

Using Discovery Approach to Teaching General Studies

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Abstract: General Studies was first launched to integrate three subjects (i.e. Social Studies, Science and Health Education) in 1996 but it was subject to some criticisms. In 2002, a new General Studies curriculum guide was introduced to primary schools. All primary schools began to use this new syllabus in the academic year 2004-2005. The reintroduction of the new General Studies puts more emphasis on the development of generic skills, accompanied by values and attitudes. It highlights the use of discovery approach in the teaching General Studies. The overarching aims of this paper are to share my experience of planning a unit of lessons and trying out the discovery approach in one school. Qualitative data was collected from a focus group interview with five primary six students participating in the trial unit. The findings suggest that students were positive towards the use of the discovery approach in learning General Studies. Some practical hints for teachers who are interested in attempting this approach are discussed.

Keywords: General Studies, discovery approach, constructivism, inquiry approach

Introduction

To keep pace with social and economic development in the 21st Century, Hong Kong has undergone a number of curriculum reforms, claiming to develop “Learning to Learn”. Effectiveness of learning in the classroom is one of the major concerns (Board of Education, 1997). In September 1996, the integration of three primary school subjects, namely Social Studies, Science and Health Education into one new subject "General Studies" was launched. This curriculum change aimed at linking relevant knowledge within the three subjects and help students to learn more systematically, making it more efficient and effective. Some criticisms have been made to such a change (e.g. Chow, 1998). In 2002, a new General Studies curriculum guide was launched. The purpose of this new curriculum is to eliminate the fragmentation of the old syllabus. In line with the curriculum reform document *Learning to Learn: The Way Forward in Curriculum Development* (CDC, 2000), it puts much emphasis on the development of generic skills as well as values and attitudes. The new syllabus also encourages teachers to use of discovery approach in the teaching of General Studies. The aim of this paper is to share my own experience of planning a unit of lessons and trying out the discovery approach in one primary school. Qualitative focus group interview was used to explore students' views on the experience about learning with the use of the discovery approach in the unit. Some practical hints for teachers who are interested in attempting this approach were discussed.

Discovery Approach

Discovery approach is recognized as constructivist approaches (Duffy & Jonassen, 1991; Jonassen, 1991; Jonassen, 2000; Saab, van Joolingen, & van Hout-Wolters, 2005). Constructivist approach puts emphasis on construction of knowledge through interaction with the environment where learners negotiate meanings with others. Discovery approach provides a learning context where knowledge construction processes occur during processes where learners have hands-on experiences to construct meanings. Discovery learning stresses that learners construct knowledge on the basis of new information as collected by them in an explorative learning environment. This form of learning has been widely studied (e.g. De Jong & Van Joolingen, 1998).

Planning a General Studies Unit

In this paper, I will share with the reads my own experience of using the discovery approach in the planning of a General Studies unit. My aim here is to share with teachers the possible procedures of planning a unit using the discovery approach. I focus on discovery learning that allows students to explore knowledge by conducting hands-on experiments and doing observations. Negotiations of meanings are generated through interactions amongst students and the teacher. Students can construct their own knowledge using this information as gained from experiments and observations (De Jong & Van Joolingen, 1998; Njoo, 1994; Njoo & De Jong, 1993). Inductive processes are generated in discovery learning where information and knowledge is generated by the use of scientific experiments.

Organization of a unit “Force”

The design of the trial General Studies unit gives high relevance to the daily lives of the students. The main theme of the unit is “Force”, which is a motivating and meaningful topic for the students to learn. There are four main topics under four sub-themes: “*Force movement*”, namely, “*Why movement?*”, “*Changing force*”, “*Why move slowly?*” and “*Why apples falling down?*”. This thematic design has used semantic webbing, helping students to form concepts systematically. Semantic webbing is a simple but effective process of brainstorming connections for a theme (Jacobs, 1989). This unit design emphasizes interrelationships of concepts, skills and values and so makes sense to teach through such connections. It is based on curriculum planning wheel to help students to learn more systematically through the integration of the concepts and elements for giving out a clear picture to the contents and relationships amongst them.

