

# A study into bruners constructivist theory



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Bruner's Constructivist Theory asserts that learning is an active process in which learners construct new ideas or concepts based upon their current or past knowledge. Instruction can be made more efficient by providing a careful sequencing of materials to allow learners to build upon what they already know and go beyond the information they have been given to discover the key principles by themselves. Bruner's constructivist theory is based upon the study of cognition. Cognitive structures are used to provide meaning and organization to experiences and allow the individual to go beyond the information given. According to Bruner, the instructor should try and encourage students to construct hypotheses, make decisions, and discover principles by themselves. The instructor's task is to translate information to be learned into a format appropriate to the learner's current state of understanding and organize it in a spiral manner so that the student continually builds upon what they have already learned.

For Constructivism theory, pursuit of student questions and interests is valued. The teacher helps to create situations where the students feel safe questioning and reflecting on their own processes, either privately or in group discussions. The student is the person who creates new understanding for him or herself. The teacher coaches, moderates, suggests, but allows the students room to experiment, ask questions and try things that don't work. Learning activities require the students' full participation (like hands-on experiments). An important part of the learning process is that students reflect on, and talk about, their activities. Students also help set their own goals and means of assessment. Students have ideas that they may later see were invalid, incorrect, or insufficient to explain new experiences. These

ideas are temporary steps in the integration of knowledge. Constructivist teaching takes into account students' current conceptions and builds from there.

Piaget's Theory is based on the idea that the developing child builds cognitive structures or in other words, mental " maps," schemes, or networked concepts for understanding and responding to physical experiences within his or her environment. Piaget further attested that a child's cognitive structure increases in sophistication with development, moving from a few innate reflexes such as crying and sucking to highly complex mental activities. Piaget believed that children should play, experiment and reason in order to learn. He believed that humans couldn't be given information that they immediately understand. Assimilation is the process of taking in, of absorbing some event or experience to some scheme". Accommodation is when one changes the scheme as a result of new information and equilibrium is when one strives for and reaches a balance of the information collected.

Gagne's theory should be classified as instructional theory as opposed to a learning theory. A learning theory account for how changes in human performance abilities come about. On the other hand, an instructional theory seeks to describe the conditions under which one can intentionally arrange for the learning of specific performance outcomes. Gagne's Taxonomy of Learning states that there are five major categories of learning outcomes:

verbal information,

intellectual skills,

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cognitive strategies,

motor skills, and

attitudes;

The five subcategories of intellectual skills are hierarchical in nature (low-level skills to high-level skills). Gagne's hierarchy of intellectual skills follows programmed instruction since one skill must be learned before another can be mastered.

Behaviorism as a theory was most developed by B. F. Skinner. It loosely includes the work of such people as Thorndike, Tolman, Guthrie, and Hull. What characterize these investigators are their underlying assumptions about the process of learning. In essence, three basic assumptions are held to be true. First, learning is manifested by a change in behavior. Second, the environment shapes behavior. And third the principles of contiguity (how close in time two events must be for a bond to be performed) and reinforcement (any means of increasing the likelihood that an event will be repeated) are central to explaining the learning process. For behaviorism, learning is the acquisition of new behavior through conditioning. There are four types of Operant Conditioning that are Positive Reinforcement, Negative Reinforcement, Punishment, and Extinction. Both Positive and Negative Reinforcement strengthen behavior while both Punishment and Extinction weaken behavior.

## **Objectives:**

To enable students to:

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1. Demonstrate knowledge of constructivist approach to learning.
2. Analyze how far constructivist approach to learning is being carried out in primary school.

## **Procedures:**

### **1 Teacher A, taken by Ho Mee Kiet at class 6H, SJK(C) Chung Hua, Sibu at 9. 30 am on 23 March 2010:**

I reached the school early in the morning and went straight to the principal's office to see the principal of the school, Mr. Wong.

I got the permission from Mr. Wong to take videos to do the SCE 3102 project first before I asked for the willingness of the Science teacher in the school to be observed by me.

Luckily one of the Science teacher, Madam Wong Kiu Sieng was willing to help me and I waited for the time of her Science period to come at the meeting room after I have confirmed with her.

