamental Points

- Vygotsky's treatment of scientific ideas (or decontextualized ideas by and large, which would incorporate mathematical ideas) suggests an objectivist approach towards the topic be educated.
- Vygotsky's connection between the private and the social is one of strategy - that to comprehend the higher mental functions of a person as a developmental process, the teacher or researcher needs to encourage the process.

The Practices of the Mathematics Classroom

A people group of training is a lot of relations among people, movement, and the world, after some time and in connection with other unrelated and covering networks of practices (Lave and Wenger, 1991). Infrastructural satisfaction like Teaching-learning resources, institutional Fees, Library facility, Administrations, and Appropriate physical infrastructure of trainee teachers Facilities, etc. depends upon in-service and pre-service teacher trainees for their two years B.Ed. Programme (Das & Roy, 2019). The classroom is a site of numerous over-lapping rehearses. Though the mathematics teacher's objective might be to start students into (what she or he deciphers as) mathematical perspectives and acting, students' objectives are probably going to be very extraordinary.

Classroom mathematics rehearses additionally produce the more explicit ways of life as great at number yet not algebra math, as competitive or collaborative in execution, and so on. The complex of homeroom rehearses additionally covers those outsides of the expectation of the educator, as talked about above, especially corresponding to peers, and in particular, the differential guideline of various understudies inside those practices. The educator may play out the job of 'master' for certain understudies corresponding to certain parts of what we may call the mathematical personalities delivered, frequently explicitly the authority prompting further investigation of mathematics, even though we are alluding here to dominance as far as school mathematics.

The substance of a mathematics curriculum that gives the aptitudes important to either or both of these settings would be extremely constrained. Numerous teachers battle to discover approaches to empower singular articulation in the classroom, including communicating mathematical thoughts, going up against the mystery of educators offering liberation to understudies from their definitive position. In any case, this can productively be viewed as a logic, whereby all members in action show intensity and frailty at various occasions, including the teacher. Math-lab is an essential tool for learning mathematics. The Mathematics Laboratory for Mathematics Education supports both students and teachers in the classroom, playing an important role in teaching and learning mathematics (Das, 2019).

Obviously, by "relationship," Vygotsky implied here not an uninvolved relationship of seeing or preparing approaching improvements. Yet, a relationship characterized by the child's needs and objectives, a relationship characterized by the types of social practice that "relate" the kid to a target domain and characterize what the earth implies for the kid. Vygotsky was making some noteworthy steps toward acknowledging the objective that he had built up in 1924 and 1925, the objective of a hypothetical point of view that would permit a brought together investigation of conduct and awareness while perceiving the one of a kind socio-chronicled nature of the human psyche.

Vygotsky was making some noteworthy steps toward acknowledging the objective that he had built up in 1924 and 1925, the objective of a hypothetical point of view that would permit a brought together investigation of conduct and awareness while perceiving the interesting socio-historical nature of the human brain.

Development of Teaching & Learning

Teaching may not be conscious and purposeful, for what it's worth in school or parental guidance. Friendly and anxious behaviors about students provide the positive emotional and motivating conditions needed to learn math (Das & Gupta, 2020). In regular circumstances of the kid's life, s/he figures out how to be, in gendered, ethnic, class, and other recorded, socio-social personalities. Figuring out how to be, or to become, is spurred by wants, objectives, and requirements, to be acknowledged, to imitate an ideal individual, or to join a gathering. Lave and Wenger's (1991) record of learning in working environment circumstances presents that hypothesis of learning as turning out to be, and Lave (1996) and Winbourne and Watson (1998) discuss the thought according to the classroom.

Vygotsky emphasized the introduction of scientific ideas to students and restricted them to rediscover the advancement of humanity for themselves. This plan is taken to be exceptionally near a transmission style of teaching by a few. Notwithstanding, Vygotsky was against just telling students. He was half worried about the intervention of social instruments and metacognitive devices. (Vygotsky, 1988).

Conclusion

Mathematics education has concentrated more on how participants experience the science classroom. Mathematics education moving endlessly from presumptions of language envisioning reality. Mathematics education has grown with mathematical theories like Vygotsky's learning theories, Piaget's Psychological theories & various Cognitive theories. For better mathematics, teaching needs a Realistic mathematics concept - the importance of mathematics educations immense from the socio-cultural point of view.

References

Alexander, Patricia, A., and P.H. Winne. "Afterword." *Handbook of Educational Psychology,* Lawrence Eribaum Associates, 2006.

Barnes, Hayley. "Realistic Mathematics Education: Eliciting Alternative Mathematical Conceptions of Learners." *African Journal of Research in Mathematics, Science and Technology Education*, vol. 8, no. 1, 2004, pp. 53-64.