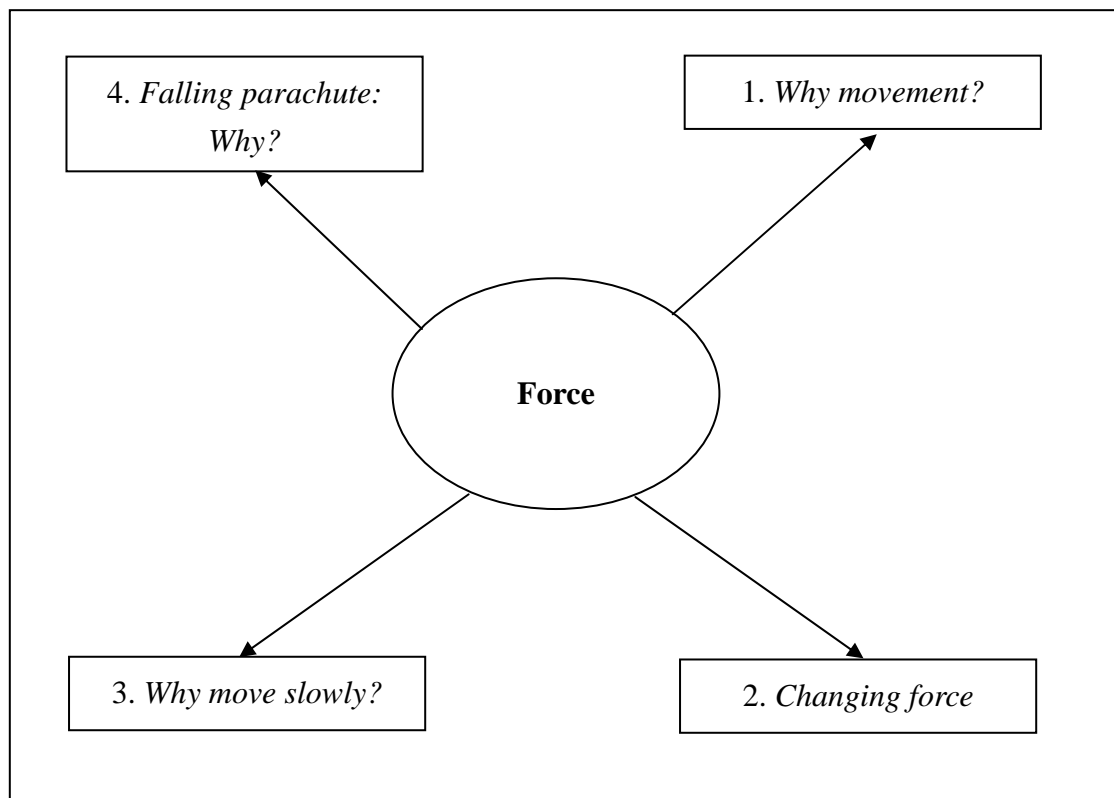


Figure 1: *Concept map of the unit*

Advanced organizer:

Start by introducing the concept map of the unit (Figure 1) in order to arouse students' interest. The purpose is to help students clearly organize what they are expected to learn throughout the unit.

Sub-theme 1 : "Why movement?"

Objectives: To identify that force can move static objects.

Procedures:

Use students' daily experiences as a basis to discuss why static objects can move. Ask students to do an experiment on how to make static things move. Ask students to take out one kind of stationery on their desks. Instruct students to think about how to make it move. Encourage students to think of different methods of how to make it move. Ask students to write their results on the task sheet and induce a conclusion about force can move static objects. Finally, invite students to demonstrate and share their successful methods of how to make objects move. (Appendix 1)

Instruct students into groups of four. Clarify the objective of the activity of "how and why

can a static object move?”. Ask students to find out the answer by doing an experiment where students use different tools to move an object. Distribute task sheets and give instructions of the rules of lending tools. Discuss with the whole class and make a conclusion about how force can make static objects move. (Appendix 2)

Sub-theme 2: “Changing force”

Objectives: To identify that different degrees of force affect velocity and direction

Procedures:

Show a playground model using a visualizer. Ask students to use different methods to make the pirate boat move in the model in order to retrieve the conclusion that has been drawn in the former lesson.

Invite two students to join in a competition in which they need to blow up a feather without touching it from one side to another side in the classroom. Guide students to use different modes to blow up the feather. Ask students to observe and compare the modes the two students use in the process. Discuss with the students what features are observed in the process of blowing up the feather by asking why the winner can win in the competition. Guide students to think about how the degree of force affects the speed and direction of the feather.

Sub-theme 3: “Why move slowly?”

Objectives: To find out that frictional force occurs due to frictions caused between objects.

