

International Standard School and Realistic Mathematics Education: A Collaborative Effort to Improve the National Competitiveness in the Global Era¹

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The rapid development of sciences and technologies has led us to a global era that demands a high competitiveness and quality of human resources. For this reason, Indonesian government through the Department of National Education has established International Standard School Program.

One of the most important points of International Standard School program is developing students' creativity as a base to improve national competitiveness. Developing students' creativity is also one of the focuses of Realistic Mathematics Education. Consequently, students' creativity as the common focus of International Standard School and Realistic Mathematics Education could be used to formulate a collaborative effort to improve the national competitiveness in the global era.

Keywords:

International Standard School, Realistic Mathematics Education, national competitiveness

A. Introduction

The rapid development of sciences and technologies has led us to a global era. Globalization can be described as a process by which the people in the world are unified into a single society and function together. In global era, the world can be viewed as a borderless region in which barriers between national borders are removed (or at least reduced) in order to facilitate the distribution of goods, capital, services, labours, information, etc. The borderless region – as the main characteristic of global era – demands a high competitiveness and quality of human resources in order to survive and

¹ Presented at the 17th *Lomba Matematika SMP Tingkat Nasional dan Seminar Nasional Pendidikan Matematika (LSM)*. Yogyakarta State University, 4 April 2009

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compete. Education significantly contributes to the improvement of the quality of human resources. Hence, Indonesian government categorizes the improvement of national education as one of the national (high) priorities. Government through the Department of National Education has established International Standard School Program as one of the programs related to the improvement of national education.

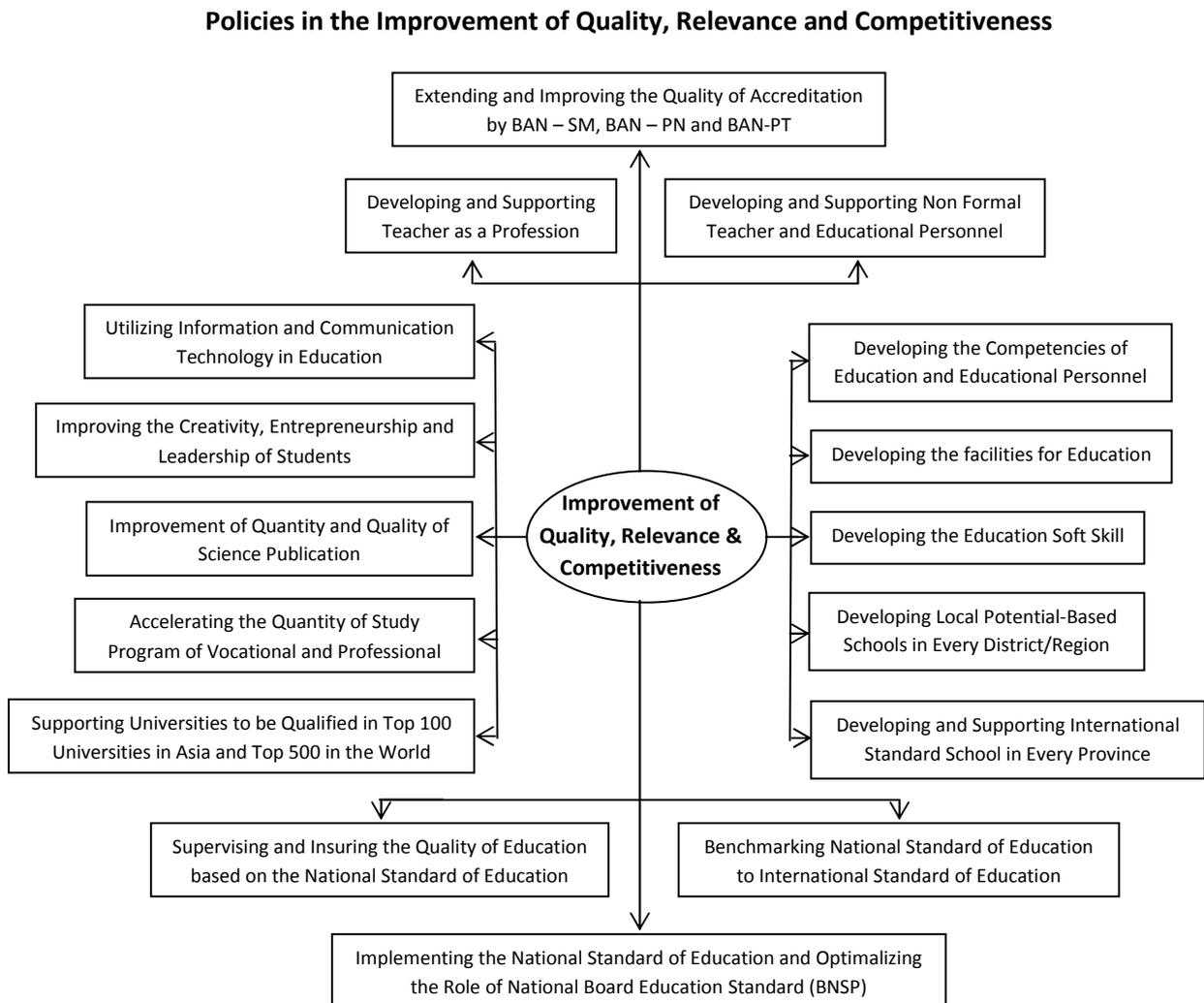
Article 50 Section (3) of the National Education Act No. 20/2003 about National Education System states that government and/or local government has to establish at least one education institution in each level of education that can be developed into international standard school. As the follow up of the National Education Act No. 20/2003, Government Regulation for the National Standards for Education No. 19/2005 Article 61 Section (1) also mentions about international standard school program, i.e. "government collaborates with local government have to establish and develop at least one international standard school in elementary education and secondary education". One of the most important points of International Standard School program as implied in the Guide for Quality Assurance for International Standard School is developing students' creativity as a base to improve national competitiveness. Students' creativity can be developed through interactive and inspirative teaching and learning processes that encourage the development of the quality, leadership, entrepreneurship, and innovativeness of students. In short, students' creativity can be developed through student-centered learning.

