

## DIFFERENCES OF SCIENCE TEACHING APPROACHES BETWEEN IN JAPAN AND IN SOLOMON ISLANDS

JOHN MARK DOVERE (Teacher Training Student,  
Graduate School of Education, Nagasaki University)  
YOSHIMASA HOSHINO (Graduate School of Education,  
Nagasaki University)

### ABSTRACT

Teaching is one of the vital practices in life that one can experience before knowing all the essential fact in life. It all started at the time of our birth to the time when we draw our last breath and it can be implemented in many different approaches but with the same goal. However, teaching approaches comprises the principles and methods used for instruction to be implemented by teachers to achieve the desired learning in students. These strategies are determined partly on subject matter to be taught and partly by the nature of the learner and the School environment as a whole. As far as the importance of teaching approaches is concern towards this report, its content was mainly focus on the differences of Education system between Japan and Solomon Islands and their differences in their teaching approaches in the lower Secondary School attached to the Faculty of Education of Nagasaki University and in the tertiary institution classrooms particularly in science. Furthermore it also states the brief note in terms of their Education curriculum and followed by conclusion.

Key words: teaching approaches, education system, education curriculum, Japan, Solomon Islands

### 1. INTRODUCTION

#### 1.1. TEACHING APPROACHES

Teaching approaches or styles can include leading and demonstrating from the front of the class or adopting a more pupil-centered approach where the teacher shapes the framework within which the pupils work and then encourages them to make their decisions under guidance. Whether a teacher considers her or himself as part of the group where whole-group decision making is encouraged, prefer to be fully in charge and tell pupils what to do or goes with the flow, letting each lesson evolve in its own way is all part of teaching approaches, and besides, the teacher's mood and energy levels can be factors that may alter significantly the suitability and efficiency of any particular teaching approach. Effective teachers are enthusiastic, flexible and

well-organized. They teach children how to learn, have clarity of purpose and of explanation and good subject knowledge. They also have high expectation and a sense of fun and humor. (*Reference 1*)

In addition, different learning approaches or strategies are behaviors and thoughts in which learners engage and which are intended to influence the learner's encoding process. Thus, the goals of any particular learning approaches or strategies may be to affect the way in which the learner selects, acquires, organizes, or integrates new knowledge. Good teaching approaches include teaching students how to learn, remember, think, and motivate themselves. In reality teachers enter the classroom with two distinctly different kinds of goals which are teaching the students "what" to learn and teaching the students "how" to learn. (*Reference 2*)

However, there are lots of effective teaching approaches with in the classroom apart from the examples mentioned. But for this various types of teaching approaches to be more effective, teachers must decide on what teaching approaches to be used depending on the context in which they are teaching, which includes the nature of the pupils and the circumstance pertaining at a particular time, such as time of the day, or season and aims of the lesson. Particular context may also demand particular pedagogic approaches, which depends entirely on the teacher, how she or he implement the type of teaching approach in the classroom, the availability of the teaching resources that can aid effective teaching and learning by the teacher and students, the classroom environment that must suit the teaching approach applied by the teacher and students background knowledge of the topic teach. By considering the above mentioned teaching and learning approaches could lead to effective teaching and learning in which both party in the classroom would satisfy by the end of the day.

## 1.2. METHODOLOGY

This research was mainly conducted on the basis of the teaching approaches used in the classroom purposely to determine the variation of different teaching approaches used, and how effectively they are to the student's learning outcome, and to further differentiate the teaching approaches used in the Japanese classroom particularly in the tertiary level and in the junior high schools to Solomon Islands classroom particularly in the tertiary level and junior high school as well. The information are collected through different means of obtaining information and most of the information are obtained from Nagasaki University through internet, questionnaires and classroom observation both in Nagasaki University and in Lower Secondary School attached to the Faculty of Education of Nagasaki University.

