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The Content Development of Mathematics and Its Pedagogical Knowledge Through Educational Technology

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Abstract:

Development of content according to their easy conceptualization is also a difficult task, mathematics and its pedagogical content are not easy to develop. Content conceptualisation of mathematical knowledge is difficult than other subjects and mathematics was a boring and burden full subject in the past. Students were usually stressed to learn its concept and the Indian education system recommended that learning mathematical and scientific content must be more interesting by using educational technologies. Difficulties of mathematical content conceptualization and understanding is much more compared to other subject content and pedagogical knowledge. In the ear of 21st century modernization and globalization there is a need to drop out the traditional method of conceptualisation of content, and emphasize the new and innovative methods of conceptualisation of mathematical and their pedagogical knowledge. The present study emphasizes on the need to give the appropriate role of educational technology to enhance the mathematical and its pedagogical knowledge and highlights the role of the facilitator and learner instead of teacher and student. Facilitators are expected to possess not only the knowledge for facilitating the development of all and students mathematical content knowledge but also the pedagogical skill to support the unique learning needs of all learners. The need to modification inclusion of educational technology lies in the content that is what the learners learn, the process that is how the learners access the information through the help of educational

technology and the product that is how learners demonstrate their mathematical knowledge and the help of using educational technology researcher want to modification past periodic thought for learner to learn mathematical concept meaningfully it is necessary for them to struggle with concepts procedures and ideas. In future there is a need to understand a new method of facilitating and drop the traditional methods of teaching, and need to adopt 21st century scientific and technological approach to facilitate mathematical content. Further, there is a need to take help of educational technology and ICT tools for enhancing the facility of learning and develop a best way of interaction with the learner.

Keywords: Content, Conceptualization, Educational Technology, Learner, Mathematics, Pedagogy, Students, Teacher

Introduction

The nature and scope of mathematics facilitator perceptions that influence mathematical facilitating and learning mathematical processes and the teacher needs to of each area of mathematics and creates ample opportunities for the learners. Facilitators reflect critically on their belief and perceptions about mathematics learning. National Council of Teachers of Mathematics (2014) advocates for supporting learners in struggling productivity by viewing, struggles as opportunities for dealing deeply understanding mathematical structure of problems and relationships among mathematical ideas, instead of simply seeking correct solutions and facilitating mathematics can only be described as truly effective when it positively impacts learning. Learning practices can make a major difference in learner outcomes as well as what makes a difference in the classroom. Focus group on teaching mathematics, emphasises, "Mathematics for all" and 21st century learners understand and generalize the basic and natural structure of mathematics with the help of educational technology. For the conceptualisation of mathematical terms, there is a need to offer a good methodology for understanding and generalizing. Drijners, Boon, and Van Renu Vijh (2010) have distinguished three directional functionalities for digital technology as the tool function for doing mathematics refers to outsourcing work that could also be done by hand, as the function of a learning environment for practicing skills and the function of a learning environment for fostering the development of conceptual understanding.

Objectives of the Study

- To know the concept of content and its nature
- To study the process and the products respectively

- To discuss the conceptualization of mathematics and its pedagogical concepts integrating with educational technology
- To assess the befit of developing mathematics and its pedagogical content through educational technology
- To familiarize the difficulties in facilitating mathematical concepts through educational technology

Methodology

The study has been conducted based on the method of document review in accordance with the qualitative approach of research and has been done on the basis of the secondary sources of data like books, research journals, newspaper articles and different websites towards "The Content Development of Mathematics and Its Pedagogical Knowledge Through Educational Technology".

The Content

Content development of mathematics should emphasise the software used for facilitating and learning mathematics as Graphic calculators, Dynamic graphing tools like GeoGebra, Dynamic geometry tools, Microsoft Excel/spreadsheet, Microsoft Mathematics, Auto shop, Olab, Mat lap, etc. With the help of educational technology, mathematical content should be learner centered and learner utilitarian and the learner can successfully impart education characterized by imparting instructions, collaborative learning, multidisciplinary problem-solving and promoting critical thinking skills as highlighted by NCF-2005. Content development of mathematics and its pedagogy in an effective way to the facilitator towards how a learner learns mathematical concepts? what do learners need to learn mathematical concepts? and what do learners already know about the mathematical concepts which we share with them?

The Process

Conceptualisation of mathematical concepts depends upon understanding, explaining, and predicting mathematics concepts/depends on 21st century learners' interest and curiosity. Developing the mathematical and their pedagogical content for easy conceptualization, and there is a need to use relevant and appropriate Educational technological and pedagogical skills for facilitating mathematical content. the help of the educational technology we implementing mathematical content in real life benefits. A number of factors may influence the facilitating of mathematics but facilitator plays an effective and important role in the facilitating conceptual learning of mathematics by encourage risk taking to solve mathematical problems, create purposeful learning experiences with mathematics concepts, develop a challenge in an understanding of mathematics concepts and increase the purposeful learning experience for students through the use of relevant and meaningful contexts.