I followed the Science teacher to the Science lab during the fourth period to observe her science lesson.

I took the opportunity to take some photos of the instruments provided in the lab before all the students arrived to the lab.

Before the lesson started, Madam Wong explained briefly about the topic that she was going to teach on this lesson so that I could catch up and understand the content of her lesson later on.

After that, Madam Wong gave me a chair and asked me to sit at the back of the lab so that I could record down the whole process of the lesson.

I recorded down the whole teaching and learning process as soon as the class started by using the camera.

The lesson was about the topic of food preservation which included the methods of preserving food.

The methods of preservation of food mentioned by the teacher during the lesson included drying, freezing, canning, vacuum treatment, sugaring, salting, and pickling.

## **2 . Teacher B taken by Voon Ann Joo at class 3Z, SJK Chung Hua Sungai Tapang at 9. 20am on 22 Mac 2010:**

I got the permission from Principal to take videos to do the SCE 3102 project.

Thus, Principal arranged a time to let me go in a class to observe the teacher.

It was Tuesday and I was given 1 hour to observe the teaching of Mr. Kong in 3Z class.

I followed the Science teacher, Mr. Kong during the fourth period of the second day in the School Based Learning (SBE) to observe his science lesson.

I took the opportunity to take some photos of the instruments in the classroom before all the students arrived to the classroom.

After that, Mr. Kong asked all the students to greet me and my friend and asked us to sit at the back of the classroom so that I could record down the whole process of the lesson.

I recorded down the whole teaching and learning process as soon as the class started by using the camera.

The lesson was about the topic of the magnet.

The two types of objects that mentioned by the teacher in the class includes the object that can be attracted by the magnet and the object that cannot be attracted by the magnet.

## **Data analysis**

### **Analysis for Teacher A**

School : SJK(C) Chung Hua, Sibul

Teacher A: Madam Wong Kiu Sieng

Class : 6H

Topic : Food preservation

Date : 23 March 2010 (Tuesday)

## **No need for this column**

**No.**

### **Observation**

### **Learning Theory**

### **Explanation**

1

The students sat according to their groups in the lab. (to carry out discussion?)

#### Constructivism Theory

Constructivism Theory encourages group work and the use of peers as resources (collaborative learning). Teacher A arranged the students to sit in their groups during every Science lesson to encourage them to discuss among themselves if got any problems to solve.

2

At the beginning of the lesson, the teacher revised the topic, food preservation methods with the students. Teacher A asked the students to think about the food they eat usually and what types of preservation methods are used to preserve the food.

#### Bruner's Constructivist Theory

For Bruner, the instructor should try and encourage students to construct hypotheses, makes decisions, and discover principles by themselves.

Teacher A has asked her students to reflect back the food they have ever eat

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before and encouraged them to think and decide which of the food preservation method that have used to preserve the food.

3

Teacher A gained the students' attention by asking them their knowledge about the ways of food preservation. She encouraged the students to think about it and gave her the examples of food which are not mentioned in the text book that are preserved using the ways mentioned just now.

Gagne step 1 - gaining attention

Gagne step one states that the instructor should give the learner a stimulus to ensure reception of coming instruction. Teacher A asked the students about their current knowledge on the topic and asked them to give her some examples.

4

After that, Teacher A gave the students some examples of the food that are preserved using drying method and asked the students their opinion about it based on their own experiences and knowledge. She also did the comparisons between the different methods of food preservation and described the food examples using the different preservation methods to the students so that the students would not confuse about it.

Constructivism Theory

It says that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences.

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When we encounter something new, we have to reconcile it with our previous ideas and experience, maybe changing what we believe, or maybe discarding the new information as irrelevant. Teacher A encouraged her students to think and told their point of views based on their own experiences.

5

Then, she guided them to stimulate and recall back the food that they have ever eaten and think about the food preservation methods that are used to preserve the food.

Gagne step 3 -Stimulating recall of prior learning

Asking for recall of existing relevant knowledge. Teacher A asked the students to recall back what kind of food that they have ever eaten before and think about the food preservation method used.

6

Besides that, Teacher A also provided a food sample which was preserved using the pickling method to enable the students to think and understand more. She passed the food sample to the students and asked them to taste it one by one. After that, she picked and asked some of the students to tell her what were the contents and the taste of the food sample.

