RESEARCHERID THOMSON REUTERS

International Journal of Research in Engineering and Applied Sciences(IJREAS)
Available online at http://euroasiapub.org/journals.php
Vol. 12 Issue 07, July- 2022
ISSN(O): 2249-3905, ISSN(P) : 2349-6525 | Impact Factor: 8.202 |
Thomson Reuters ID: L-5236-2015

Importance of Mathematical Modeling in Real Life Problems

Dr.Seema Bansal, Assistant Professor, Department of Mathematics,
Vaish College, Bhiwani (Haryana), Email Id seema_ckd@rediffmail.com

***Abstract*:** Mathematical modelling is generally observed as the art of applying mathematics to a real world problem with a view to improved escalate the problem. As we know, mathematical modelling is clearly related to problem solving. Importance of Mathematical modelling in the school setting daily problems. However, they may not mean the same thing. Mathematics is used in every where day to day life in human beings weather it is a biological, technological, and problems for secondary school mathematics activities, our aim is to show the importance of mathematical modelling in real life problems. Mainly in this paper will explore the edge between workplace mathematics, particularly tech-related real-world (TRW) problems, and school mathematics.

Key words: Mathematical modelling, Real life problems, Problem situation.

Introduction:

Mathematics has been used in life since human existence. Different civilizations over time have left behind a storehouse of mathematical knowledge of various kinds and in different contexts. Each of these pieces of knowledge is relevant to prevailing needs at different times in history and is intended to provide answers to all phenomena, whether in the fields of physics, chemistry, astronomy, or physics. literature, music, astrology, art or religion. However, it seems that at some point, math teachers forget to relate these everyday problems to the mathematics presented in the classroom, which according to Arrieta, et al, (2007) and Suárez (201), their way of teaching and learning. more interesting. On Wikipedia.org,

The definition of mathematical model is found as: "A mathematical model is a description of a system using mathematical concepts and language. The process of developing a mathematical model is termed mathematical modeling. Mathematical models are used in the natural sciences and engineering disciplines as in the social sciences".

WikipeBlum and Leiβ (2007) attempt to elucidate the underlying ideas and terms identified with the term mathematical modeling and visualization processes. Lesh and Doerr (2003) described that mathematical models are applied frameworks that include the components, relationships, tasks, and decisions that monitor the communications communicated using the framework. externally documented and used to develop, describe, or clarify the practices of different frameworks, possibly with the goal that other frameworks can be controlled or well predicted. Yoon, Dreyfus and Thomas (2010) state that the mathematical modeling task starts with a real problem and is accomplished by mathematicizing the problem and discovering its answer and deciphering the arrangement. it in relation to reality. Real-life problems are the starting point for modeling activities, and these activities are considered an ideal way to identify and understand aspects of math in real life, math learning, and life. real life.dia.org,

A mathematical model that sheds light on the fundamental properties of application frameworks. Mathematical modeling (MM) can be described as a revolving multi-dimensional problem-solving process that involves the interpretation of real-life problems in the language of mathematics, informing users of scientific process and thus examine arrangements (Blum and Niss 1991; Haines and Crouch, 2007). Barbosa (2012) states that MM is an area of learning where learners are invited to ask and find, through mathematical methods, situations that arise in different learning territories. In the case where we use the sociological approach, inquiry goes beyond defining or understanding a problem, coordinating math learning, modeling and reflection.

