ISSN: 2349-9141

*Available online at http://www.ijirr.com*

*International Journal of Information Research and Review*
*Vol. 2, Issue, 06, pp. 802-804, June, 2015*

OPEN ACCESS JOURNAL

*Full Length Research Paper*

# HINDRANCES TO PURE MATHEMATICS AS A TRANSFORMATION TOOL IN THE KENYAN SOCIETY

***Dr. John Wanyonyi Matuya**

Maasai Mara University, P.o Box 861-20500, Narok, Kenya

***Corresponding Author**

**Received 19th May 2015; Published 28th June 2015**

**Abstract**

Mathematics is the study of idealised structures. All other sciences use to a greater or lesser degree these idealised structures to model the part of the world that they study. But for many Mathematics is a Science that is fun and challenging in itself. To study and explore the idealised structures, find out their properties, how they can best be understood and described, and which idealised structures are rich, natural and fruitful to study. Mathematics plays a crucial role in the society since it is core for almost all disciplines and it is applicable in day today life. The society has some sense of the importance of Applied Mathematics and Statistics, but they view Pure Mathematics as something with little use. In fact it is viewed as speculative Mathematics that is taught for its own sake. In this paper we raise important issues related to the study of teaching and learning of mathematics at the university level. We examine the challenges facing mathematics education by linking secondary education to university education. We demystify the fact that pure Mathematics is studied for its own sake by demonstrating that pure Mathematics is the logic and the vehicle for transforming the society. We give way forward to the concerns in mathematics education so as to pave way for improvements. The findings in this study are of interest to the teachers of mathematics, researchers, employers and many other people who are keen on the trends of mathematics.

**Keywords:** Pure Mathematics, Hindrances (challenges), Society.



*To cite this paper:* Dr. John Wanyonyi Matuya, 2015, Hindrances to pure mathematics as a transformation tool in the kenyan society. *International Journal of Information Research and Review.* Vol. 2, Issue, 06, pp. 802-804.

## INTRODUCTION

After Einstein's mathematician friend, Marcel Grossmann explained manifold theory to him, Einstein wrote " in all my life I have not laboured nearly so hard, and I have become imbued with great respect for mathematics, the subtler part of which I had in my simple-mindedness regarded as pure luxury until now ''(David,2006). Mathematics education has been a focus of attention in Kenya. It has been a target of intense criticism and debate among different stakeholders and communities. Mathematicians are the worst public relation officers when it comes to their subject. The performance in mathematics is wanting and is therefore viewed as a subject for a few talented persons. Most students are not keen to pursue mathematics at university level because employment opportunities and well paying jobs appear not as to be certain as in some other disciplines. However, almost all disciplines have their roots in mathematics.

### Challenges/ Hindrances

### Secondary Education

- Poor teaching methods because of the wide curriculum and struggle to cover the syllabus
- Negative attitude towards the subject by both teachers and students
- Inadequate or lack of teaching and learning resources e.g reference books, teaching models
- Inadequate personnel. The teacher student ratio is worrying
- Poor remuneration for teachers of Mathematics.
- Mass failures i.e most students score grade E.

### University Education

### Undergraduate

- Double mathematics is no longer popular since the employer is keen on two teaching subjects. The only immediate employment is being the teacher of Mathematics.

- Teachers of university mathematics courses, on the whole, have not been trained. Therefore they don't consider educational pedagogical issues beyond the determination of the syllabus. This is seen through photocopied books labeled my notes and hand outs. This has contributed to:

- Lack of research.
- Limited or no contact with the students

- Discontinuity between Mathematics education in secondary schools and universities, in terms of content, purposes, goals, teaching approaches and methods.

**Postgraduate**

- Funding for young researchers in mathematics is not guaranteed. Funds are channeled in other areas, in the name that they are geared towards vision 2030.
- Applied mathematics and Statistics attract more students than Pure mathematics because

- They have wider area for employment.
- Pure mathematics is full of abstract concepts. It is referred to as speculative mathematics. The results are not applied immediately. "What is the purpose of studying Algebra and Topology if we are not going to apply it in everyday life".
- Thesis defense for Masters / PhD is easier for Applied and Statistics than pure mathematics.

- Lack of specialists, that is, seasoned researchers to guide students at Masters and PhD level.

**Benefits of pure Mathematics to the society**

G.H. Hardy, in his book "A Mathematician's Apology", wrote: "I will say only that if a chess problem is, in the crude sense, 'useless', then that is equally true of most of the best mathematics; that very little of mathematics is useful practically, and that little is comparatively dull. I have never done anything 'useful'. No discovery of mine has made, or is likely to make, directly or indirectly, for good or ill, the least difference to the amenity of the world. I have helped to train other mathematicians, but mathematicians of the same kind as myself, and their work has been, so far at any rate as I have helped them to it, as useless as my own. Judged by all practical standards, the value of my mathematical life is nil; and outside mathematics it is trivial anyhow. I have just one chance of escaping a verdict of complete triviality, that I may be judged to have created something worth creating. And that what I have created is undeniable: the question is about its value'' (Godfrey, 1940).