Bruner's Constructivist Theory

Teachers Asking Questions - help students with critical thinking skills by asking them open-ended guiding questions about an investigation they are

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conducting. Teacher A let the students to taste the food themselves so that they would know what the food exactly tasted and the method that actually used to preserve it.

7

Then she discussed with the students and corrected their misconceptions about the topic learned.

### Constructivism Theory

Constructivist teachers inquire about students' understandings of concepts before sharing their own understanding concepts. Teacher A asked the related questions about the topic to the students to see the understanding level of the students before she added in some new information.

8

After gone through all the food preservation methods with the students, Teacher A gave some time for the students to do exercises in the exercise book. After that, she discussed the questions with the students.

### Constructivism Theory

Constructivist teachers allow wait time after posing questions. Teacher A gave her students some time to let them to do the brain storming and think about the questions that were given to them.

## **Conclusion for Teacher A: (Conclusion is based on the analysed data. It should be brief)**

Madam Wong Kiu Sieng had used Gagne's Learning Theory, Bruner's Constructivist Theory and Constructivism Theory in her lesson. Teacher A helped the students to construct new ideas based upon their current knowledge. At the beginning of the lesson, Teacher A revised the topic; food preservation methods with the students. She asked the students to think about the food they eat usually and what types of preservation methods are used to preserve the food. For Bruner, the instructor should try and encourage students to construct hypotheses, makes decisions, and discover principles by themselves. Teacher A has asked her students to reflect back the food they have ever eat before and encouraged them to think and decide which of the food preservation method that have used to preserve the food. Besides that, Teacher A also provided a food sample which was preserved using the pickling method to enable the students to think and understand more. She passed the food sample to the students and asked them to taste it one by one. After that, she picked and asked some of the students to tell her what were the contents and the taste of the food sample. Teachers asking questions will help students with critical thinking skills by asking them open-ended guiding questions about an investigation they are conducting. The teacher let the students to taste the food themselves so that they would know what the food exactly tasted and to let them guess the method that actually used to preserve it.

Gagne step one states that the instructor should give the learner a stimulus to ensure reception of coming instruction. Teacher A asked the students

about their current knowledge on the topic and asked them to give her some examples. Teacher A gained the students' attention by asking them their knowledge about the ways of food preservation. She encouraged the students to think about it and gave her the examples of food which are not mentioned in the text book that are preserved using the ways mentioned just now. After that, she gave the students some examples of the food that are preserved using drying method and asked the students their opinion about it based on their own experiences and knowledge. She also did the comparisons between the different methods of food preservation and described the food examples using the different preservation methods to the students so that the students would not confuse about it. Gagne step three is stimulating recall of prior learning that asking for recall of existing relevant knowledge. Madam Wong also guided them to stimulate and recall back the food that they have ever eaten and think about the food preservation methods that are used to preserve the food by giving them some hints and instructions.

Constructivism Theory says that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. When we encounter something new, we have to reconcile it with our previous ideas and experience, maybe changing what we believe, or maybe discarding the new information as irrelevant. This teacher is a constructivist teacher who inquires about students' understandings of concepts before sharing her own understanding concepts. Teacher A asked the related questions about the topic to the students to see the understanding level of the students before she added in some new

information. Teacher A encouraged her students to think and told their point of views based on their own experiences and she would correct their misconception if there is any after that so that the students could learn more effectively. She is also a constructivist teacher who allows wait time after posing questions. After gone through all the food preservation methods with the students, Teacher A gave her students some time to let them to do the brain storming and think about the questions that were given to them.

Teacher A gave some time for the students to do exercises in the exercise book. After that, she discussed the questions with the students.

Constructivist teachers pose questions and problems, and then guide students to help them find their own answers. They encourage group work and the use of peers as resources (collaborative learning). Constructivism Theory encourages group work and the use of peers as resources (collaborative learning). Teacher A arranged the students to sit in their groups during every Science lesson to encourage them to discuss among themselves if got any problems to solve.