Mathematical modeling refers to the process of building a mathematical model to solve real-world problems (Blum and Leiss, 2007; Blum and Niss, 1991; Kaiser and Sriraman, 2006). Researchers have recently adopted a new paradigm for performing mathematical modeling that incorporates traditional problem solving into a range of professional or interdisciplinary outcomes (Bakker, 201 ; FitzSimons & Boistrup , 2017; Sokolowski, 2018). Specifically, the researchers (e.g. Maaß, Geiger, RomeroAriza, & Goos, 2019) argue that the use of mathematical modeling can enhance students' understanding of the role of mathematics in various fields of study. STEM field. Exposing students to the math behind authentic problems taken from the real workplace, specifically Mathematics at work, has the potential to enhance their understanding of real-world situations from mathematical perspective. The use of these problems in school mathematics has value not only intellectually but also as a compelling answer and motivating reason for learning mathematics (HernandezMartinez & Vos, 2018). Additionally, the ability to understand why math is important to STEM fields makes these fields more accessible to students, who may choose them for their future studies or careers. them (Damlamian et al., 2013; Kaiser, van der Kooij and Wake, 2013)

RESEARCHERID THOMSON REUTERS
International Journal of Research in Engineering and Applied Sciences(IJREAS)
Available online at http://euroasiapub.org/journals.php
Vol. 12 Issue 07, July- 2022
ISSN(O): 2249-3905, ISSN(P) : 2349-6525 | Impact Factor: 8.202 |
Thomson Reuters ID: L-5236-2015

2. Mathematical modelling

In mathematical modeling, students elicit a mathematical solution for a problem that is formulated in mathematical terms but is embedded within meaningful, real-world context (Damlamian et al., 2013). Mathematical modeling is defined as a cyclic process that involves the transition from a real-life situation to a mathematical problem. Researchers have described various approaches for constructing the modeling cycle (e.g., Borromeo Ferri, 2006; Blum & Niss, 1991; Doerr & English, 2003; Galbraith, Renshaw, Goos, & Geiger, 2003; Lesh & Doerr, 2003; Niss, Blum, & Galbraith, 2007). In this study, we chose to focus on the model suggested by Blum and Leiss (2007) (see Fig. 1).

Figure 1 demonstrates the seven main phases of the mathematical modeling cyclic process: (1) understanding a real-world situation; (2) simplifying (idealizing) the real-world situation to obtain a real-world model; (3) mathematizing the real-world model, i.e., devising a plan for solving the problem by translating the real-world model into a mathematical model; (4) applying mathematical routines and processes; (5) interpreting the mathematical solution by verifying that the problem accords with reality; (6) validating the results of the previous stage, i.e., checking the adequacy of the results and repeating certain stages or even the entire modeling process if necessary; and (7) presenting the results of the modeling cycle.

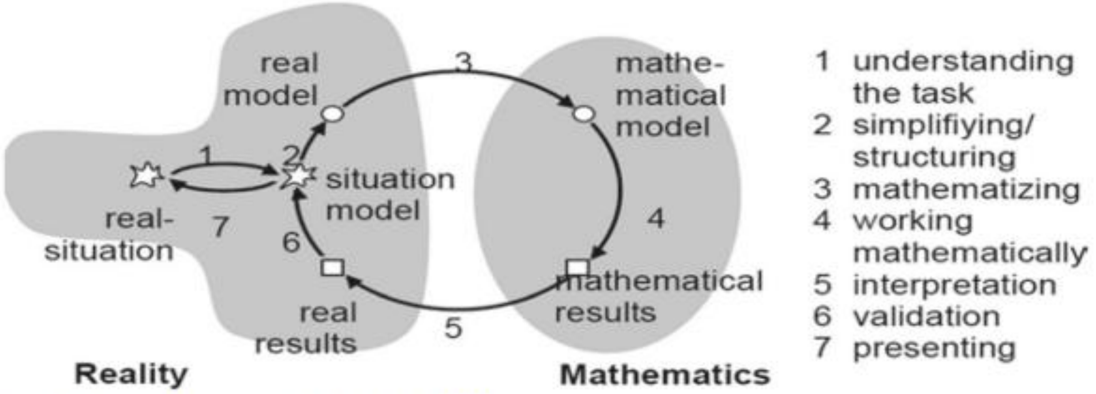

Fig. 1 The modeling cycle (Blum & Leiss, 2007)