When we are teaching a child to count, we normally count a variety of different things with them: sticks, stones, toys, bricks, cartoon animals, and so on. The child eventually understands the abstract principle behind these concrete instances of number, and can then go on to count all the important things that need to be counted later in life. By understanding the abstract principles, they are well prepared not just for putting numbers to use in their everyday activities, but also when they need to count something new. If someone said to us, "Why are you teaching your child to count toys? Since they will likely be a bank teller like yourself, wouldn't it be better to teach them how to count money?," most of us would consider such a comment ridiculous: we know at least subconsciously that number is an abstract concept, and that the counting of toys and cartoon animals is merely a means to the key goal of understanding number in the abstract. When we understand the abstract concept well, we can then put it to use in all sorts of areas. Understanding a piece of abstract mathematical theory is like understanding numbers in the abstract. We usually gain the understanding by looking at special cases. And, although an abstract mathematical theory, just like the abstract concept of number, is divorced from the real world, it very often has the potential to be useful in a variety of different areas: its abstraction is strength because it maximizes its potential usefulness. One example of the power of abstraction is provided by Laplace's equation, one of the most studied and best understood (non-trivial) partial differential equations in mathematics. A variety of phenomena in astronomy, electromagnetism, and fluid flow are governed by this equation, as is the steady state heat distribution in an object. By understanding the abstract mathematical equation, we simultaneously gain an understanding of all these phenomena.

CT scanners are one of the greatest advances in modern medical technology. These scanners form a three-dimensional image from a collection of two-dimensional images taken from different angles. The same principle is employed in reflection seismology to create three-dimensional images of the earth subsurface, and in certain types of electron microscopy. In all cases, the underlying mathematics involves the inverse Radon transform, or related transforms. Another example is provided by Number Theory, long considered the most inapplicable of all areas of mathematics. It was widely felt that the only reason to do research in Number Theory was to discover its beauty. This all changed with modern encryption theory, which is an essential part of e-commerce and relies heavily on the properties of prime numbers and other aspects of Number Theory.

In algebra especially coding theory plays a great role in the Banking sector, that is, use of pin numbers. The closure property used in laboratories during DNA test. The test is meant to give information about genealogy or personal ancestry. For instance if we want to establish if a child belongs to couple $X$ . The existence of an inverse in creation, that is, for every male there's a female. Pure Mathematics is the mathematics which underlies all applications. Deep mathematical theories have sometimes been developed for their own sake, to find application much later on. What is "pure" in one era often becomes applied later. Finance and cryptography are current examples of areas to which pure mathematics is applied in significant ways. Finally, outside of its direct applicability to the world around us, mathematical research helps us to improve and refresh the quality of what we teach, and certainly the world needs a large number of graduates with a wide variety of mathematical skills to fill the wide variety of positions that require some Mathematics or the ability to analyze problems logically.

**Way Forward**

- The society to change its attitude towards Mathematics
- Funding for researchers in mathematics just like other disciplines.
- In service courses for teachers of mathematics at university level i.e on methodology and psychology of human beings. In secondary schools we have SMASSE (Strengthening

Mathematics and Sciences in Secondary Education). We advocate for SMUE (Strengthen Mathematics in University Education) at university.
- Strengthening mathematics bodies.
- Establishing institutions of mathematics.
- Collaborations with industries and private sectors.
- Forums for interaction to exchange views and experiences from a wide variety of places and backgrounds.
- Adequate teaching and learning resources

  - Reference books
  - Journals and periodicals
  - Mathematics soft wares.

- Better remuneration for teachers of Mathematics
- Linking Mathematical concepts at all levels for continuity, that is, from primary to university level.

**Conclusion**

It is clear that that all disciples have roots in Pure Mathematics which is the logic, foundation and a language of communication. The society should change their attitude and demonizing Pure Mathematics as subject with little or no value in the society as evidenced in the benefits. For instance use of coding theory, application in finance, Medical field (CT scanners and DNA tests) and existence of an inverse in creation.

**Quotes**

- "Anyone who can't cope with mathematics is not fully human. At best he is a tolerable subhuman who has learned to wear shoes , bathe and not make messes in the house'' Robert Heinlein
- "Mathematics is like love, a simple idea but it can get complicated'' Andrew Wiles
- "If you do pure math for its own sake, you might be disappointed. But if you keep in mind the unexpected rewards you might receive, and if additionally you enjoy the beauty of pure thought and can handle it, then the experience could be gratifying'' Ishamael

**Acknowledgement**

I thank Prof. Shem Aywa for mentoring me in pure Mathematics and the organizers of the first Maasai Mara University International conference for giving me a forum to share my findings.

## REFERENCES

David, J.D., *the strength of gravity*, printHT, UK, 2006.
Godfrey, H, *A Mathematician's Apology*, England, 1940.
Brown, C.M. and Murphy, T.J. 2000. *Research in Undergraduate Mathematics Education,* Reference Services Review Vol 28(1), pg 65-80.
Barrow-Green, J. 1998. *History of Mathematics: Resources on the World Wide Web*,Mathematics in School Vol 27(4) pg 16-22.
Richard Scheaffer, *et al.* 2007. *Working Group on Statistics in Mathematics Education Research Foundation.* The American Statistical Association.
Stephen M. Stigler, 1992. *A Historical View of Statistical Concepts in Psychology and Educational Research,* American Journal of Education Vol 101 (1), pg 60–70.
Thomas D. Cook, 2002. *Randomized Experiments in Educational Policy Research* Vol 24 (3), pg 175-199.
Department of Mathematics and Statistics, 2012. *why do research in Pure Mathematics* , Maynooth University
http://en.wikipedia.org/wiki/Pure_mathematics

*******