Overall, we can see that Madam Wong had used up several steps in Gagne's Learning Theory, Bruner's Constructivist Theory and Constructivism Theory through her teaching. However, her lesson was lack of fun that she didn't hold any activities to let her students to involve themselves in applying the knowledge they have learned.

## **Analysis for Teacher B**

School : SJK Sungai Tapang, Kuching

Teacher A: Mr. Kong Jian Chai

Class : 3Z

Topic : Magnet This column not needed.

Date : 23 March 2010 (Tuesday)

**No.**

**Observation**

**Learning Theory**

**Explanation**

1

After greeting, teacher B asked the students to open the exercise books about today's topic, which is the object that can be attracted by magnet and the object that cannot be attracted by magnet and explain briefly.

Gagne step 2- Informing the learner of the objective

Step 2 is telling learner what they will be able to do for the instruction.

Teacher B gave some explanation about the topic then he informed the students that what they are going to do in today's lesson.

2

Teacher B divides all the students into few groups according to their seat in the class.

Constructivism learning theory

Students work primarily in groups. They worked together in groups according to their seat in the class to do experiments.

3

He gave the magnets to all the groups and asked them to find the object that can be attracted by magnet and the object that cannot be attracted by the magnet.

Ausubel learning theory

New information is organized under higher level concepts already existing in the learner's mind. Students knew that all iron-made things can be attracted by magnet. However, teacher B stated more examples to let the students try to see whether they can be attracted by magnet or not.

4

Teacher B guides them during doing the experiment. He also walked around the classroom so that all the students do the experiment successfully.

Constructivism learning theory

The teacher coaches, moderates, suggest, but allow the students to experiment, ask questions, try things that don't work. Teacher B stated more examples to let the students try to see whether they can be attracted by magnet or not even though he knows the result already.

5



He showed to the students that only 1 cent coin can be attracted by magnet and 10 cent magnet cannot be attracted by magnet to identify misconceptions of the students.

### Constructivism learning theory

Students are encouraged to use active techniques (experiments, real-world problem solving) to create more knowledge and then to reflect on and talk about what they are doing and how their understanding is changing.

Students' misconception of every coin can be attracted by using magnet are corrected and they have new understanding.

6

Teacher B asked the students to categorise the objects and draw the object under the two categories.

### Bruner constructivist theory

People disagree when their ideas are not in alignment with each other. When learning is in a discovery format, there may very well be times when there is disagreement, different people will see the same situation differently, however, it is then up to the teacher to guide students to the desired outcome. In the video, teacher B will ask the student what they are drawing during their categorisation and correct their mistakes.

7

He also answered some questions from the students if the students ask him questions.

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### Constructivism learning theory

Students have ideas that they may later see were invalid, incorrect, or insufficient to explain new experiences. These ideas are temporary steps in the integration of knowledge. Constructivist teaching takes into account students' current conceptions and builds from there. Teacher B will answer some questions from the students and the students can learn new knowledge from the questioning.

8

He praised the student if that student does correctly.

### Behaviorism learning theory

Teacher will smile and compliment the students on good performance. In the video, teacher B will praise the student if he or she does correctly.

9

Teacher B asked the students to do the cutting and paste in their exercise books. He gave clear instruction so that the students would not do wrongly.

### Gagne Steps 9 - Enhancing retention and transfer

Teacher will provide diverse practice to generalize the capability. In the video, teacher B let the students to do the exercises by cutting and pasting the picture into the exercise book. Doing exercises enable students to have better understanding.

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Teacher B guides them during doing the exercises. He also walked around the classroom to make sure all the students are doing their homework.

### Constructivism learning theory

Teachers have a dialogue with students, helping students construct their own knowledge. Teacher B helped the students if they have any problems in doing their exercises.

### **Conclusion for Teacher B:**

After greeting, teacher B asked the students to open the exercise books about today's topic, which is the object that can be attracted by magnet and the object that cannot be attracted by magnet and explain briefly. The theory used is Gagne step 2, which is informing the learner of the objective. Then, teacher B divides all the students into few groups according to their seat in the class. He used Constructivism theory so that every student can continuously reflect on their experiences, students find their ideas gaining in complexity and power, and they develop increasingly strong abilities to integrate new information. After that, he gave the magnets to all the groups and asked them to find the object that can be attracted by magnet and the object that cannot be attracted by the magnet. Ausubel learning theory is used by teacher B because new information is organized under higher level concepts already existing in the learner's mind. Teacher B guides them during doing the experiment. He also walked around the classroom so that all the students do the experiment successfully.