3. The interface between workplace mathematics and school mathematics

Working environment arithmetic and school math are various fields (Fitz Simons, 2013). Work environment arithmetic is the context oriented, utilitarian computations essential for substantial work exercises, while school math is regularly more unique (Kaiser, van der Kooij, and Wake, 2013). FitzSimons and Boistrup (2017) distinguished four sorts of

RESEARCHERID THOMSON REUTERS
International Journal of Research in Engineering and Applied Sciences(IJREAS)
Available online at http://euroasiapub.org/journals.php
Vol. 12 Issue 07, July- 2022
ISSN(O): 2249-3905, ISSN(P) : 2349-6525 | Impact Factor: 8.202 |
Thomson Reuters ID: L-5236-2015

arithmetic utilized in professional or expert instruction, of which the sorts on one or the flip side of the range don't mirror the idea of working environment math. Type An alludes to "setting free," decontextualized arithmetic, and type D is "sans science," alluding to professional exercises that are obviously disconnected to math. The crossing point between type B—unequivocal utilization of numerical models previously, during and following work exercises, and type C—numerical ideas and techniques verifiably coordinated into work exercises (in the same place, p. 344), addresses how arithmetic is contextualized in the work environment.

Work environment science is more noticeable to specialists in the field than to the lay public, yet as PCs assume control over a developing number of numerical errands and most estimations are performed consequently, arithmetic is frequently bundled into a "black box" so that even those dealing with the issue may not understand it is there (Damlamian et al., 2013; Williams and Wake, 2007). Understanding the science behind answers for work environment issues becomes significant when clever fixes are required, for example, for notable applications that lead to significant leap forwards (Gravemeijer, 2013; Levy and Murnane, 2007). The abilities required for work environment arithmetic have been depicted in past examinations (Hoyles, Noss, Kent, and Bakker, 2013; van der Wal, Bakker, and Drijvers, 2017), which distinguished seven sorts of abilities called techno-numerical proficiencies, alluding to abilities like information education, specialized relational abilities, and specialized imagination.

Concerning school science, specialists separate between normal strategies used to open understudies to the applied idea of arithmetic, going from the easiest to the most convoluted: (1) straightforward word issues, (2) plan of numerical assignments in lay language, (3) delineation of numerical ideas, for example, printed graphs or body signals, (4) utilization of notable numerical calculations, like experimentation, for taking care of realworld issues, and (5) demonstrating, which alludes to the utilization of intricate critical thinking processes (FitzSimons and Boistrup, 2017; Maaß, 2006).

Innovative headways have expanded the predominance of arithmetic in the work place (OECD, 2019), in this manner setting out more open doors for interfaces between working environment math and school math, yet compelling connecting needs the help, all things considered. From the school science viewpoint, instructors should better get ready understudies to go up against certifiable circumstances in current life by upgrading their comprehension of work environment math, which is dissimilar to generally "practical" and "true" issues that understudies experience in proper school arithmetic (FitzSimons and Mitsui, 2013; Hahn, 2014). Joining these learning encounters can offer understudies the chance to figure out the practices that architects use (FitzSimons, 2013). According to the business point of view, engineers and different representatives ought to comprehend the intricacy of work environment arithmetic and have the option to convey the expert terms and the fundamental math involving clear and brief clarifications in plain language that can be perceived by non-specialists (Garfunkel, Jeltsch, and Nigam, 2013), yet the most widely recognized technique utilized for introducing genuine issues in conventional auxiliary school settings is word issues, which wrap absolutely numerical issues into a verbal portrayal of out-of-school situations and different disciplines (Depaepe, De Corte, and Verschaffel, 2010). For educational purposes, these issues regularly present a twisted image of the real world, or furnish insignificant extra-numerical data with restricted pertinence (Blum and Niss, 1991), making understudies frequently overlook the important true angle. Consequently, these issues don't get ready understudies for the progress to explicit arithmetic related information or for the overall critical thinking procedures used in work environment exercises, particularly in quickly changing innovation conditions (Beswick, 2011; Bonotto, 2013; Hoogland, Pepin, de Koning, Bakker, and Gravemeijer, 2018). In this review, we propose the utilization of numerical displaying to make an instructive connection point between working environment math and school science.

