

TEACHING MATHEMATICS TO ENGINEERING STUDENTS IN DEVELOPING COUNTRIES

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Abstract

In this paper we discuss several aspects of teaching mathematics to engineering students in developing in countries taking into consideration the methods and strategies of teaching mathematics both at school level and higher education level in general and especially for engineering students. A proposal for measures to remedy the negative aspects of teaching in developing countries is then given.

Keywords: Teaching Mathematics, engineering students, developing countries, developed countries, school level, higher education level .

Introduction

Some negative aspects of methods and strategies of teaching mathematics at school level, higher education level in general, and especially for engineering students, in several developing countries are briefly discussed. A proposal for future measures is accordingly given.

In Section 2 the current situation of teaching at school level, higher education level in general, and especially for engineering students in several developing countries are given.

The negative aspects of teaching mathematics at school level and higher education level in general and especially for engineering students in developing countries are illustrated in section 3.

A proposal to remedy the negative aspects is discussed in section 4.

In section 5 our recommendations for the future are given.

Finally the conclusion is then
briefed in section 6.

Current Situation in several Developing Countries

To study the situation of teaching in general in developing countries we have to consider following differences (see [1], [2]):

Governing system ranging between dictatorship and partial democracy.

Economic situation differing between very rich and very poor countries.

Standards of teaching in schools and universities which is rather good in some countries and quite bad in some other countries.

Total population which ranges between some hundreds of thousands and some tens of millions.

Ratio of number of schools and universities to total population differing between adequate and not adequate.

Area of the country ranging from a small area and a huge area.

Geographical situation ranging from well situated developing country between 3 continents and very far countries from Europe and USA.

Percentage of non-alphabetical people which is very high in some countries and very low in some other countries.

Technical and financial support of developed countries which ranges from excellent support for some countries and very poor for some countries.

Negative Aspects of teaching mathematics in Developing Countries

General Aspects

The main negative aspects are (see [1], [2]):

Dictatorship is usually not interested in raising critical thinking people. One of their strategies is to keep low standard teaching.

Economically weak developing countries cannot afford investing financially in the field of education.

Developing countries with high population and/or huge area are hindered to spread education in the whole country

High percentage of non-alphabetic people gets sometimes higher priority than education in schools and higher education

Technical and financial support of developed countries is usually based on political decision for definite developing countries

At School Level

The main negative aspects are (see [3], [4]):

Lack of potential teacher with pedagogic high standards and up to date teaching strategies.

Over populated classes.

Emphasizing memorization rather than thinking.

Neglecting visualization and imagination skills.

Lack of support of uneducated parents.

Spending long time on games and internet.

In higher Education

The main negative aspects are (see [5], [6]):

Ignoring the negative aspects of teaching mathematics at school level by some instructors.

Using textbooks written by scientists in developed countries which do not take into consideration the negative aspects of teaching at higher education level in developing countries.

Over populated classes at state universities.

Lack of critical thinking, systematic analyzing, objective criticizing, and creative proposing especially by the freshmen.

Lack of visualization and imagination by the students.

Engineering Students

The main negative aspects are (see [7], [8], [9], [10]):

Many engineering students do not realize the importance of mathematics for their study and careers.

Even some instructors of engineering courses also do not realize the importance of mathematics for the students' study and careers.

Using textbooks written by mathematicians in developed countries which do not take into consideration the negative aspects of teaching mathematics to engineering students in developing countries

Several universities minimize the number of mathematics courses for the sake of more engineering courses.

A Proposal to Remedy the Negative Aspects

Generally

Establishing a democratic governing system which is really interested in raising critical thinking people.

Investing more in the field of education by state and private sectors.

Decreasing the percentage of non-alphabetical population.

Planning to eliminate or at least minimize technical and financial support of developed countries.

At School Level

Educating the teachers at school level to have pedagogic high standards and up to date teaching strategies.

Decreasing number of populated classes.

Emphasizing thinking rather than memorization.

Stressing visualization and imagination.

Organizing special tutoring for socially needed parents.

Motivating the young people to get better attitude towards learning.

In higher Education

Taking into consideration the negative aspects of teaching mathematics at school level by all instructors.

Using textbooks written by scientists in developing countries which take into consideration the the negative aspects of teaching at higher education level in their countries

Decreasing number of populated classes at state universities.

Stressing of critical thinking, systematic analyzing, objective criticizing, and creative proposing especially by the freshmen.

Stressing of visualization and imagination by all students.

Engineering Students

Engineering students must realize the importance of mathematics for their study and careers.

All instructors of engineering courses must also realize the importance of mathematics for the students' study and careers and convey that to them.

Using textbooks written by mathematicians in developing countries which take into consideration the negative aspects of teaching mathematics to engineering students in their countries

Universities' administration must increase the number of mathematics courses.

Recommendations

To remedy the negative aspects given in section 3 in developing countries, we recommend following measures:

Establishing democratic governing system which encourages critical thinking people, invests more financially in education, and decrease the number of non-alphabetic population.

Educating all school teachers, who stress critical thinking and visualization in less populated classes.

Recognizing the higher education instructors of the negative aspects of teaching at school level.

Stressing critical thinking and visualization by all higher education instructors.

Realizing the importance of mathematics by all engineering students and instructors.

Increasing the number of offered mathematics courses with wide spectrum for engineering students.

Using textbooks written by scientists in developing countries which take into consideration the political, sociological, economic, social and cultural aspects in their countries

Conclusion

Enhancement of e-learning in all developing countries according to their sociological and political aspects is highly recommended. In all those countries an intensive informative educative campaign is accordingly very important.

Due to its important role in social and development aspects traditional learning should not be replaced by e-learning in developing countries.

Potential technological support of all developed countries like Bahrain is a necessity

Generous financial support of developed countries to economically weak developing countries like Egypt should be granted. This financial support must be directed to the needy people and not to the governments.

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