A Term Paper on

SIGNIFICANCE OF JICA'S TEACHING PACKAGE IN IMPROVING THE QUALITY OF SCIENCE EDUCATION

Submitted by

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Registration No.: **26**; Batch: 4

Foundation Training Course for Field Level Officers of Primary Education

(Submitted in partial fulfillment of the requirements of the course)

May 03, 2012

NATIONAL ACADEMY FOR PRIMARY EDUCATION (NAPE),

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ABSTRACT

Eight Millennium Development Goals (MDGs) were adopted by the UN as being important for the future prosperity of humankind at the beginning of this millennium. To achieve the second goal, JICA works to increase the enrollment rate of students by encouraging community participation and increase the quality of education by improving teaching methods, textbooks, teaching materials. As a result, new teaching and learning methodologies are introduced and the lessons of science are improved in the target institutions through the use of Teaching Packages. This Teaching Package encourage student-centered lesson, which involves a process in which students take lesson themes as their own and find solutions on their own. Moreover, it helps the students to understand the contents of learning by their self-motivated activities, rather than by rote memorization alone. Therefore, JICA supported Teaching Package has a great significance in improving the quality of science education.

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ACKNOWLEDGEMENTS

This scholarly activity of formulating a term paper on the significance of JICA supported Teaching Package in improving the quality of science education in primary education level in Bangladesh has been taken under consideration to fulfill the requirements of the 'Foundation training course for field level officers of primary education'. In this regard, it is my pleasure to take the opportunity to thank some of my mentors and fellows; it may not be possible for me to complete this paper without their cordial support. At first I like to express my bottomless gratitude to the almighty for his continual adore, which allows me to complete this study.

I like to present my earnest admiration and gratitude to our honorable course director Dr. Gopika Ranjan Chakraborty, Senior Specialist, NAPE, the coordinators Mr. Khondoker Din Mohammad and Mr. Md. Abdul Jalil, Asstt. Specialists, NAPE and course facilitators, who have initiated and supported me to do this scholarly activity with their precious counsels and management. Herewith I like to thank all the participants of the course who inspire me most with lots of endurance and tolerance. At last, but not the least, I like to present my gratitude to the National Academy for Primary Education (NAPE) for providing me ample support and facilitating training in the early stage of my career that will definitely help me in achieving success in the future.

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INTRODUCTION

In the human development field, the Japan International Cooperation Agency (JICA) provides technical cooperation in three sectors: (1) education (basic education, higher education, technical and vocational education and training), (2) social security (social insurance and welfare, support for persons with disabilities, labor and employment), and (3) health (infectious disease control, maternal and child health, reproductive health, health systems, human resource development for health). These are all fundamental and important issues in human life closely related to the concept of human security. They are also related to five[a] of the eight Millennium Development Goals (MDGs) that were adopted by the UN as being important for the future prosperity of humankind at the beginning of this millennium (JICA, 2007).

JICA in Education

In the basic education area, JICA works to increase the enrollment rate of students by encouraging community participation and increase the quality

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[a] The MDGs related to human development are (1) achieve universal primary education, (2) promote gender equality and empowerment of women (elimination of gender disparity in education), (3) reduce child mortality, (4) improve maternal health, and (5) combat HIV/AIDS, malaria and other diseases. (The other three goals are to eradicate extreme poverty and hunger, ensure environmental sustainability, and develop a global partnership for development.)

of education by improving teaching methods, textbooks, teaching materials, etc., as well as cooperating in educational administration. Today, the international community is working for free and high quality primary education, improved adults literacy rate, and gender equality in education based on "Education for All-Dakar Framework for Action," which sets a target year of 2015 (JICA, 2007).

Though the enrollment rate in primary education is increasing, there are still about 77 million children worldwide who do not attend school (JICA, 2007). While the enrollment rate in the first grade is on the rise, many children cannot reach the final grade. There are more children who do not attend school in the lower classes among those who are under the poverty line group than there are in the wealthy classes, more in rural areas than in urban areas, and 57% of them are girls (JICA, 2007).