## 1.3. RESEARCH OBJECTIVES

The brief objectives of this research and the specific aims are as follows;

- To acquire maximum knowledge on how science topics are taught in the Japanese classroom
- To acquire maximum knowledge on different teaching approaches used in the Japanese classroom and how effectively they apply those teaching approaches to different science topic
- To differentiate the teaching approaches used in the Japanese classroom to Solomon Islands classroom.
- To have a fair understanding on the Japanese Education system by comparison to Solomon Islands Education system

## 2. EDUCATION SYSTEM IN JAPAN

The Education system in Japan are govern by the national education policy that all people shall have the right to receive an equal education corresponding to their ability, as provided by law. The people shall be obligated to have all boys and girls under their protection receive ordinary education as provided for by law. Such compulsory education shall be free.(Article 26 of the Constitution of Japan)

However, the Japan school education system has had a 6-3-3-4 structure which the kindergarten classes are not included. These classes of kindergarten aim at helping pre-school children develop their mind and body by providing a sound educative environment for them. Kindertagens cater for children aged 3, 4 and 5, and provide them with one- to three-year courses. All the children who have attained the age of 6 are required to attend elementary school for six years. Elementary schools aim at giving children between the ages of 6 and 12 primary general education suited to the stage of their mental and physical development. All the children who have completed elementary school are required to study in lower secondary school for three years until the end of the school year in which they reach the age of 15. Lower secondary schools give children between the ages of 12 and 15 general secondary education suited to the stage of their mental and physical development, on the basis of the education given in elementary school.

Those who have completed nine-year compulsory education in elementary and lower secondary school may go on to upper secondary school. Students must normally take entrance examinations to enter upper secondary school. In addition to full-day courses, there are also part-time and correspondence courses. Full-day courses last three years, while both part-time and correspondence courses last three years or more. The last two courses are mainly intended for young workers who wish to pursue their upper secondary studies in a flexible manner in accordance with their own needs. All these courses lead to a certificate of the upper secondary education. In terms of the

content of teaching provided, the upper secondary school courses may also be classified into three categories: general, specialized and integrated courses. General courses provide mainly general education suited to the needs of both those who wish to advance to higher education and those who are going to get a job but have chosen no specific vocational area. Specialized courses are mainly intended to provide vocational or other specialized education for those students who have chosen a particular vocational area as their future career. These courses may be further classified into: agriculture, industry, commerce, fishery, home economics, nursing, science-mathematics, physical education, music, art, English language and other courses. These institutions of higher education are divided into national, public, and private institutions, depending on the organization. (*Reference 3*)

## 2.1. EDUCATION CURRICULUM IN JAPAN FROM ELEMENTARY SCHOOL TO HIGH SCHOOL

The curriculum for schools in Japan prescribed in the course of studies, which are established by the ministry of Education, Culture, Sports, Science and Technology, have consists of various academic subject, moral education, special activities and integrated studies which they are based on the course of study undertaken by the students. They (ministry of Education, Culture, Sports, Science and Technology) also prepare guidelines containing basic outlines of each subject taught, and the objectives and content of teaching in each grade.

All elementary, junior high and high schools are obliged to use text books that have been evaluated and approved by the Ministry of Education, Culture, Sports, Science and Technology. The purpose of the official authorization system, which had been used since then, is the standardization of education and the maintenance of objectivity and neutrality on political and religious issues. A system of free distribution of textbooks for compulsory education was also established and implemented. The textbooks used in each public school district are chosen from among government authorized candidates by the local board of education based on a review by the prefectural board of education. At private schools, the school principal is responsible for the choice. However the standard curriculum in the elementary school includes the following subjects: Japanese language, social studies, arithmetic, science, life environmental studies, music, arts and crafts, physical education, and homemaking. Also at this stage of education, the curriculum requires extracurricular activities, a moral education course, and integrated study, which can cover a wide range of topics (international understanding, the environment, volunteer activities, etc.). Reading and writing are perhaps the most important parts of the elementary school curriculum; in addition to the two Japanese syllabaries, students are expected to learn at least 1006

Chinese characters by the end of the sixth grade.

In the junior high school, the standard curriculum includes the following required subjects: Japanese language, social studies, mathematics, science, a foreign language elective (almost always English), music, fine arts, health and physical education, and industrial arts or homemaking. Requirements also include extracurricular activities, a moral education course, and integrated study.