Procedures:

Introduce different materials (e.g. drawing paper, card board, glass paper, tissue, plastic container, etc.) to students. Ask students to form groups of four. Ask students to observe the differences amongst the materials when the toy car moves. Instruct students to record the degree of speed and do comparisons. Guide students to find out the relationship between different materials and frictional force. By doing so, instruct them to discover the relationship between friction and frictional force. (Appendix 3)

Sub-theme 4: “Falling parachute: Why?”

Objectives: To discover the impact of gravity on daily life

Procedures:

Ask students to observe the phenomenon of falling by demonstrating throwing an eraser. Instruct students to make a parachute individually and try their parachute by falling to the ground.

Consolidation and development:

Ask students to observe the phenomenon of falling a parachute and guess what phenomenon it is. Ask students to create a tool with reference to the characteristics of frictional force. Ask students to think about what will happen if there is no gravity in the earth. Discuss with the students how gravity affects human beings in the earth. (Appendix 4) After that, let students share their work in the class.

How did the students perceive the effectiveness of learning in the trial unit?

When asked about the evaluation of the lessons in the unit, some students responded that:

“The teacher does give clear instruction, give some tasks, not boring and more exciting. The homework serious to do.”

“Much more about General Studies. And I know more about daily application [of the concepts].”

Students also expressed that they learnt some generic skills such as collaboration skills, creativity, problem-solving skills, etc. in the tryout unit. Student A said, “I can remember what I have learnt from the lesson.”

“I think I can learn much knowledge in General Studies.”

“Because I feel that I learn 100% from the lesson.”

“In the lesson, some knowledge outside the textbook was learnt. For example, who invented stream engine.”

Students were interested in the activities with the use of the inquiry approach. Students expressed their preference of activities to explore new learning. They preferred hands-on experience to explore new things and they thought that this could help them remember what they had learnt more concretely:

“It’s great fun. It helped me learn much more.”

“I like the activity of blowing a feather. Because I can use the force to change the direction of the object.”

“I can bring the things from home and tried to use the forces to move them. In this activity, I felt very happy.”

Being asked which was the most impressive activity, the students had different views. One student pointed out, “The most impressive activity is that we blew up the feather to test the force.” The following are examples of what other students said:

“My most impressive activity is doing task sheets. The task sheets helped me learn more, and after doing the task sheets, I can understand more.”

“Making the parachute...it’s funny and interesting and I can learn more.”

“We brought a basketball to test the force...in the activity, I can learn more about forces.”

“We played but in playing, I can learn more and had deeper impression.”

From the above statement, it is noted that although playing is always misunderstood as a kind of valueless learning activity (Clements & Fiorentino, 2004) from the feedback of the students, the students regarded playing as one kind of learning.

In addition, when being asked about their most interesting activity, they showed different views. One student said,

“I like the parachute. Because I took my materials to make it. I felt very excited.”

“Playing with the feather. I can know the direction of force by doing this. It’s playful.”



Photo 1: A student making a parachute

When asked about their preferred mode of General Studies learning, they spoke about the activity approach. One student said, *“doing activities...not boring like lecturing.”*

Collaborative work acts as a great learning strategy in getting students motivated and involved in the activities. One student said, *“When we were in group.”* Other students added,

“We had some activities to do. We felt very happy. Such as making a parachute,

using forces to move objects. I preferred group work. The teacher let us group together freely. We can work together and be cooperative.”

“I had some activities to play. We had some group work. The teacher let us group together freely.”



Photo 2: *Students doing group work*

Group work creates an important platform to help students to broaden their scope of reflection whilst exposure to varied conceptions and perspectives brought about scaffolding effects to enrich their understanding (Chan, 2001). Students could examine sophisticated and complicated views during the learning process. Teachers should create more opportunities for helping students to develop different generic skills such as collaboration skill and communicative skills with the use of group work that is supplementary to the inquiry approach.

Practical Hints for Teachers Who Try Out Discovery Learning for the First Time

If teachers are interested in trying out the discovery learning approach, the following key points can be considered.

First, set the objectives of the unit clearly. Always remember to start with clear objectives which help develop learning activities. Then, establish a meaningful and purposeful learning context in which students are motivated to be engaged in learning activities.

Moreover, during the learning process, there is always a provision of sufficient time and space for students to explore and try out their ideas. The teacher's role is to facilitate the learning process and help probe possibilities for enhancing learning motivation of students.

To enhance the effectiveness of discovery learning, it is also important for teachers to clearly identify access to learning for scaffolding and give guidance on how to make good use of examples, resources and tools. Teachers should be ready to assist the process of scaffolding for conceptualizing and reorganizing students' ideas and thoughts.

