Journal of Action Research 2017

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Message from the Chief Editor

'Action research is a form of collective self-reflective inquiry undertaken by participants in social institutions in order to improve the rationality and justice of their own social and educational practices, as well as their understanding of the practices and the situations in which these practices are carried out.'

(Grundy, 1982)

In order to improve learning and teaching, we educators keep refining the school-based curriculum. Apart from discussions and co-planning meetings, action research is a more structured way of looking at our teaching and reflecting upon it. During the process, teachers work closely together to hammer out various strategies to maximize the effectiveness of a lesson. The collective wisdom paves the way for better curriculum and instruction that cater for students' needs.

Action research is a way to bridge the gap between pedagogical theories and practice, and make the curriculum design and implementation more down to earth. The roles of both teachers and students also change. From being a teacher to a teacher-researcher, we understand how to optimize students' learning and may bring about a change in classroom practice. On the other hand, students' active participation and evaluation of the lesson are valued. They become practitioners of the curriculum and their voice is heard. In this way, action research is the first step for teachers and students to co-construct the school-based curriculum.

I am proud of our teachers as they took the initiative to conduct action research for both students' learning and their professional development. I believe the synergy of our team will make a positive impact on learning and teaching at HHCKLA Buddhist Leung Chik Wai College.

Dr. Eva CHIU

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Exploring the Use of Nearpod in the Junior Secondary Reading Classrooms

Selena T. C. TAM and Sanda W. N. HO

With the advancement in educational technology, using PC tablets in the literacy classrooms is receiving more and more attention. Recently, a free and interactive app called Nearpod has launched for synchronized learning among different computers or tablets in the classrooms. In Hong Kong, the Fourth Strategy on IT in Education has just been in place and most schools have already had tablets for students and the WiFi Infrastructure (Education Bureau, 2015). Therefore, there is an urgent need to investigate how Nearpod can be utilized in Hong Kong reading classrooms for engaging and interactive learning.

Literature Review

Web 3.0 in Education

Web 3.0 (or the Semantic Web) is defined as putting the data and documents on the web in order to let the machines process, transform, assemble, and act on the data in the useful ways (Yu, 2007). Web 3.0 can also understand the meaning of the information. In terms of education, it can help teachers develop a course, support learners, do assessment and keep records. Students can personalize their learning and construct their knowledge (Morris, 2011).

From the theoretical perspective, Web 3.0 has a great potential in learning and teaching. Social interaction with others and the environment can enhance cognitive growth (Vygotsky, 1978). In language learning, learners require comprehensible input which allows learners to develop their own linguistic competence (Krashen, 1985). Through communication, learners can develop their communicative competence (Canale & Swain, 1980).

Regarding teaching, Web 3.0 can also do what Web 2.0 does, that is, to share information online and engage students in authentic and interactive

tasks using multimodalities (Chapelle, 2003). Current literature about the pedagogies using digital technologies promotes less teacher-centred instruction and more students' affective cognitive and operative engagement in the classrooms. (Gambrell, Malloy & Mazzoni, 2011; Munns, Sawyer & Cole, 2013). Meanwhile, Web 3.0 can create virtual reality with touch technologies (Durrant & Walsh, 2013). It allows teachers to design more authentic and engaging tasks.

Reading in a Digital Environment

Reading is a psycholinguistic process, a sociocultural process, as well as an individual behavior (Eskey, 2002). It is about acquiring information from a printed text, then relating it to your existing knowledge and finally constructing meaning. It is also a culturally learnt behavior with a specific purpose and a habit for personal interest.

Researchers from around the world discovered that there are some important differences between reading prints and reading digital texts, which are mode processing through semiotic systems of language, sound, image and movement in a screen-based text. However, since the nature of reading is still about making meaning, the reading processes required for reading print-based texts can also apply to reading digital texts. According to PISA, there are different levels of complexity for reading print and digital texts, including drawing on background knowledge, responding, empathizing, analogizing, obtaining and evaluating facts, critiquing and making intertextual links (OECD, 2011).

