

# Constructivism and metacognitive strategies



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Learning is an interesting process for students, teachers and curriculum designers in the field of education. Constructivism has become a very important and a powerful way of thinking in the recent years. Emphasis is given to constructivism approach lately in all schools and educational institutes. To enhance constructivism in the teaching and learning processes, the need to teach metacognition is equally important because it plays a vital role in successful learning.

It is the school's mission to create problem solvers with critical thinking skills. This skill is very needed in moulding the students in becoming active participants in our society who can make valid decisions. Students need the ability to interact and work with others effectively. Therefore it is our part as educators to help our students gain the ability to be able to fit into the society well. We need to help students to build knowledge based upon what they have already known.

As language teachers, it is believed that it is essential to provide learners with chances to experience what the learner is learning. Learners need to really get involved in the process of learning.

The focus on teaching and learning are needed if teachers are to implement constructivism and metacognitive approach to thinking. Therefore proper lesson planning is needed to focus on what the teacher and students will do.

In this paper, a brief explanation on the constructivist and metacognitive approach to teaching and learning of writing portfolio to learners of English as a second language. A portfolio is a compilation of works collected by the English Language learners over a given period of time. The portfolio is a

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useful teaching and learning tool for students learning English as their second language because it gives them the opportunity to demonstrate their knowledge in a supportive framework that takes into consideration their individual needs. Like in this case, they were asked to find out details about 2-3 colleges and to make a comparison on the right college to choose.

It can offer a good way of learning if proper scaffolding is done. This is also a good way for the teacher to find out about their students' strengths and weaknesses and also their interests. This kind of information is difficult to get if a teacher-centered approach is used. It is shown in this paper, how the constructivist and metacognitive approach in teaching and learning is a done to make meaningful knowledge.

In this paper, it also shows that careful scaffolding is needed in helping learners to develop effectively and independently.

Learners in the Chinese Independent School have been expected to accept undisputedly the teachers' words and work that is produced for their students. All these while, students role have been passive receivers. Lately, in this school with the change in trend, new technology and training provided to teachers, many teachers are beginning to realize the importance of constructivism and metacognition approach in the teaching and learning process. Therefore, a survey and interviews have been also conducted to see the number of teachers practicing these approach in their classroom and their opinions towards these approaches.

## **WHAT IS CONSTRUCTIVISM ?**

In this chapter, we will look at the meanings of constructivism. The historical background

of these approaches and the people behind these studies. In using the constructivist approaches in the teaching and learning processes in classroom, it is important for an educator to study first the approaches and apply them .

We will also look at the effectiveness of using these approaches in the teaching of English Language. By doing this, as an educator, we will not only look at the best approaches to teach the learners but also how we as educators can upgrade our knowledge in teaching.

### **2. 1 CONSTRUCTIVISM**

Constructivism has roots in philosophy, psychology, sociology and education. Its main or central idea gives importance to the construction of human learning where learners accommodate new knowledge to their previous learning.

Constructivism can be tracked back more than millennium years ago. Renowned names like Lev Vygotsky, Giambattista Vico, John Dewey, Jean Piaget, David Hume, and others had recorded ideas of constructivism in their work. Jean Piaget is honored for his writings which have provided the beginning for cognitive psychology and is also viewed as a constructivist.

There are two versions of constructivist approach which is cognitive and social constructivism. They were developed and made popular by Jean Piaget and Lev Vygotsky (Cruickshank, Bainer & Metcalf, 1999).

According to Jean Piaget, he believes that the learner's knowledge is built with the help of the learner's activities that helps him to make discoveries in his mind. Therefore, the mental activity of the learner is emphasized and the teacher needs to create a situation whereby the learner associates his previous knowledge (Moore, 2004). His views is cognitively oriented.

In contrast, Vygotsky believes in social constructivism and that construction of knowledge is socially oriented (Cole & Wertsch, 2002). He believes that learning happens with the interaction with the environment (Moore, 2004)

However, both the constructivist approach focuses on constructing the knowledge. Every learner constructs his ideas differently based on their preexisting knowledge (Taber, 2006).