Discovery learning approach insists on active participation by students themselves. The teachers should always be aware of giving opportunities to students who can explore the learning context with minimal guidance from teachers. They also should also make guidance available to students when facilitating transfer of learning.

There should be opportunities for students to summarize and synthesize the key ideas as gained from their learning experience. The teachers should also provide chances for students to reflect on their own learning. Assessment is one key component in facilitating learning process. It may involve self-assessment and peer assessment made by students.

Conclusion

This paper serves the purpose of describing and analyzing how discovery approach has been applied to General Studies unit planning, as well as discussing its practical application in General Studies unit planning. Using an inquiry discovery framework to plan the curriculum is helpful in improving learning and teaching. The trial of the unit has proved the use of discovery approach to be a stimulus to pupil learning. Students showed positive feedback to the use of inquiry approach in learning General Studies. This trial experience can be further promoted to other unit teaching. Further investigation should be used for examining the effectiveness of using inquiry approach. Continuous reflections should be made amongst teachers and such experiences should be shared in the whole learning community so as to make continuous improvement to teaching and learning of the subject.

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沙田崇真學校
2004 至 2005 年度
常識科工作紙(一)
課題 力和運動

(Appendix 1)

姓名：_____ () 班別：_____ 日期：_____ 月 _____ 日

考考你

動動腦筋，試驗 **10** 種不同的方法，可以令你放在桌面上的文具移動，然後把你大發現逐項寫在下列橫線上。

- | | |
|--------------|---------------|
| ◇ 發現 1：_____ | ◇ 發現 6：_____ |
| ◇ 發現 2：_____ | ◇ 發現 7：_____ |
| ◇ 發現 3：_____ | ◇ 發現 8：_____ |
| ◇ 發現 4：_____ | ◇ 發現 9：_____ |
| ◇ 發現 5：_____ | ◇ 發現 10：_____ |

我還有更多發現：_____

🌀結論🌀

我發現：

- ◆ 當靜止的物件遇到_____，便能使它運動。
- ◆ 我從實驗中發現不同的_____的例子。

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常識科工作紙(二)
課題 力和運動

(Appendix 2)

姓名：_____ () 班別：_____ 日期：_____月_____日

猜一猜：試**觀察**以下的情況，然後作出**歸納**。

	情況	你利用了 甚麼 做以下的動作？
1.	搬動桌子	
2.	搬動椅子	
3.	拿起書本	
4.	拿起書包	
5.	推動鉛筆	
6.	推動原子筆	
7.	推動乒乓球	
8.	推動足球	
9.	推動籃球	
10.		

歸納：

- 我利用_____使物件或物體運動。而這些物件或物體原本是_____的。

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常識科工作紙(三)
課題 力和運動

(Appendix 3)

姓名：_____ () 班別：_____ 日期：_____ 月 _____ 日

試試看：測試以下各類物料的阻力程度，然後圈出試驗結果。

物料	阻力程度*								
1. 畫紙	1	2	3	4	5	6	7	8	9
2. 縐紙	1	2	3	4	5	6	7	8	9
3. 瓦通紙	1	2	3	4	5	6	7	8	9
4. 硬咭紙	1	2	3	4	5	6	7	8	9
5. 粗面咭紙	1	2	3	4	5	6	7	8	9
6. 紙巾	1	2	3	4	5	6	7	8	9
7. 塑膠容器	1	2	3	4	5	6	7	8	9
8. 玻璃紙	1	2	3	4	5	6	7	8	9
9.	1	2	3	4	5	6	7	8	9

*「1」代表阻力最弱，「9」代表阻力最強。

*每項阻力程度的數字只可圈一次，遇到阻力相近的物料請重新試驗，直至判斷出分別為止。

實驗結果：

- 從以上測試結果，我發現阻力最大的物料是_____，而阻力最小的是_____。
- 根據我的觀察，阻力較小的物料的表面特點是_____，所以它們的_____會較小，而玩具車運動時也會較順暢。

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2004 至 2005 年度
常識科創意工作紙(一)
課題 力和運動

(Appendix 4)

姓名：_____ () 班別：六年級()班
日

日期：____月____

第一部分：思考題

請仔細思考以下題目，然後寫下你的見解。

如果地球沒有地心吸力，

人類會_____

_____。



第二部分：生活應用題

1. _____

2. _____

3. _____



第三部分：創意題

你會利用**摩擦力**創造什麼呢？請繪畫及描寫出你的想法。

名稱： _____	
創造原因：	

功用：	

運作方法：	