Using Nearpod in the Classrooms

It is free to access Nearpod with iPads or other tablets. Nearpod is particularly useful for maintaining an interactive teaching-learning environment. It aims at providing a secure sharing platform. Various functions could be adopted in Nearpod, such as poll questions, quizzes, open-ended questions and drawings. In a classroom, a group of students use this apps with digital devices simultaneously. They are shown the Nearpod presentation and

engaged in it. Teacher, on the other hand, can still be the controller of the slides in the presentation (Schwab, 2013). Teachers could access free version of Nearpod to create and store 10 self-designed slides whereas unlimited storage and more access can be purchased for the Gold and School editions.

Teachers can visit www.nearpod.com for an instructional overview and watch the tutorial video. Teachers can first download the apps with a device and create their own accounts. The presentation slides can be stored in the account afterwards for future lessons. Once the teacher creates a 'lesson', a PIN will appear for student use. Students use the PIN and log in for the presentations. When students sign in, they are asked to provide their names. It is essential for the listing of names as teachers can refer to the names and monitor students' learning progress. Teachers can also hit the sharing button next to the students' names if they find the students' answers interesting. Synchronous learning occurs when students' devices move along with the teachers' main device.

The Utilization of Tablets in the Reading Classrooms

The majority of research on using tablets in reading classrooms focuses on using e-books or Web 2.0 technologies for reading comprehension or developing integrated skills at primary levels. The results showed that by using tablets for reading, students had higher reading speed (Belmore, 1985), more reading gains, more attention and higher motivation to read (Larson, 2010; McClanahan, Williams, Kennedy, & Tate, 2012; Siegle, 2012). Simpson and Walsh (2014) found that touch technologies provided students with more interactive affordances to develop their reading and writing skills. Technically, a tablet allowed students to change the size of the words (Dundar, & Akcayir, 2012), use text-to speech options, and access an e-dictionary. Some e-books included animation, objects and the flip-page function. It can also reduce paper waste (Delacruz, 2014).

A few research relating to the use of Web 2.0 and Web 3.0 technologies in

reading classrooms were conducted in the western contexts. Simpson and Walsh's study (2014) indicated that there were higher levels of engagement, motivation, interaction and creativity in an IT classroom. Delacraz (2014) reported a study regarding the use of Nearpod to teach nine students guided reading in an elementary school. The findings showed that students preferred Nearpod because of its interactivity and entertaining features. The multimedia helped students to think more in depth about the text. From the teacher's perspective, Nearpod was useful in letting the teacher customize the text, questions, and quiz based on students' needs. Fast results in real-time was also an advantage of Nearpod.

Methodology

Background of the Study

This study involves two Form two classes in a band two CMI school in the New Territories. One of them was the elite class with 32 students and the other was the weak class with 21 students. They mainly come from the working class and so English lessons in the school were their major sources of language input.

These two classes were selected because of their willingness to learn English and their learner diversity. Students in the elite class were able to understand the texts in the textbook without much teacher guidance. Their English abilities were diverse. Students' English proficiencies in the weak class were generally low. Five of them were diagnosed as those with special education needs. A few strongest students in this class had similar English abilities to the weakest students in the elite class. In this study, students who got over 20 marks out of 50 in the second term English Language reading test were defined as average students. In the elite class, only two students failed to get 20 marks whereas six students in the weak class got 20 marks or above.

There were six Nearpod reading lessons in total (three for the elite class and three for the weak class). Each reading lesson was conducted by the two researchers, with one being the main teacher and the other one being the

teaching assistant. The main researcher was the reading teacher of that elite class whereas the co-researcher was the reading teacher of the weak class. The study started in April and lasted for two months. At the end, all students (53) completed the questionnaires and 51 students were interviewed.

Research Questions

The study aims to address the following questions:

1. What are the benefits of using Nearpod in the junior secondary reading lessons?
2. What are the challenges of using Nearpod in the junior secondary reading lessons?

Research Design

A three-stage PER model of change was employed in the present study (Taylor et al., 2005). PER refers to planning, experimentation and reflection. Law et al. (2010) stated that its problem-solving and critical approach helps teachers change their pedagogy, which can be shared to others.

For the planning stage, researchers have to identify goals and design strategies for increasing students' engagement and interaction. In this study, three Nearpod lessons with a variety of Nearpod functions were designed to explore to what extent and how students' levels of engagement and interaction can be increased.