According to Bruner (1960), constructivism is an active learning process which learners construct new ideas based upon their present and prior knowledge. Vygotsky (1962) defined constructivism as knowledge that is constructed through the social interaction (A. P. John, 2010)

Piaget's theory of constructivism argues knowledge is constructed based on learners experiences. The two important components in the construction of knowledge according to Piaget are accommodation and assimilation.

Assimilating is about incorporating new experiences into the old experiences.

Accommodation is reframing the new experiences into the existing mental capacity (W. A. Hoover, 1996)

Constructivism is a theory about how people learn. In constructivism, individuals construct their own understanding and knowledge, thorough experiencing on their own and having reflections on those experiences. When we come across a new knowledge, we will assimilate it with our previous knowledge or ideas or experience and accommodate it with the old or prior knowledge to reach an equilibrium status where the new knowledge and old knowledge creates another new experience for the individual.

Thus, in constructivism, we create our own knowledge by asking questions, exploring and assessing what we know.

Constructivism gives importance to experience because it is the basis for gaining new knowledge. Learners learn new knowledge by believing that it is true and real. If the new knowledge does not collaborate with the existing knowledge or experience and the beliefs of learners, than there is a possibility that learners might refuse or turn it down, or we might even explore it further so that they we understand it better, or there is a possibility that we change it to accommodate to our views (R. J. Stahl, 1990). Experience is the platform for getting new knowledge in constructivism approach.

Schema is equally important for the new knowledge (R. J. Stahl, 1992). Not always the learner constructs accurate knowledge or a learner may sometimes construct something that is unintended. Therefore, the existing knowledge is adapted or modified accordingly or reconstructed to something

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intended. This is an active problem-solving process. According to Flavell (1985), in constructivism approach, it is believed that impulsive conclusion and explanation are regularly happening in the processing, storing and retrieval of information.

In the teaching and learning of writing using the constructivism approach for instance, constructed meaning is from the influence of a variety of areas like language, prior knowledge, context and others (Spiro, 1980). Meaning is inferred from the whole body of language which is constructed from words, sentences or passages. These meanings can be understood differently for different learners. Meanings are constructed from the learners' experiences and prior knowledge. The learners become active learners even when they are reading a passage in order to learn new information (Spiro, 1980). That is why, in the lesson plan prepared, teacher prepares students for writing by taking them through the process of reading a passage associated to their portfolio writing.

There are two vital beliefs that go around the idea of constructed knowledge. First, learners construct new understanding using what they already know. They are no more tabula rasa or blank slates where knowledge is shaped. In constructivism, learners begin a learning situation with already existing knowledge by assimilating it with what they have gained from their previous experience and accommodating that prior knowledge to their new knowledge.

Secondly, all learners are active rather than passive like in the traditional way of teaching and learning. Learners can change to accommodate their

new knowledge if they find what they have learnt is not consistent with their current understanding. Therefore, learners continue to be active in constructivism.

Thus, to summarize, we can say that learners in constructivism;

apply their present understandings

note relevant knowledge in their new learning experiences

study their prior and current knowledge

modify knowledge based on their analysis (A. H. Wesley, 1996)

## **2. 2 CONSTRUCTIVISM IN THE TEACHING PROCESS**

The constructivist theory has very important effect on the teaching process in the

classroom. Using the constructivist theory of learning encourages learners to reflect their own knowledge (Bodner, 1986). A wide variety of different teaching practices are carried out in the classroom. Teachers encourage students to use active techniques by carrying out experiments and real-world problem solving. This is done in order to create more knowledge which is done solely by the learners themselves. Learners then reflect what they have learnt, or are learning and how their understanding is changing through this reflection period.

Teachers give more freedom to students to understand knowledge on their own and to explore knowledge on their own. Teachers facilitate and prompt learners while doing this, teacher guides the activities so that learners can

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build their knowledge based on the platform that the teacher has laid. In the lesson plan prepared, teacher does a lot of scaffolding in order to build the structure towards building the students' knowledge.