4. Digital Video on Teaching Mathematics

As Jofrey states (2005, 2010), presentation of computerized video in the homeroom setting has been more grounded power than simple video since VCR controls hinder the errand of counseling the video. Taping gadgets and projects used to control recordings are unique. Also this is one reason that the suitability of involving computerized video in the homeroom has been exhibited in the course of recent years, as it empowers accomplishing learning targets dependent on the articulation and correspondences potential that video offers. One of the advantages of video examination innovation is that understudies can picture a few portrayals of a similar issue circumstance. For example, from the video of the movement of a bike, understudies can imagine an image photo, tables of information, charts, numerical formulae and verbal and composed depictions (Joffrey, 2005).

At present we live in a general public that is progressively visual in nature; understudies are progressively keen on counseling recordings of their advantage in information bases on the Internet, added to the decreased expense of camcorders and mechanical improvements that work with use and conveyance of computerized instructive media and materials.

Production of educational video clips supports teaching because it offers the opportunity to understand and develop intellectual activities during the process, and promote having the students themselves become the creators or designers so as to achieve greater depth in the study themes.

Video tapes of moving articles or of genuine circumstances work with for educators the undertaking of consolidating into the homeroom valid exploration that permit the understudies, with the assistance of particular programming, to further develop their perception of the ideas to be learned, just as to make realistic, scientific and mathematical portrayals of issue circumstances that connect with day to day existence. This is called attention to by Calderón, Núñez and Gil (2009), where they utilize an advanced camera as a Physics lab device to concentrate on a shot tossed by a home-made gadget, and where the goal was to analyze the hypothetical expectations against trial results.

5. Information and Communications Technology (ICT)

The present society is an every day client of computerized innovation. Do the trick it to see that most of individuals have a cell phone, iPod, PC, adding machine, grapher, electronic tablet and electronic plan. This then, at that point, makes one wonder: If society has emphatically esteemed utilization of computerized innovation in various social mediums, for example, at home, work, administrations, bury alia, why has it not done as such in the science study hall too? During the gatherings of scholastics of Numerical Analysis of the CUCEI Department of Mathematics, conversations have been hung on utilization of advanced innovation in the homeroom and one of the long-lasting conversations manages the explanation instructors will not utilize such innovation. A portion of the contentions communicated are that utilization of computerized innovation carries with it the deficiency of number juggling, mathematical or thought abilities among understudies, while instructors are not persevering in working with such innovation; they don't feel able; they neglect to keep awake to date; and don't have any desire to leave their usual ranges of familiarity in light of the fact that doing as such would suggest work, time and commitment. Thusly, it is simpler to just not use ICTs in their classes. It has been seen that understudies took on the Numerical Analysis subject struggle noticing and moving the information gained from arrangement strategies for non-straight conditions, frameworks of direct conditions, conventional differential conditions with starting qualities, insertion and changing capacities to issue circumstances inside setting. Thusly, we propose to coordinate numerical displaying so understudies can work with an issue circumstance from day to day existence, one in which it is fascinating for them to look for the numerical articulation, with the help of ICTs that depict it, and afterward return to clarify the circumstance, as did the understudies in the entire meeting.

Conclusion

This study presents a perspective of mathematical modeling as an educational interface between technological mathematics in the workplace and formal mathematics in high school. We present a method that follows the mathematical modeling cycle proposed by Blum and Leiss (2007) to identify real-world (TRW) technology related problems, simplifying the real aspect of problems and mapping problems for the official high school curriculum. mathematics after completing the educational program. model the cyclic process by implementing the interface with the mathematical domain.