At the experimentation stage, the project has to be implemented, observed and evaluated. In this study, three reading cycles were involved. In each cycle, the main researcher first designed a Nearpod lesson. Then she conducted the lesson in the elite class and the co-researcher was observing it and supporting the lesson. Later the co-researcher adapted the lesson so that they suited the level of the weak class. After that, she conducted the adapted lesson in the weak class with the main researcher observing it. The Nearpod functions used in each cycle were a bit different in order to let

students explore them. Evaluation meetings were held after each lesson.

The reflection stage is about reviewing the actions and planning for future actions. In this study, a post session report, which possesses each student' answers and the whole class' percentages, was generated right after each lesson. After the three cycles, a questionnaire was administered to students to collect their views on the usefulness of Nearpod functions. An interview was conducted with each student. The two researchers also reflected on the lessons.

Planning

This study used the Nearpod trial Gold edition, which includes the functions of adding slides, polls, video hyperlinks, quizzes, draw, open-ended questions, web contents, fill-in-the-blank questions, memory tests and field trip. In order to explore all these functions and design relevant lessons, three reading cycles were set and each of which explored some of the functions. The researchers put the images of the texts on different slides so that students knew which paragraphs teachers were focusing on. Students could also choose to read their print book when necessary. The devices used in this study were HP Pro Slate 10 EE G1 with styluses.

Three types of texts which students were familiar with were selected from New Junior Thematic Anthology (Set A) Level 2 based on students' interests (Hughes & Schreyer, 2015). They are a magazine article about Korean dramas, a website article about modern communication technologies, as well as a story about a haunted glass factory. Each lesson lasted for 35 minutes and had three steps. The first was the pre-reading part which was a poll. It gathered students' views on a certain topic and activated their schema. The second was the while-reading part with the texts, quizzes and some other functions to comprehend the texts. The last step was a short writing task or mind-map drawing task. It helped students apply what they had learnt to the task.

The second reading cycle was implemented one month after the first one. The topic was a magazine article about modern communication technologies. The researcher chose it because she wanted to try out more Nearpod functions in a more formal text type. The lesson started with a poll asking students' favourite social networking sites and students were responsive. Then students had to read paragraphs 1 and 2 and complete a fill-in-the-blank task, a memory test and a quiz. Students paid attention to the fill-in-the-blank task. The memory test asked students to match six social networking icons with the least move. After they finished the test, they had to choose one icon that had not been mentioned in the text. They were highly engaged. Unfortunately, their results of these two tasks could not be recorded and shown to the whole class. Then students read paragraphs 3 to 6 and completed two quizzes and two long questions. This time the researcher discovered that she could choose the best answers of the long questions and shared them to the student page. Students found this useful. At the end, students had to draw a mindmap summarizing the article. Three students failed to complete this task. After the lesson, the co-researcher expressed her concern about the difficulty of the mindmap drawing task for her weak class. Thus, she replaced this with a multiple choice question asking students to use the stylus to circle the social networking site they liked. Also, it was decided that the stronger students should sit next to the weakest students to support their learning. The weak class' lesson ran more smoothly than the last lesson because students were more familar with the operation. The two weakest students followed it better. However, a few students used the Google Translate from Chrome to translate the questions into Chinese.

The last cycle was conducted one week after the second one. This time the researchers planned to teach an affective text so as to explore other Nearpod functions. It was a story relating to a haunted glass factory. The lesson began with a poll asking students' preference on the supernatural beings. After that, they were given time to go to the quizlet website and play with the difficult words in the story. They could hear the pronunciation of those words, use flash cards to get familiar with them, match them with

their definitions or pictures, play the spelling game and the hitting game. Then they read different paragraphs and finished the relevant fill-in-the-blanks, quizzes and long questions as mentioned before. Some students encountered connection problems during this session. One failed to connect to the platform and he could only look at his classmate's tablet. Some were counted as new students in the platform after reconnection. For the consolidation part, students were asked to use the field trip function to explore a real haunted glass factory in Latvia. Though they did not have the virtual reality glasses, they could still navigate around the panoramas of the place like Google street view. At the end, they were asked to write their feelings about that place. Later, it was found that the poor wifi connection was due to the overuse of wifi by too many students in different classes. After the lesson, both researchers believed that the writing task for the field trip would be very difficult for the weak class. They skipped the field trip part and some quizzes. And the weak class lesson was similar to the previous one but students were not as excited as the first lesson.