In constructivism, teachers regularly checks on students' work and encourages them. Teachers check frequently how and in what ways the activity is helping students to gain knowledge and understanding.

Thus, the teacher's main role in constructivism is to encourage and facilitate students' learning and reflection process. Therefore a teacher is basically a facilitator or guide. The constructivism approach uses the learner-centered approach rather than a teacher-centered approach.

In the teaching process, a teacher plays the role of an expert of knowledge. The teacher still plays an active role in constructivism as an expert who guides and leads students in the right path by laying the platform for them to build their knowledge upon. Teacher set up the learning environment which derives different learning purposes but learners are the ones who will carry out the activity differently.

A teacher's role here is basically helping learners to construct knowledge and not reproducing knowledge. The teacher gives the necessary tools for the learners to build their ideas upon. These are like the problem-solving activities, carrying out experiments and inquiry-based activities. In another word, teacher carries out scaffolding to build upon. In this case, even, parents, peers, reference books, websites are sources of help in helping the learner in their language learning.

As a teacher, it is important we need to keep asking questions like :

Do my students use critical thinking in my classroom ?

Am I asking for my student's understanding before proceeding with my answers ?

Is there any collaborative learning in my classroom ?

Am I asking open-ended questions to my students ?

Am I giving opportunity for my students to express their views ?

Am I giving my students sufficient time to work with their concepts ?

The most significant bases of a social constructivist theory is linked to Vygotsky, in his theory of the " Zone of Proximal Development" (ZPD). " Proximal" means " next". He observed that when children were tested on tasks on their own, they hardly did well compared to when they were working in collaboration with an adult. The adult was teaching them how to perform the task. Thus, the process of collaborating with the adult enabled them to refine their thinking or their performance to make it more effective. The ZPD is about " can do with help", not as a permanent state but as a stage towards being able to do something independently.

## **Figure 2. 2 Zone of Proximal Development**

Therefore the scaffolding development is very crucial in this part of teaching.

The teacher acts as a scaffold and provides the necessary tools for her learners. Scaffolding refers to providing supports for meaning through the use of simplified language, teacher modeling, visuals and graphics,

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cooperative learning and hands-on learning (Ovando, Collier, & Combs, 2003).

Here learners will have the opportunities to formulate their own ideas and test these ideas, Learners not only make conclusions based on the research they have carried out but also they will be able to infer the knowledge they have learnt and convey it in a collaborative learning environment by working and discussing or sharing thoughts with their own peers.

This will enable learners to turn into an active participant in the learning process and not to be a passive recipient like in a teacher-centered approach.

According to Needham (1987) as cited in Parkinson (2004), there are five key phases to teach the constructivist view. They are as mentioned below:

First learners must be taught orientation. Secondly, the induction or elicitation of ideas. Then, comes the reconstruction of ideas. Fourth is the application of ideas. Lastly is the review.

Based on the phases suggested above to teach, teacher has come out with an appropriate lesson plan to teach using the constructivist approach. This lesson plan was used in teaching writing in class.

The reading done beforehand is the scaffolding approach used to guide learners for better writing.

The lesson plan integrates reading which was done three lessons before the writing activity and leads students from the pre-reading stage through the post-writing reflection stage.

A more detailed explanation is given on page 8 and is put in the lesson plan (appendices).

## **PRINCIPLES**

### **CONSTRUCTIVISM APPROACH**

#### **ORIENTATION**

**Explore learners' prior knowledge**

**Associate lesson to learner's interests and prior knowledge**

#### **ELICITATION OF IDEAS**

**Establish the context**

**Elicit learner's ideas and opinions – brainstorm with peers in groups (collaborative approach)**

#### **RECONSTRUCTION**

**Excite learner's interests and curiosity**

**Planning – by doing mind map**

#### **APPLICATION**

**Carry out research**

**Learners investigate (look for points)**

#### **REVIEW**

**Reflect on learner's ideas – give feedback**

**Learners exchange information**

**Learners analyze information**

**Learners reflect on their prediction**

**Learners connect their existing knowledge to the next lesson**

**Table 2. 4 Constructivist approach in teaching**

Scaffolding writing through reading a text, carrying out activities and active participation of students determines the success in this area.