There are also about 781 million adults in the world who do not have the minimum level of literacy (JICA, 2007). This is equal to one-fifth of the world's population and two-thirds of this portion is women.

In order to respond to these issues, JICA has expanded cooperation in the basic education sector. The actual amount and share of JICA's entire cooperation for education at the beginning of the 1990s was about 12%[b] of

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[b] JICA's entire cooperation for education at the beginning of the 1990s was about ¥ 15 billion annually.
(Note: ¥ is Japanese Yen; 100 ¥ =1.25 $ (US Dollar) approximately.)

JICA's operation; however, it has now increased to about 20%[c] (JICA, 2007; 2011).

Under the basic policy of providing cooperation in line with the needs of developing countries, JICA (2007) has identified the following five points as priority areas for cooperation in basic education.

1) Increase of enrollment in primary and secondary education

2) Improvement of the quality of primary and secondary education

3) Reducing gender disparities

4) Promotion of non-formal education, and

5) Improvement of education management.

JICA IN IMPROVING THE QUALITY OF PRIMARY EDUCATION

In many developing countries, education focused on rote memorization is provided in class where teachers write on the blackboard while lecturing and children just listen (Mezirow, 1997). However, the demand for classes that deepen children's understanding and boost their ability to think has increased. In response, JICA extends assistance aimed at

[c] JICA's entire cooperation for education now accounts for around ¥ 25 billion annually.
(Note: ¥ is Japanese Yen; 100 ¥ =1.25 $ (US Dollar) approximately.)

improving the quality of education by increasing teachers' teaching capacity through pre- and in-service teacher training and developing teachers' manuals that are useful in improving classroom activities, especially in the science and mathematics education sector.

JICA in Bangladesh

The People's Republic of Bangladesh has been working actively toward achieving universal implementation of primary education since the signing of "Education for All (EFA)" declaration in 1990 (MoE, 2010). From 1998 to 2003, the Primary Education Development Programme I (PEDPI), which is a sub-sector wide program, was put into effect to implement the construction of primary schools and resource centers, the training of teachers and administrative officers, and the development of educational materials and the establishment of information management systems. As a result, it succeeded in raising the net enrollment ratio of primary education to 87.2% (JICA, 2011). However, the completion rate of primary schooling, which is compulsory, remains at 59.2%, and the problems of withdrawal and consequent reduction in the quality of education are recognized as important challenges (JICA, 2011; MoE, 2010).

The Government of Bangladesh (GOB) started the Second Primary Education Development Program (PEDP II, 2004-2010) from 2004 as the second phase of the PEDPI under the cooperation of eleven donor organizations (JICA, 2007; 2011). PEDP II aims to improve the quality of education, and includes four major components (JICA, 2011), namely 1)

organizational reform, 2) improvement of educational quality in the school and in the classroom, 3) improvement of infrastructure and 4) improvement of access. Among them, regarding Component 2) "improvement of educational quality in the school and in the classroom," the GOB requested technical assistance to the Government of Japan on the improvement of educational quality at the classroom level.

Receiving the request mentioned above, this project was started from October 2004 as a four-year project, aiming to improve the quality of training for science and mathematics teachers at primary schools and that of education given in the classroom. With the National Academy for Primary Education (NAPE) serving as the major counterpart (C/P) organization, the project promotes cooperation and collaboration between teachers and others involved in education, and implements activities conducive to the improvement of educational quality through the development of science and mathematics teaching materials. As a result, new teaching and learning methodologies are introduced and the lessons of science and mathematics are improved in the target institutions through the use of Teaching Packages (Kayashima, 2012).