All the students were asked to complete a questionnaire in the last lessons. Percentage distribution of each question for all students, the elite class only, and the weak class only were calculated respectively using SPSS 21. The researchers conducted an interview with each student and each interview lasted for 10 minutes. The interview findings were coded by both researchers. The two researchers also had an overall reflection meeting after the three cycles.

The six post session reports generated by Nearpod indicated over 70% of the students participated in the lessons. The actual percentages of student participation should be much higher than that because of the researchers' dummy accounts and the students' duplicated accounts during the lessons. The percentage distribution in the questionnaire was as follows,

Table 1: Percentage Distribution of All Participants for the Usefulness of Nearpod in Reading Lessons

To what extent do you agree that the following statements describe the use of Nearpod in your English reading lessons?		**Level of Agreement**				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	I enjoy using Nearpod in my English reading lessons.	1.9%	1.9%	22.6%	26.4%	47.2%
2.	Nearpod helps me understand the English text better.	1.9%	1.9%	22.6%	26.4%	47.2%
3.	The poll function of Nearpod arouses my interest to read the text.	3.8%	11.3%	20.8%	34.0%	30.2%
4.	Nearpod creates an interactive learning platform. I find it useful in learning reading.	1.9%	1.9%	34.0%	30.2%	32.1%
5.	I find Nearpod interesting because I can use different modalities for learning reading.	3.8%	3.8%	22.6%	32.1%	37.7%
6.	Nearpod can cater for learner diversity in reading lessons.	3.8%	5.7%	41.5%	32.1%	17.0%
7.	Nearpod helps me know and keep up with the pace of the class.	7.5%	0.0%	30.2%	35.8%	26.4%
8.	Nearpod helps shy students interact with others.	3.8%	5.7%	37.7%	24.5%	28.3%
9.	Nearpod forces students to stay on the page with certain paragraphs. It helps me focus on the paragraphs more.	1.9%	7.5%	35.8%	34.0%	20.8%
10.	The fill-in-the-blanks function of Nearpod helps me identify the key words in the text more easily.	1.9%	5.7%	30.2%	37.7%	24.5%
11.	The memory test in Nearpod helps me remember the knowledge about social networking apps.	1.9%	9.4%	28.3%	43.4%	17.0%
12.	The quiz in Nearpod shares my answers and lets me know my classmates' performances. I find it useful.	5.7%	9.4%	24.5%	28.3%	32.1%
13.	The open-ended question in Nearpod lets me know the long answers of all my classmates. I can learn how to answer the questions in complete sentences from it.	5.7%	1.9%	26.4%	41.5%	24.5%
14.	The draw function in Nearpod helps me understand the text using the visual aids.	7.5%	11.3%	18.9%	30.2%	32.1%

The results showed that about 70% of the participants agreed that they enjoyed using Nearpod in their English reading (Q.1) lessons and found Nearpod interesting because they could use different modalities for learning reading (Q.5). About 40% of them were uncertain about whether Nearpod could cater for learner diversity in reading lessons (Q.6). More than 15% of them disagreed that the draw function helped them understand the text (Q.14), the poll function of Nearpod aroused their interest to read the text (Q.3) and the answer sharing function of Nearpod was useful (Q.12).

Regarding the interview, nearly all of them (96%) expressed that they preferred Nearpod lessons to traditional lessons. Most of them claimed that Nearpod was engaging, entertaining and interactive. They could also get fast results in real time and keep up with the pace of the class. Physically, it was handy, convenient, and environmentally-friendly as it reduced paper waste. Some reported that it was more informational and it let teacher know who finish the tasks. Some mentioned that students could be more active and concentrated. They also had a better learning atmosphere. A few expressed that they could use text-to-speech function in the tablets and Nearpod lessons were attractive because traditional pedagogy has been used for all the other lessons already. For those who did not prefer Nearpod, they claimed that students only focused on other functions of their tablets and didn't pay attention. Also, they thought Nearpod actually took more time because of all kinds of technical problems. Some believed that they could read and write more easily using the print texts.