Theme : Education

Book : English for Advanced, Student's Book

Lesson : Gathering Information on Various Colleges

Overview : After reading about steps in choosing the right college. Students were

asked to scan for information on the handout given and come up with constructive opinions. Finally they prepare a portfolio by gathering information about 2-3 colleges and compare them (review).

Time : 3 lessons (each lesson is 40 minutes)

Time to complete Portfolio : One month

Objectives : 1. Connect student background by making predictions about text.

Predict text content through pictures.

Take notes while reading.

Self-question as sections of the text are read.

Work collaboratively in a group.

Create a portfolio to present the most important information about 2-3 colleges.

### **2. 2. 1 ORIENTATION**

The objectives here are to explore learners' prior knowledge by making predictions about the text they read. Learners make connections to the text based on their prior knowledge.

The steps carried out in conducting the writing is as mentioned below.

### **2. 2. 2 ELICITATION OF IDEAS**

In lesson 1, teacher elicits students' understanding by showing pictures of some colleges and ask them if they know the background of these colleges. Students were asked to give their opinions based on their previous knowledge that they bring into this context. Teacher highlights words used to compare these colleges, and the aspects students compare like fee, distance from home, courses available, popularity and so on.

### **2. 2. 3. RECONSTRUCTION**

Then, students read a text in their Students' Book regarding the importance of choosing the right college and on how to choose a course of study based on learner's interest. The text also implies the steps learners can take in order to choose the right college for them, it indicates what kinds of questions the learners need to ask themselves before choosing the right course and college. Two pre-reading strategies that effectively assist students in monitoring their own comprehension are using subheadings and headings and analyzing captions. They reconstruct their knowledge.

## **2. 2. 4 APPLICATION**

In lesson 2, teacher grouped the students and gave some hands-on-activities (refer to appendices) on choosing the right college for each student based on their interest, budget, and other factors. Students make constructive opinion based on the information they have gathered. They were given one lesson to prepare their views.

## **2. 2. 5 REVIEW**

During the 3rd lesson, they then presented their opinions in class. Their peers commented and gave their feedbacks. There was a mini discussion as some students had different views. Here collaborative approach was used as well as student carried out their own meaning -making based on their previous knowledge.

Teacher had built the scaffolding by providing the necessary information that the students needed to have in their portfolio and how they may present their views in a constructive manner. The end goal of this activity is to have students do this activity individually, with the teacher being the facilitator. The amount of teacher-directed instruction is going to vary depending on the students involved.

Students were further given more scaffolding which consists of instructions to do the portfolio, resources they can find their information from and teacher posted questions to students to help them begin their research and construct a better understanding. Though students had to do individual work, they still were assigned in groups so that they could help one another. Allowing students to work independently is an important aspect of social



constructivist theory. It is also equally important to scaffold before and during individual or group task.

When students do their portfolios, they need to check on all these areas :

**PLANNING**

**WRITING**

**SHARING**

**REVISING**

**EDITING**

**EVALUATION**

**SELF-REVIEW**

### **Figure 2. 3 Steps in Writing Portfolio**

#### **2. 3 CONSTRUCTIVISM IN THE LEARNING PROCESS**

The classroom activities should interest the learners to analyze their information and ideas. Learners control their own learning process. Learners are not blank slates. Their previous knowledge is the raw material for the new knowledge they will create.

Based on the explanation given in 2. 4 on how teacher conducts a reading and writing lesson, the teacher presents the class with a problem. In this case comparing 2-3 colleges and review the choice of college made. The learning process takes place when the learners reflect and construct their own understanding carrying out a research. The learner creates a new understanding. They also talk about their activities and set their own goals.