Teacher B uses Constructivism learning theory and he coaches, moderates, suggest, but allow the students to experiment, ask questions, try things that

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don't work. Next, he showed to the students that only 1 cent coin can be attracted by magnet and 10 cent magnet cannot be attracted by magnet to identify misconceptions of the students. Once again, Constructivism learning theory is used. Teacher B asked the students to categorise the objects and draw the object under the two categories. Bruner constructivist theory is used when learning is in a discovery format, there may very well be times when there is disagreement, different people will see the same situation differently, however, it is then up to the teacher to guide students to the desired outcome. He also answered some questions from the students if the students ask him questions. Constructivism learning theory is used again because constructivist teaching takes into account students' current conceptions and builds from there. He also praised the student if that student does correctly.

Behaviorism learning theory is used because teacher will smile and compliment the students on good performance. Teacher B asked the students to do the cutting and paste in their exercise books. He gave clear instruction so that the students would not do wrongly. Gagne Steps 9 - Enhancing retention and transfer is used so that students can have better understanding. Finally, Teacher B guides them during doing the exercises. He also walked around the classroom to make sure all the students are doing their homework. Constructivism learning theory is used and teacher B has dialogues with students, helping students construct their own knowledge.

## **Suggestions**

### **Suggestions for coursework:**

We need to understand the concept of all the learning theory so that we can apply the knowledge to do the project more effectively and not confuse when doing the project.

When interpret the data, we need to refer to all the learning theory before we decide which learning theory the teacher is using.

### **Suggestion for Teacher A:**

Even though the teacher got used Bruner's Learning Theory in teaching this topic, she didn't apply the learning theory more effectively. Science teaching should be hands-on activities, which requires critical thinking by students for minds-on. She should carry out more hands-on activities for students. For example, the teacher can hold an experiment for the students to preserve any kind of food themselves so that they will know the exact ways to preserve the food and understand more on the topic. From the video clip, the teacher had provided a food sample which was preserved using the pickling method and let the students to taste it but she didn't give chances to the students to try preserving any food themselves.

Besides that, the teacher should apply Bruner's Learning Theory- Students Asking Questions more in her teaching. This is because natural curiosity is built around asking questions. From the video clip, we can see that the teacher only apply Bruner's Constructivist Theory- Teachers Asking Questions and the students only answering the questions she asked without asking any questions themselves concerning the topic. She should

encourage her students to develop questions they want to know about something they are investigating.

The teacher's teaching was a bit messy and unorganized. She should apply all the Nine Events of Instruction in Gagne's theory in her teaching so that the students will not confuse and can learn more effectively during her lesson.

We found that the teacher is too depending on the textbook. It's more likely a traditional lecture which will cause her students to feel bore and lost their interest on this subject. It would be fine and better if the teacher uses other ways to transfer knowledge such as using the ICT provided or held some activities to let all the students involved in it.

Although the teacher got let the students to sit in groups, we can hardly see that she let the students to do group discussion during the lesson. She can actually conduct a group discussion among students and gave some time for them to discuss and solve the problem among themselves. These benefits the students especially will help those students who are poor in their academic. Through group discussion, they can help and learn more from each other.

### **Suggestions for Teacher B:**

Teacher B should stimulate recall of prior learning by asking the students for recall of existing relevant knowledge. This step in Gagne learning theory is very important so that his students can recall the existing relevant knowledge to do the experiment and stimulate their thinking.

Teacher B should provide an immediate feedback on the activities done.

After experiment, teacher should discuss the answer with the student immediately. This is for their reinforcement and their errors are corrected at that time.

There should be a computer and LCD in each class so it is better for teacher to use the ICT provided to teach. Through ICT, the learning process will become more interesting and enables students to understand about the topic easily.

Teacher B shall apply Needham Phase IV (Application: Concepts that are learned are then to be applied to everyday living) by relating the knowledge that taught into daily lives.