For the high school core curriculum, it includes the following required subjects: Japanese language, geography and history, civics, mathematics, science, health and physical education, art, foreign language, home economics, and information. Extracurricular activities and integrated study are also required. Students in special vocational programs also take courses in their area of study (business, industrial arts, agriculture, etc.) while spending less time on the core curriculum than regular students. (*Reference 4*)

## 2.2. SCIENCE IN JAPANESE JUNIOR HIGH SCHOOL – THIRD GRADE

The science content taught in the Japanese junior high school third grade class includes the following topics;

### 1) Motion and energy.

The objectives of this topic is for the student to understand through observation and experiments about motion and energy and to try develop their perspective and ideas concerning the regularity of motion of the object and basic energy with student's daily life and society.

### 2) Chemical changes and ions

In here the objective is to understand through observation and experiments about chemical changes and to develop student's perspectives and ideas of the phenomena concerning the electrical conductivity and the neutralization reaction of the aqueous solution.

### 3) Human and technology

This was the last topic taught in the junior high school third grade apart from moral subject and its objectives is to enable students recognize the relation of the use of energy resources and to develop student's ideas concerning the scientific way of thinking about technology usage of the natural environment.

By completing this level of Education, students are capable of explaining the concepts of the interrelationship of motion, energy and work, ions and ionic substances for the next level of Education. (*Reference 4*)

## 2.3. SCIENCE TEACHING APPROACHES IN JAPANESE JUNIOR HIGH SCHOOL (THIRD GRADE)

There are many ways or technique of teaching with in the classroom, but for the teaching to be more effective, teachers must decide what teaching method to be used depending on the students' background knowledge in the previous lesson, environment and learning goals. According to science classes observation in the Lower Secondary School, one of the authors (Dovere) has learnt that teachers use child-centered teaching approaches most frequently.

In Dovere's observation, the teacher begins the class with questions so as to determine the weakness and potential of the students on the topic taught before proceeding by recapping from the previous lesson. The teacher then introduce the topic by demonstration which provide the students an opportunity in learning new explorations and visual learning skills from different perspectives. The students then did the experiment in small groups and noted down their observations on the experimental sheet provided by the teacher. While the student did the experiment, the teacher also participated by assisting each group. The students in their groups were able to write conclusions about their experiments. The teacher was able to check the students learning activities and records on worksheets. After the experiment, all the groups displayed their worksheet and give explanations.

Finally the teacher then discussed the results for each group identifying where the students may have gone wrong and correct them. The teacher then summaries the experiment topic and give praise to the students for their success in the experiment. This serve as a very good motivation to the students and you can see it on the students' faces.

#### 2.4. SCIENCE TEACHING APPROACHES IN JAPANESE TERTIARY INSTITUTION (NAGASAKI UNIVERSITY – FACULTY OF EDUCATION)

The teaching approaches in the tertiary institution are quite different from that in the junior high school especially on experiment sessions. In the beginning of each semester, the teacher with the help of his or her lab assistance gave out all the necessary information needed for all the experiment topics to be covered in the due semester. Then they will explain all the given information regarding the experiment topic, experiment report writing and how they will assess their students' result at the end of the semester. At this point they will also point out where all the science apparatus and chemicals needed for all the experiment topics are stored. Furthermore on that, they will also give some lectures on how to work with glasses and do demonstrations. The students then continue on with the glass work after the demonstration by the teacher and his or her assistance. During the course of the experiment sessions, the students are to do the experiment at their own, by themselves collecting all the require apparatus needed and diluting chemicals to the required

concentration. If glasses are requiring, then the students themselves will work on the glass to whatever size and shape required by the experiment.

The teacher and his or her lab assistance will also present during the experiment session just to ensure that the students have done the experiment accordingly and give assistance to whatever means when needed by the students. At the end of the experiment, students are to do the clean up by themselves and dilute the chemicals used at a required safety pH before stored them in their storage containers. Concentrated chemicals are not allowed to be poured in to the sink. Lab coats, gloves and goggles are to be worn at all times during the course of the experiment as well as observing the laboratory rules.



Figure 1. Illustration of students interact with the experiment in the tertiary institution (in Nagasaki University)

### 3. EDUCATION SYSTEM IN SOLOMON ISLANDS

The Education system in Solomon Islands is govern by the ministry of Education and human resources and then further subdivided in to different departments which they are specializing in different administration.

However, there are five types of schools operating in the formal education system of Solomon Islands: Early Childhood Education Centers (ECEs), Primary Schools (PS), Community High Schools (CHS), Provincial Secondary Schools (PSS) and National Secondary Schools (NSS).