Realistic Mathematics Education is one of the approaches for teaching and learning process, especially teaching and learning of mathematics, that focuses on students as the main subject of learning process – instead of the object of teaching process. "Using students' product" is one of the tenets of Realistic Mathematics Education that emphasizes on the use of students' work as the base of the learning of mathematical concepts. It is obvious that the value of this tenet (i.e. "using students' product") is developing students' creativity. Focusing on the "developing students' creativity" as the common focus of Realistic Mathematics Education and International Standard School,

it is interesting to see Realistics Mathematics Education and International Standard School as a collaborative effort to improve national competitiveness in global era.

B. International Standard School

As already mentioned in the introduction, International Standard School program was established by Indonesian government as one of the strategies to improve the quality of education and national competitiveness. The general strategies formulated by government to improve the quality of education can be seen in the following diagram:



(cited from The Strategic Plans of Department of National Education)

Figure 1. Strategic Plans of Indonesian Education

In the Guide for Quality Assurance of International Standard School, an international standard school is defined as a school that qualifies the eight standards of national education plus one extra standard that is the standard of international values. The eight standards of national education mentioned in Government Regulation for the National Standards for Education No. 19/2005 are (1) standard of content/curriculum, (2) standard of process, (3) standard of competency, (4) standard of teacher and educational personnel, (5) standard of facilities, (6) standard of management, (7) standard of finance, and (8) standard of evaluation. The international values as the extra standard means that an international standard school should adapt the components of the National Standard of Education to international standard of education. Furthermore, an international standard school should also adopt components of international standard of education to the National Standard of Education which can potentially improve the quality of national education.

Government through the Guide for Quality Assurance of International Standard School mentions nine objects of quality assurance for international standard school, namely: (1) accreditation, (2) curriculum, (3) teaching and learning process, (4) evaluation, (5) teachers, (6) educational personnel, (7) management, and (9) finance. One of the indicators for the objects of quality assurance is that the teaching and learning process should encourage the development of the quality, leadership, entrepreneurship, and innovativeness of students. This can be gained through interactive – inspirative – interesting teaching and learning processes that motivate students to be active and creative. In short, the teaching and learning process should be a student-centered learning. Furthermore, the Regulation of Minister of National Education No. 41/2007 about Standard of Process states that the teaching and learning process should be systematically conducted through processes of exploration, elaboration and confirmation. The exploration process is also one of the characteristics of Realistic Mathematics Education, that is phenomenological exploration, that focuses on the use of phenomenology as the starting point of the teaching and learning process.

C. Realistic Mathematics Education

Realistic Mathematics Education was underlined by the idea of Hans Freudenthal that viewed mathematics as human activity, instead as subject matter that must be transferred from teachers to students (Freudenthal, 1973 & 1991). Based on Freudenthal's idea, the teaching and learning process of mathematics should be connected to daily life context. Hence, Realistic Mathematics Education connects students' informal knowledge – that is obtained from their daily life – to formal concept of mathematics. In short, the main focus of the teaching and learning process is activities that lead to the process of mathematization. The term “reality” as the focus of Realistic Mathematics Education means that the problem situation must be experientially real for students.

There are five tenets of realistic mathematics education defined by Treffers (1987), namely:

1. Phenomenological exploration

Contextual problems are used as the base and starting point for the teaching and learning process. The teaching and learning process is not started from formal level but from a situation that is experientially real for student.