Learners make their own judgments about the knowledge they have constructed.

Therefore, learners control their own learning process and they reflect on their experiences. They become experts of their own learning through the presentations and group discussions that they get involved in. The learners also learn from their peers from their feedbacks and so on.

The main activity in a constructivist approach in classroom teaching is problem-solving. Learners use the inquiry-methods to ask questions, investigate a topic and use a variety of resources to find solutions to their problems and answers. Learners draw conclusions and the exploration continues to take place.

They keep exploring new knowledge and when these new knowledge is gained, they try to accommodate it with their prior knowledge. They may come across ideas that they feel should be changed or incorrect to fit the information that they already have. Sometimes, learners reject the ideas when they cannot fit them into their prior knowledge.

Learning consists of individual's constructed meanings. Therefore, these are the principles that an educator should keep in mind.

## **Learning is contextual**

Learning is active and social. We do not learn isolated facts because it is related to our lives.

### **Learning is a social activity**

Our learning is always connected to the people and things around us. Thus, interaction with others through collaborative learning is an integral aspect of learning.

### **Learning involves language**

Language influences learning as people talk when they learn.

### **Learning is an active process**

Learners construct their own knowledge by interacting with the world. It is an active process.

### **Learning involves construction of meaning**

Each meaning that a learner constructs gives him a better understanding to other knowledge which he can accommodate to fit his prior knowledge.

### **One needs knowledge to learn**

Learners cannot assimilate new knowledge without a prior knowledge to build upon.

### **Learning takes time**

We need time to learn and reflect on what we have learnt.

## **2. 4 CONSTRUCTIVISM IN THE CLASSROOM**

The following section summarizes the characteristics of constructivist approach in the

teaching and learning process in classroom based on the examples given above.

Goals and objectives are gained by the students

Teachers are guide, facilitators and coach

Encourages learner inquiry

Encourages dialogues with teacher and peers

Provide activities, tools and set environment to encourage metacognition and the others.

The learner intercedes and controls learning

Content chosen is authentic and represents the complexity of real-world problems

Knowledge construction is given importance.

Construction happens through social negotiation, collaboration and experience.

Learners explore to seek knowledge

Learners get to learn apprenticeship learning

Collaborative and cooperative learning are very much emphasized.

Scaffolding to help learners reach a higher limit.

## **WHAT IS METACOGNITION ?**

In constructivism, it is all about giving opportunity for learners to construct their own ideas and explore ideas on their own. They also reflect and analyze

ideas to suit to their needs. Metacognitive approaches are used to help learners to understand the knowledge better.

Metacognition approach gives meaningful learning to learners because learners take own responsibility to construct ideas in the learning process. In the classroom, learners ask question (inquiry-method) to understand better (Parkinson, 2004).

### **3. 1 METACOGNITION**

According to the constructivism view, metacognition is an important feature that confers

to meaningful and successful learning. Metacognition sets the foundation where learners build their new information upon (Narode, 1989).

One way of supporting the students learning process and encouraging problem- solving skills is through the approach of metacognitive in teaching and learning. Metacognitive support can be used by learners in problem-solving methods. Metacognitive is distinctive and can be helpful in learners' thinking skills, information processing skills and thus can help them to check the learner's own learning process.

Metacognition plays an important role for the success in learning and it is closely linked to the development of independent learning which is through constructivism.

John Flavell defines metacognition as “ the active monitoring and consequent regulation and arrangement of the thinking and learning activities” (Krueger, 1986).

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Metacognition is also viewed as the ability to recognize and understand one's thinking patterns and processes or cognition and the ability to analyze one's own learning and development. Therefore, learners possess the necessary awareness to think, develop and engage methods so that they will be able to think more efficiently in order to produce the intended results (Wesley, 1996).