Early Childhood Education (ECE) centers are the first introduction to formal schooling for most Solomon Islanders. These Schools (ECE) centers, also known as Kindergartens, tend to be community or village-based. ECE centers are designed for pre-schooling for children aged 3 - 5 years. In practice, however, many children

remain in Kindergarten beyond 5 years of age, before going on to start Primary School. Other children start ECE when they are older than 5. Currently formal education commences in Primary schools at the preparatory grade, for children aged six years. The purpose of Primary education is to introduce children to the skills needed for writing, reading, and to acquire basic knowledge on mathematics, community studies, science, agriculture, art, music, physical education and Christian education.

Secondary education follows after primary schooling and continues for three years to form three, six years to form six (6) and for a small number, seven years to form seven (7). The purpose of secondary education is to expand knowledge of subjects already studied at primary school including literature, science, mathematics, social studies, commerce and other subjects essential for physical and intellectual development and to prepare students for specialized skills training. In the Secondary school system, there are 3 categories of schools: National Secondary Schools (NSS): These schools are the original High Schools operated by the Government and the Churches; their student enrolments come from across the country. Provincial Secondary Schools (PSS): These schools were initiated by the Government but run by the Provinces; their student enrolment should be restricted to the provinces only. Community High Schools (CHS): These schools started as Primary schools and the secondary sections were added on. The school is built and managed by the Communities and assisted by the Church or Provincial Education Authorities.

Entry into secondary school is highly competitive, with students admitted to Form 1 on the basis of their performance in the Solomon Islands Secondary School Entrance Examination (SISSEE). The official entry age for Form 1 is 13 years. All students enrolled in Form 1 study the same curriculum for the first 3 years of secondary school in preparation to sit the Form 3 Examination. Places in upper secondary are allocated on the basis of performance in end of year examinations, with fewer and fewer places available at each more senior level (form six and seven) of schooling. (*Reference 5*)

### 3.1. EDUCATION CURRICULUM IN SOLOMON ISLANDS

The Education curriculum for Solomon Islands both in private and public schools for the kindergarten, Primary level (elementary), junior high schools and high schools consists of various academic subjects and it aims in enhancing learners knowledge, understanding, skills and abilities and to assist all learners develop positive values and attitudes which will result in the establishment of a solid foundation for life-long learning for the whole person.

The subject taught in elementary schools includes mathematics, social studies, science, and English, agriculture, arts and crafts, New Testament studies and physical education. In junior high school, the subject taught are mathematics, social studies,



science, English, agriculture, home economic, business studies, New Testament studies, industrial arts and physical education. In high schools the subject taught includes mathematics, social studies, science, English as the major compulsory subject and agriculture, home economic, business studies, New Testament studies, industrial arts and physical education as an optional subject where students are to choose at their interest. Students at this level are only allow taking three optional subjects as maximum and two optional subjects as minimum. (*Reference 6*)

### 3.2. SCIENCE IN SOLOMON ISLANDS JUNIOR HIGH SCHOOL – FORM THREE (GRADE 3)

The science content taught in Solomon Islands junior high school for form three (third grade) classes includes the following topics;

#### 1) Resources.

The objectives of this topic is for the student to understand through observation and experiments about the origin of the elements, minerals resources, properties of metals and energy resources and to try develop their perspective and understanding, concerning how some metals are extracted from their ores and used, the major elements used by living organism, the criteria used for the basic classification of elements in the periodic table and the reactivity of some common elements.

#### 2) Electricity and light

In here the objective is to help learners develop their understanding through observation and experiment on how electricity is transmitted and used including the safety precautions required, the properties of light, the basic of electric circuit, how electricity is used to drive machinery including the use of electromagnet, and refraction and dispersion of light and how this properties are used.

#### 3) Animal system

This topic require leaners to develop their views and understanding on the reproduction and growth in humans, nutritious life style and disease, blood transport in mammals and movement and coordination in human through experiment and observation.

#### 4) Considering the future

The objectives of this topic is for the learners to develop their understanding on how to conserve their local environment and to identify and understand the work of various organizations involves in the south pacific environmental concern. (*Solomon islands science syllabus*).