2. Using models and symbols for progressive mathematization

The aim of this tenet is bridging from concrete level to more formal level using models and symbols.

3. Using students' own construction

The freedom for students to use their own strategies could direct to the emergence of various solutions that can be used to develop the next learning process. The students' strategies in the activities are discussed in the following class discussion to support students' acquisition of the formal level of mathematics concepts.

4. Interactivity

The learning process of students is not merely an individual process, but it is also a social process. The learning process of students can be shortened when students communicate their works and thoughts in the social interaction emerged in classroom.

5. Intertwinement

The activities used in the teaching and learning process do not merely support learning for a single mathematics topic, but they also should support the learning process of other mathematics topics or concepts.

D. Conclusion: A collaborative effort to improve the national competitiveness

From aforementioned information, there are some common characteristics of International Standard School and Realistic Mathematics Education. These common characteristics are:

1. Creativity through exploration process

Exploration process is stated in the Regulation of Minister of National Education No. 41/2007 as one of the processes that have to be included in the teaching and learning process. The process of exploration is also used in Realistic Mathematics Education, namely phenomenological exploration. This characteristic focuses on exploring and using problem (i.e. motivating problem in the standard of process and contextual problem for Realistic Mathematics Education) as the starting point of teaching and learning process. The process of exploration should activate and motivate students in their learning process. Furthermore, various problems can stimulate students to be more creative in finding various strategies to solve the problems. The creativity of students is an important base for the improvement of national competitiveness.

2. Communication

Confirmation as mentioned in the standard of process shows how the problems that have been explored and elaborated in the teaching and learning process should be well-confirmed. The confirmation process should ensure that students have understood the learned concepts. The key feature of confirmation process is communication. Students should communicate their idea and understanding to the others in order to share and also develop the idea. Communication among students is also considered in Realistic Mathematics Education that is “interactivity”. The idea and the learned concept are shared through interactivity among students. As mentioned by Zack & Graves (2002), the learning process of learners is not merely an individual process, but it is also a social process, and these both perform simultaneously. The learning process of learners can be shortened when they communicate their works and thoughts in the social interaction.

Furthermore, communication and social interaction become more important in society. Communication is one of the most important aspects in the global era. Therefore, the global era also demands communicative human resources in order to communicate and spread information in the borderless region. It can be concluded that communication skill is also required for the improvement of national competitiveness in the global era.

From the common characteristics of International Standard School and Realistic Mathematics Education, it is obvious that International Standard School and Realistic Mathematics Education support the improvement of national competitiveness in global era. Therefore, it is important to collaborate International Standard School and Realistic Mathematics Education in our education system to improve the quality of Indonesian human resources in the global era. The relation and role of International Standard School and Realistic Mathematics Education to the improvement of national competitiveness can be seen in figure 2.

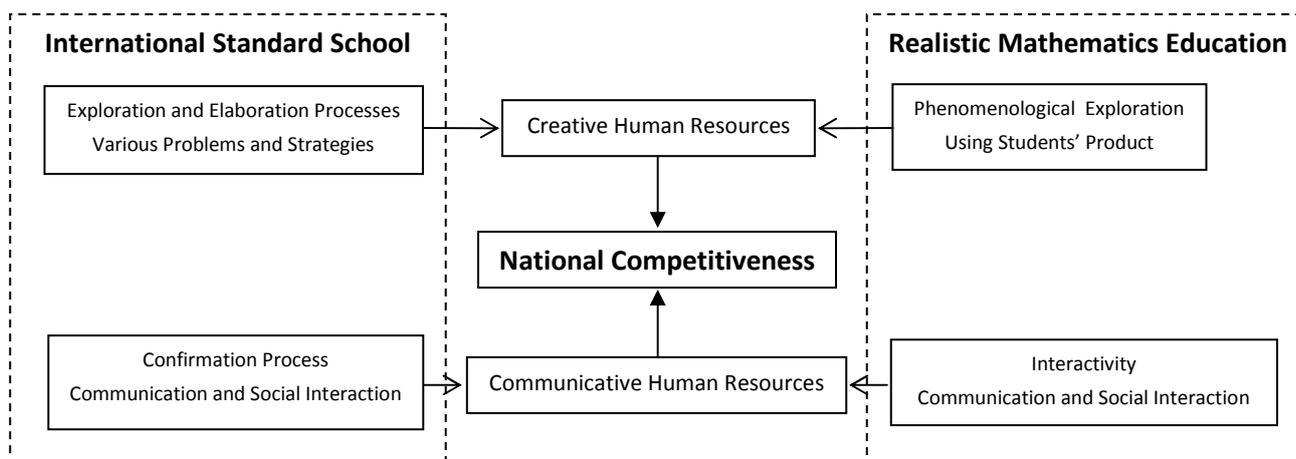


Figure 2. A collaborative effort to improve national competitiveness

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