Learners will reflect on their learning process like problem-solving and then will be able to recognize the patterns which will enable them to have a meaningful transition for further development of knowledge. When a learner has the ability to reflect on his own thinking and analyze his own strategies, it means he is using his metacognitive skills to do these.

In this case, students carry out research, compare critically and write a portfolio is an example of using metacognition approach.

Metacognition's components are metacognitive knowledge and metacognitive experiences (Flavell, 1981). Metacognitive knowledge is knowledge about one's own cognitive and affective activities and status and the control of this knowledge to achieve a specific goal. The cognitive knowledge is knowledge of the world and the affective knowledge are the abilities and motivation. These are also classified as declarative knowledge, procedural knowledge and conditional knowledge. Declarative knowledge is an example of what knowledge and why the knowledge is learnt. In this case, students need this knowledge to choose the right college after they have left school. Procedural knowledge is how the knowledge is used and conditional knowledge is how to evaluate the effectiveness (Carrell, Gajdusek & Wise,

2001). The learner actively monitors his own mental processes by going through the cognitive and affective processes (Brown, 1987).

Various studies have also proved the benefits and advantages of metacognition in teaching and learning. In language learning for instance, Oxford, Park-Oh, Ito and Sumrall (1993), Miserandino (1996), Victori Lockhart (1995), White (1995), Fleming and Walls (1998) have provided evidence in the use of metacognition in teaching and learning process. In addition, they have also indicated that the use of metacognition is the key factor for being a successful learner whereby learners possess all the positive attitudes in building their self-esteem (McInerney et al., 1997).

It clearly reveals that a good learner takes responsibility for his own learning by planning, monitoring, managing, reflecting on the process of learning. Therefore it can be said that metacognitive strategies are very closely related to self-directed learning and it is an important means to achieve goals through metacognition.

Figure 3. 1 shows the interaction of metacognitive knowledge in promoting learning. There are four steps where a good learner will take in order to construct knowledge in meaningful way.

## **MONITORING**

**(check existing metacognitive knowledge in long term memory and the task)**

## **2. PLANNING**

**(strategies used to complete task, involves setting of time, intensity, etc)**

**Figure 3. 2 The interaction of metacognitive knowledge in promoting learning**

## **3. PROBLEM-SOLVING**

**(regulate one's own thinking)**

### **3. 2 METACOGNITION IN THE TEACHING PROCESS**

According to constructivism, a teacher cannot come up with their own interpretations of the world onto her learners because everyone of us do not share a common belief or experience. Each individual has the right to construct their own understanding and interpretations through his or her own experiences. An educator can model, coach, inquire on the knowledge constructed by the learners. This will help learners to encode and manipulate the information they construct. Educators guide learners through this process and the learners own knowledge is constructed.



## **4. EVALUATING**

**(judge the knowledge and ability gained)PRINCIPLES**

**METACOGNITION APPROACH**

**EXPLORE LEARNER'S PRIOR KNOWLEDGE**

**Explore learner's prior knowledge**

**ESTABLISH CONTEXT**

**Guide them in the topic(control of learning)**

**STIMULATE LEARNER'S CURIOSITY**

**Encourage learners to predict the outcome**

**CONDUCT INVESTIGATION**

**Select strategies to carry out research**

**REFLECT ON LEARNER'S IDEAS**

**Monitor the learning process**

**Give feedback by correcting them**

**Analyze effective strategies**

**Table 3. 1 Metacognitive approach in teaching**

Based on table 3. 1, an educator can help learners explore their prior knowledge by interviewing, asking questions on the topic taught.

Example :

1. What do we look into when choosing a college? (Based on the topic taught on reading and writing as mentioned on page 7)
2. What are the minimum requirements for most of the colleges in Malaysia ?

3. Can you name a few famous colleges in Kuala Lumpur?

Teacher needs to encourage the learner to predict the outcome based on their understanding of the topic.

**Example :**

1. What will happen if there are no pamphlets or brochures regarding these colleges ?

2. What are the problems that students might face with and without these ?

Teacher then guides her learners to choose the best strategy to car