### 3.3. SCIENCE TEACHING APPROACHES IN SOLOMON ISLANDS JUNIOR HIGH SCHOOL

Teaching approaches in the Solomon Islands classrooms depend entirely on the availability of teaching resources. This is because not every school is well equipped with teaching resources especially in science. Almost every junior high school and few high schools still lack the experiment resources, which affects the application of effective science teaching approaches. In some cases teachers have to improvise using local resources in order to carry out some of the required experiment while most of the experiment activities, are just done theoretically, by teacher centered teaching approach. That is instead of students to carry out experiment activities, they are only given notes and explanations of the concepts of the experiments topic. The other most frequently used approach is by group discussion where students are to discuss the given experiment questions and then later present the outcome of their discussion to the class, followed by teacher correcting their mistakes and summarize the topic. Another factor that also affects the application of using suitable teaching approaches in the Solomon Islands classroom is lack of well equipped science laboratory. Almost every junior high school is lack of well equipped standard science laboratory which create a great barrier between teaching and learning science, and gives teachers less choices in their classroom teaching approaches, but to do whatever they can do in relation to classroom teaching approaches to help the poor students.

#### 3.4. SCIENCE TEACHING APPROACH IN SOLOMON ISLANDS TERTIARY INSTITUTION

The teaching approaches particularly in experiment, in the Solomon Islands tertiary institutions are quite different from the Japan tertiary institutions. It is differing from the way that the experiment is either done in groups by the students or demonstrates by the lab assistance. Whichever way the experiment is done is depend entirely on the availability of the experimental resources. That means the students can only carry out the experiment in groups if there is enough experiment resources available but if there is not enough experiment resources, the lab assistance have to do the experiment while the student do the observation. The experiment is done with the lab assistance alone, without the science lecturer which hinder the opportunity for the students to ask questions which they don't understanding during the course of the experiment. Another point of differences which this report would like to put across is on the preparation of experiment materials. In Solomon Islands tertiary institutions, before the students enter the laboratory, the lab assistance has to prepare all the necessary materials needed for the experiment. The students just walked in and continue with the experiment with the help of the lab assistance. Again this prevent the students from fully understand the experiment setup as well as the concepts of how to work with glasses to different sizes and shapes.

Concerning the laboratory safe rules such as wearing of laboratory coat, goggles and gloves during the course of the experiment doesn't really matter in the Solomon Islands science laboratory, especially in the tertiary institutions, apart from the lab assistance the only one who wear laboratory coat.

#### 4. CONCLUSION

The Education system and curriculum in Japan compared to Solomon Islands are slimly varied in regards to their education structure and with great differences in their curriculum, which depend entirely in every individual country to choose upon. Even though we have differences and similarities in one way or the other, our education systems still have similar goals and that is to educate our citizens for a purpose. However, by providing formal education to somebody needs careful planning or a teaching method which comprise of principles and methods used for instruction to be implemented in the classrooms, to achieve the desired learning in learners. These strategies are determined partly on subject matter to be taught and partly by the nature of the learner. In comparison to teaching approaches used in the Japanese classroom, it is too modernize compare to Solomon Islands classrooms in both junior high schools and in the tertiary institutions, because of the availability of teaching resources especially in science. That has given the Japanese science teachers the advantages of implementing various types of effective teaching approaches that suite the topic of the day. On the other hand, Solomon Islands teachers lacked those teaching resources which has put a great barrier in implementing different effective teaching approaches that will make both the teacher and students to appreciate each other's achievement, but to teach the students in whatever approach that would at least satisfy both the students and the teacher at the end of the day.

#### 5. REFERENCES

1. *Approaches Teaching and Learning 2007 INTO Consultative Conference on Education*, Irish National Teachers' Organization.
2. Weinstein, Claire E.; Mayer, Richard E., *Innovation Abstracts*, **5**, No.32, 3-4(1983).
3. <http://www.mext.go.jp/english/introduction/1303952.htm>.
4. <http://factsanddetails.com/japan/cat23/sub150/item2789.html>
5. <http://www.classbase.com/countries/Solomon-Islands/Education-System>
6. *National Curriculum Statement*, Ministry of Education and Human Resources Development, Honiara, Solomon Islands (2011).