Beswick, Kim. "Putting Context in Context: An Examination of the Evidence for the Benefits of 'Contextualised' Tasks." *International Journal of Science and Mathematics Education*, vol. 9, 2011, pp. 1485-1486.

Bourdieu, Pierre. *An Outline of a Theory of Practice*, Cambridge University Press, 1977.

Bruner, Jerome. *Actual Minds, Possible Worlds*, Harvard University Press, 1987.

Das, Kaushik, and Dipanjana Roy. "Infrastructural Facility Faced by Trainee Teachers in New Two Years B.Ed. Programme in West Bengal." *International Journal of Research in Social Sciences*, vol. 9, no. 7, 2019, pp. 210-222.

Das, Kaushik, and Madhurima Gupta. "Action Research on Mathematics Phobia among Secondary School Students." *International Journal of Indonesian Education and Teaching*, vol. 4, no. 2, 2020, pp. 239-250.

Das, Kaushik, and Ratna Chowdhury. "Analytical Study on Practice Teaching of B.Ed. Students in B.Ed. Department, Gobardanga Hindu College, under WBSU in India." *International Journal of Scientific Research and Reviews*, vol. 8, no. 2, 2019, pp. 3882-3898.

Das, Kaushik, et al. "SWOT Analysis of Teacher Educators in B.Ed. Department under West Bengal State University in West Bengal, India." *Research Review International Journal of Multidisciplinary*, vol. 4, no. 6, 2019, pp. 87-91.

Das, Kaushik., et al. "Applications of Mathematical Knowledge in History, Geography, Fine-Arts & Physical Education Subjects in Two-year B.Ed. Programme: Indian Context." *Journal*

of Emerging Technology and Innovative Research, vol. 6, no. 6, 2019, pp. 8-15.

Das, Kaushik. "Lack of Mathematical Knowledge in Two-year B.Ed. Programme: Indian Context." *Research Journal of Educational Sciences*, vol. 7, no. 3, 2019, pp. 1-6.

Das, Kaushik. "Pedagogical Approaches in Mathematics: Indian Perspectives and Practices." *International Journal of All Research Writings*, vol. 1, no. 3, 2019, pp. 16-21.

Das, Kaushik. "Role of ICT for Better Mathematics Teaching." *Shanlax International Journal of Education*, vol. 7, no. 4, 2019, pp. 19-28.

Das, Kaushik. "Significant of Mathematics Laboratory Activities for Teaching and Learning." *International Journal on Integrated Education*, vol. 2, no. 5, 2019, pp. 19-25.

Donaldson, Margaret. *Children's Minds*, HarperCollins, 1986.

Dowling, Paul. *The Sociology of Mathematics Education,* Falmer Press, 1998.

Feuerstein, Reuven. *Instrumental Enrichment: An Intervention Program for Cognitive Modifiability*, University Park Press, 1980.

Freudenthal, Hans. *Mathematics as an Educational Task*, Springer, 1973.

Gravemeijer, Koeno. *Developing Realistic Mathematics Education*, Cd-Beta Press, 1994.

Lave, Jean, and Etienne Wenger. *Situated Learning: Legitimate Peripheral Participation*, Cambridge University Press, 1991.

Lave, Jean. "Teaching, as Learning, in Practice." *Mind, Culture & Activity,* vol. 3, no. 3, 1996, pp. 149-164.

Morgan, Candia. *Writing Mathematically: The Discourse of Investigation*, Falmer Press, 1998.

Roy, Dipanjana, and Kaushik Das. "Job Satisfaction among Female School Teachers in North 24 Parganas, West Bengal." *Journal of Xi'an University of Architecture & Technology*, vol. XII, no. VII, 2020, pp. 271-281.

Sfard, Anna. "On the Dual Nature of Mathematical Conceptions: Reflections on Processes and Objects as Different Sides of the Same Coin." *Educational Studies in Mathematics*, vol. 22, 1991, pp. 1-36.

Streefland, Leen. *Realistic Mathematics Education in Primary School*, Freudenthal Institute, 1991.

Vygotsky, Lev. *Thought and Language*, Massachusetts Institute of Technology Press, Cambridge, 2012.

Wertsch, James V., and LS Vygotskiĭ. *The Concept of Activity in Soviet Psychology*, M. E. Sharpe, 1981.

Winbourne, P., and A. Watson. "Learning Mathematics in Local Communities of Practice." *Proceedings of the Twenty-Second Annual Meeting of the International Group for the Psychology of Mathematics Education*, 1998, pp. 177-184.

Author Details

Kaushik Das, *Department of Mathematics, Gobardanga Hindu College, Gobardanga, West Bengal, India,*
Email ID: *kaushik.das53@gmail.com*