Components of Mathematics Content

- Mathematics and its Pedagogy
- Reflection on Mathematics Conceptual
- Supportive Environment
- Learner Centeredness
- Assessment of Learning
- Asking for Responding at Feedback
- Inductive and Deductive Learning
- Recycling Information

The Products

Reflecting on many ways of conceptualisation and understanding of mathematical concepts and using and implementing educational technology to easily conceptual and understandable mathematical concepts. use of the recent web-based technology and ICT-approach to the conceptualization of mathematical and their pedagogical concepts. using of ICT and educational technology, mathematical and their pedagogical content relate with concrete and abstract material in their scenario. The help of hardware and software tools developed mathematical and their pedagogical content easily conceptual and creating environment learning with joyful. Web-based(digital) learning is any type of learning that facilitated by technological instructional that makes the effective learning. digital learning occurs across all learning areas and domains.as blended and virtual mathematical learning, game-based mathematical learning, accessing digital mathematical content, collaborating locally and globally with mathematics content, assessment and reporting online mathematical content and active participation in online mathematical communities. Using technology to connect, collaborate, create mathematical understanding and enriching mathematical concepts. To become a mathematician, 21st century learner needs regular opportunities for exploring links within their mathematical experience, through reasoning, problem-solving and pattern spotting.

Conceptualisation of Mathematics and its Pedagogical Concepts Integrating with Educational Technology

An interesting aspect of the findings is the purpose of the mathematical assumptions, however, there is a straightforward way to relate the extent of proficiency in simplifying the situation of the level of simplification. level of simplification mathematical problems and concepts leading to unrealistic situations. There is a need to maintain realistic features of conceptualization of mathematics and their pedagogical concepts with the help of the educational technology. Educational technology and its tools help conceptualization and understanding of the mathematics

and its pedagogical concepts. Using visual aids and integrating with educational technology mathematical content and its problems are procedures in multiple resources of the solution. Integrating educational technology, and able to define mathematical language and its characteristics. Shulman (1986) was one of the initiators of this discussion with the introduction of the idea of Pedagogical Mathematical Content Knowledge (PMCK), which is the intersection of mathematical content and specific knowledge of their pedagogy. mathematical content knowledge (MCK) and Pedagogical Content Knowledge (PCK) are integral parts of effective mathematics instruction.

The Benefit of Developing Mathematics and its Pedagogical Content Through Educational Technology

- The richness of mathematics and its pedagogy content. • Learners, participation increase in mathematics.
- Easily understandable pedagogical knowledge of mathematics.
- Enriches and enhances understanding of learners.
- Reduces learning burden.
- Learning and instructional material are more attractive.
- Learners taking interest in involving and participating in mathematical activities and its creativity.
- Educational technology allowing creativity in facilitating and learning mathematics.

Difficulties in Facilitating Mathematical Concepts Help Educational Technology

- Facilitator- Based factors
- Learner-based factors
- Mathematical content-based factors
- Mathematical pedagogy-based factors
- Educational technological factors
- Web-based and internet connectivity related factors
- Mathematics facilitator behavior with the technology
- Mathematics symbols and operations-based factors

Benefits of Integrating Educational Technology in Facilitating Mathematical Concepts

- Providing high-quality web-based alternative routes for facilitating mathematical Concepts and mathematical knowledge.
- Building open resource for the learner and include with rural or urban areas Schools.
- Educational technology provides a new innovative resource for learning mathematics and other subjects.

- Educational technology provides us real visualization of nature of mathematics using and applying graphics and animation tools.
- Educational technology gives chance for the facilitator to explore his/her Mathematical knowledge in word scenario.
- Educational technology provides an open resource for learning mathematics and its pedagogical concepts.
- Educational technology gives open chance for exploring Mathematics and other subject content knowledge using social media like Facebook, YouTube, Olab, twitter, Instagram, google scholar, and other open online resources.

Barriers of use of educational technology in mathematics and its pedagogy

- Lack of educational technological resources.
- Lack of adequate technical support for educational technology.
- Lack of knowledge and skill about inclusion and integration of educational technology.
- Learners and facilitators do not have access to the necessary educational technology.
- The software is taking enough time to draw the figure, graph and symbols

Conclusion, Discussion and Summary

The success of educational technological innovations should be elaborate open resources of the plate from as online, and web-based resources of assessing for learning enhance of mathematics and its pedagogy. designing and developing mathematics and its pedagogical content according to the need of digital-age of learning scenario. Content should be effective and efficient for students and 21st century learners recognize the importance of using concrete materials and visual aids to develop a deep understanding of the mathematics concepts. For the effective and useful learning, we need to develop healthy content and less misconceptions with help of educational technology. The content should be developed based on the nature and scope of mathematics, mathematics facilitating and learning mathematical processes, planning for facilitating mathematics content and mathematics content should be useful in real-life. The facilitator needs to be aware of these and creates ample opportunities for a learner, facilitator needs to reflect critically on their beliefs and perceptions about mathematics and its facilitating and promote learning using educational technology. The help of educational technology developing mathematics and its pedagogical content provides a new way of learning. It is necessary to contact develop according to present need and scenario and fulfil the content and its pedagogical aspect according to social need and demand on the current scenario and there is a need to develop mathematical content and its pedagogical content integrating with educational technology and learner centered activities. Educational technology facilitates mathematical software, Internet accessibility, handheld data-

collection devices and sensory probes. Content should be effective and efficient for 21st century facilitators and learners recognize the importance of using concrete materials and visual aids to develop a deep understanding of the mathematical concepts.

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