PHILOSOPHY BEHIND THE TEACHING PACKAGE

With a view to develop attitudes and abilities to investigate scientifically, to foster scientific views and thinking, and to deepen the understanding of natural phenomena through enhancing students' interest in

nature and letting them engage in observations and experiments with a clear purpose, teaching package for Science were introduced (JICA, 2011; Kayashima, 2012). In other words, the goal of the teaching package in Science is to help students to develop four kinds of abilities and attitudes as follows (IFIC, 2007).

(1) Scientific Methods

Scientific research methodology can be categorized into two kinds of methods. One is a method of acquiring new knowledge based on facts gained by observation and experiments. In a narrow sense, it may refer to the research method or heuristics. The other is a method of sorting out and organizing knowledge in a systematic way that already exists and/or that is not yet fully organized. This is also known as systematization.

(2) Scientific Attitudes

(a) An attitude of observing things properly and objectively, free from subjective views, bias, and prejudice.

(b) An attitude of seeing things in an accurate, precise, lucid, and clear manner.

(c) An attitude of identifying relationships between things.

d) An attitude of establishing laws for them by sharpening one's intellect and senses.

e) An attitude of establishing laws by concentrating one's thoughts, observing things patiently and meticulously, and searching for the truth.

(f) An attitude of being cautious, scrupulous, and thorough in doing things.

(g) An attitude of always having questions in mind and seeing things in a theoretical, rational, and critical manner.

(h) An attitude of courageously asserting what one thinks is right.

(3) Scientific Perspectives

Science provides students with a foundation for a view of nature––or a particular way of perceiving nature. A view of nature encompasses a view of matter, a systematic way of perceiving forms of existence and movement of matter; a view of life, a systematic way of perceiving life phenomena and defining life: and a view of the universe, a particular way of perceiving the universe, as exemplified by the Ptolemaic theory and the Copernican theory.

(4) Scientific Thinking

Scientific thinking refers to a process of establishing scientific knowledge, by dividing problems/phenomena into smaller parts, organizing and systematizing the facts and findings interrelated by a particular principle, and identifying common rules behind facts and findings collected about a

phenomenon. This process of reasoning is applied to problem-solving. It takes the form of:

(a) analytical thinking; analytical thinking calls for the ability to: i) recognize problems, to find workable means for meeting those problems, ii) understand the importance of prioritization and order of precedence in problem solving, iii) gather and marshal pertinent (relevant) information, iv) recognize unstated assumptions and values, v) comprehend and use language with accuracy, clarity, and discernment, vi) interpret data, to appraise evidence and evaluate arguments, vii) recognize the existence (or non-existence) of logical relationships between propositions, viii) draw warranted conclusions and generalizations, ix) put to test the conclusions and generalizations at which one arrives, x) reconstruct one's patterns of beliefs on the basis of wider experience and xi) render accurate judgments about specific things and qualities in everyday life.

(b) Synthetic thinking; synthetic thinking" is the ability to draw on ideas from across disciplines and fields of inquiry to reach a deeper understanding of the world and one's place in it. There is a movement in education that maintains divergent thinking might create more students that are resourceful rather than presenting a series of problems for rote memorization or resolution, divergent thinking presents open-ended problems and encourages students to develop their own solutions to problems. It helps divergent production that is the creative generation of multiple answers to a set problem.

(c) Inductive thinking; the inductive reasoning is much more nuanced than simple progression from particular or individual instances to wider generalizations. Rather, the premises of an inductive logical argument indicate some degree of support (inductive probability) for the conclusion but do not entail it; that is, they suggest truth but do not ensure it. In this manner, there is the possibility of moving from generalizations to individual instances. Inductive reasoning consists of inferring general principles or rules from specific facts.