The results of the study highlighted the importance of the first two phases of the modeling cycle (p. Emphasis on the practical field of mathematical modeling and the transition from real-world situations to simulations). situational situations that interface with the mathematical domain). Consistent with the first objective of this study, a key finding is that in technology-related fields, the less complex the interface with the mathematical domain, the more engineers interviewed for the study. This can provide about 50% problems. extracted from the fields of metrology, graphics, and microprocessor design, which are three of the eight key technology areas explored in this study. and academia and how they relate to t in the high school math curriculum because the study participants are not part of the engineering and

RESEARCHERID THOMSON REUTERS
International Journal of Research in Engineering and Applied Sciences(IJREAS)
Available online at http://euroasiapub.org/journals.php
Vol. 12 Issue 07, July- 2022
ISSN(O): 2249-3905, ISSN(P) : 2349-6525 | Impact Factor: 8.202 |
Thomson Reuters ID: L-5236-2015

scientific worlds. Our aim is to give an idea of what might be the most popular among different STEM fields and which have the greatest potential to provide problems with math problem solving processes. basic learning. Regarding the second objective of this study, another major finding also addresses the practical field of mathematical modeling, which is the most common method specified by engineers to simplify TRW problems for High school math is bridging analogies. The engineers proposed using different methods they applied themselves to explain the non-mathematical field, i.e. the technologically related aspect of the TRW problem. demonstrates the applied nature of mathematics, especially through connections with technology-related fields.

Refrences

1. Suárez, L. (2014). Modelación-Graficación para la matemática escolar (Modeling-Graphing for school mathematics). Madrid, España: Ediciones Díaz de Santos. ISBN:978-84-9969-614-0.
2. Lesh, R., & Doerr, H. M. (2003). Beyond constructivism: Models and modeling perspectives on mathematics problem solving, learning, and teaching, Mahwah, NJ: Lawrence Erlbaum Associates.
3. Yoon, C., Dreyfus, T., & Thomas, M. O.(2010). How high is the tramping track? Mathematising and applying in a calculus model-eliciting activity. Mathematics Education Research Journal, 22(2), 141-157.
4. Blum, W., & Niss, M.(1991). Applied mathematical problem solving, modelling, applications, and links to other subjects – state, trends and issues in mathematics instruction. Educational Studies in Mathematics, 22(1), 37–68.
5. Barbosa, J. (2012). Mathematical modeling, mathematical content and tensions in discourses. In G. A. Stillman, G. Kaiser, W. Blum, & J. P. Brown (Eds.), Teaching mathematical modeling: Connecting to research and practice ,Dordrecht, The Netherlands: Springer, 67-76.
6. Blum, W., & Niss, M. (1991). Applied mathematical problem solving, modelling, applications, and links to other subjects – state trends and issues in mathematics instruction. Educational Studies in Mathematics, 22, 37–68
7. Kaiser, G., & Sriraman, B. (2006). A global survey of international perspectives on modelling in mathematics education. ZDM – Mathematics Education, 38(3), 302–310.
8. Bakker, A. (2014). Characterising and developing vocational mathematical knowledge. Educational Studies in Mathematics, 86(2), 151–156.
9. FitzSimons, G. E., & Boistrup, L. B. (2017). In the workplace mathematics does not announce itself: towards overcoming the hiatus between mathematics education and work. Educational Studies in Mathematics, 95(3), 329–349.
10. Sokolowski, A. (2018). Scientific inquiry in mathematics-theory and practice: A STEM perspective (1st ed.). New York, NY: Springer.
11. Maaß, K., Geiger, V., Romero-Ariza, M., & Goos, M. (2019). The role of mathematics in interdisciplinary STEM education. ZDM – Mathematics Education, 51, 869–884.

12. Hernandez-Martinez, P., & Vos, P. (2018). "Why do I have to learn this?" A case study on students' experiences of the relevance of mathematical modelling activities. ZDM – Mathematics Education, 50(1–2), 245–257.