(d) Deductive thinking; or deductive reasoning, also called deductive logic, is the process of reasoning from one or more general statements regarding what is known to reach a logically certain conclusion. Deductive reasoning involves using given true premises to reach a conclusion that is also true. Deductive reasoning contrasts with inductive reasoning in that a specific conclusion is arrived at from a general principle. If the rules and logic of deduction are followed, this procedure ensures an accurate conclusion. and

(e) Analogical thinking; Analogical thinking is what we do when we use information from one domain (the source or analogy) to help solve a problem in another domain (the target). Analogies are used during the process of problem solving, and analogies have been involved in numerous scientific discoveries. However, studies of novice problem solvers show that they often have difficulty in recognizing that one problem can be used to solve another.

SIGNIFICANCE OF THE TEACHING PACKAGE

The JICA supported Teaching Package encourage student-centered lesson which involves a process in which students take lesson themes as their own and find solutions on their own by using their mind and body, and through interacting with others. It is important that students understand the contents of learning by their self-motivated activities (both mental and physical)—rather than by rote memorization alone—and acquire new knowledge, skills, values, and attitudes (Mezirow, 1997; Bluhm, 2006; IFIC, 2007).

It is often the case that a lesson is judged student-centered based on the presence of conspicuous activities by students such as group activities and hands-on activities. However, such a presence does not necessarily provide a decisive criterion. Conspicuous activities by students may seem to indicate student centeredness on the surface, but that does not always mean that students use their brain. Alternatively, when such activities are not present, active thinking may be going on deep inside their brain. Although group activities (and hands-on activities) provide an effective introduction to student-centered lessons, the goal of the student-centered approach is to encourage each student (within the group) to work on lesson themes of their own accord, thus stimulating the thinking process inside their brain with or without conspicuous activities. Student-centered lessons should be designed accordingly (Bluhm, 2006).

It was widely believed that children were like a white canvas waiting to be painted and that knowledge should be given from the outside. Currently, however, more and more educators are embracing the idea that children make sense of the world around them by approaching it by using their knowledge and experience. According to this idea, learning—the process of acquiring new knowledge—involves commitment and activities on the part of the learner as essential elements. For this reason, lessons, which play a central role in learning at school, need to place students at the center. Therefore, teachers should act as facilitators who support self-motivated learning by students, rather than knowledge providers (Mezirow, 1997). Student-centered lessons should meet the following conditions:

(a) Students take lesson themes as their own and use their own brain to work on such themes. For this to happen, teachers should select lesson themes that stimulate students' interest and motivate them to think on their own, by including those closely associated with their surrounding environments,

(b) Lessons involve mental and physical activities by students,

(c) The curriculum should build on what has already been learned and at the same time involve interesting and attainable challenges, and

(d) These challenges are in line with teaching objectives.

This transformation process will not be possible unless school teachers change their mindsets and attitudes to improve their teaching methods (Mezirow, 1997). The goal here is to provide lessons that are more accessible

to students; lessons that are arranged with interaction with students; lessons that allow students to learn and think on their own; and lessons that encourage students to work with others to solve problems.

These lessons enable students to learn basic knowledge and skills more effectively and acquire logical and scientific ways of thinking and viewing. What students have learned and acquired will be put to good use in their daily lives. In this regard, the Teaching Package that supported by JICA is acting with its fullest phase to achieve the quality in education, especially in science education sector of primary education level. In addition, it will help students to overcome difficulties, improve the standards of living for themselves and their families, and eventually build a better community, a better country, and a better future.

CONCLUSION

Significance of education can be explained from the two different perspectives. First, it is a basic human right. Second, it supports the development of countries by providing individuals with the knowledge and skills required for survival and by helping them to fully develop their abilities and utilize their potential as a member of society.

As the pivotal organization for implementing the technical cooperation of the Japanese government, JICA has focused on education among other strategic sectors including rural development, health, and infrastructure development. Specifically, JICA has placed particular emphasis on basic education, which constitutes the basis for acquiring knowledge and skills required for living. Furthermore, Teaching Package that supported by JICA helps the students to understand the contents of learning by their self-motivated activities. Therefore, JICA and its supported Teaching Package have a great significance in improving the quality of primary education, especially, science education in primary education level in Bangladesh.

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