When asked whether they liked the fast results and sharing funcion from Nearpod, over 93% of the elite class students liked it but only 68% of the weak class students thought it was good. A number of students expressed that it showed the best answers to others and helped them understand more about their own strengths and weaknesses and they could learn from others. They also knew the percentages of corrected answers and it helped them keep up with the pace of the class. Some reflected that they could discuss the answers with other classmates and understand teacher's explanation more quickly. It also helped shy students who did not dare to

express their views in class. A small number of students expressed that it reduced teacher's workload and let teacher know who have difficulties in doing the tasks. For those who did not like the function, they were mainly from weak class and they expressed that answer sharing was embarrassing because their classmates would laugh at them. Other claimed that it only let classmates copy their answers and some students did not do the quiz seriously.

In the post-lesson meeting, both teachers agreed that Nearpod lessons were engaging and interactive. They all pointed out that sharing the long answers to students was very effective because they could check all students' work progress, collect their answers instantly, and share the best ones instantly. It couldn't easily be done in the traditional classrooms where teachers had to collect their print texts, check them one by one after the lesson, and share it one by one in the next lesson. Sharing the percentage of corrected answer was also useful when students did it seriously. The poll, memory test, video, draw, field trip and hyperlink to quizlet also helped students to learn reading using different modalities. Surprisingly, some weak students performed quite well in the Nearpod lessons. It may be motivated by the use of tablets. However, there were still some concerns when using Nearpod in regular classrooms. First, the problems of tablet unavailability and poor network connection have to be settled. Also, it was impossible for teachers to monitor the student pages since they used Chrome to go to Nearpod. Furthermore, it was very time-consuming for teachers to design one single Nearpod lesson. Sometimes, it was not easy to match the text with the Nearpod functions (like field trip). Finally, Nearpod trial Gold edition failed to keep personalized records of any singular students in the platform.

Reflections

With the emergence of Web 3.0, its application in the language classrooms has not been much explored. This study explored the use of Nearpod, an educational app with Web 3.0 technology, in the junior secondary reading classrooms. The findings from post-lesson reports, questionnaires, interviews and teacher reflective meeting indicated that the biggest benefits of Nearpod reading lessons were engaging, interactive and interesting classrooms. It could cater for the needs of students who loved using IT to learn. The reading practices employed in Nearpod trial Gold edition were between transitional texts and transformative texts. They allowed students to read and respond to the tasks onscreen that involve some modes simultaneously, which is similar to transformative texts stated by Simpson and Walsh (2014). However, the modes of responses were limited to writing, drawing and multiple choices. In this way they were like transitional texts. From the students' persepctive, using Nearpod was handy and convenient. Students were able to learn reading through different modalities such as animated image, sound, text, video, and panoramic views. The fast results in real time and the sharing function also helped students learn from other classmates. By linking to other webpages, they were even able to use a wide range of modalities, which can suit students' various learning styles. They could also know the pace of the class. For teachers, Nearpod let them design more engaging and interactive activities, explain the answers more quickly and know the pace of their class. It could reduce paper waste as well.

The researchers identified a number of challenges when using Nearpod in the reading classrooms. Insufficient tablets, slow wifi connection and the insensitive styluses were the largest challenges. Manpower support in the lesson was also needed for preventing students' off-task behavior and solving technical problems. Teacher should also have the relevant pedagogical knowledge and sufficient time so that they can capitalize on Nearpod functions for designing an engaging and interactive lesson. Students may feel bored when they used the same functions often, just like the poll and the quiz.

Nearpod also catered for learner diversity in different ways. Stronger students learnt reading better by the interactivity and the various modalities of the platform. They learnt how to answer the long questions from their classmates' best answers. They could be engaged in nearly all learning functions from Nearpod. Shy students were also able to express their answers. For weaker students, they understood the text better and learnt from the stronger students in class. However, they might need to learn the basic knowledge of the text (e.g. vocabulary) before learning from various modalities. Also, weakest students felt embarrassed to share their answers. It was also impossible for teachers to provide different levels of tasks to the students in the same class.

From the above reflections, it was concluded that Nearpod reading lessons had its values in the junior secondary reading classrooms. Teachers should be trained to use Nearpod and design lessons for it. Also, technical and teaching support was needed in each lesson. In the future, the Nearpod School edition, which included advanced features and technical support, could be investigated.

Conclusion

In this study, the use of Nearpod trial Gold edition in Form two reading classrooms was investigated. The results indicated that Nearpod provided engaging, interactive and interesting lessons to students, who responded more actively than they did in traditional classrooms. Students learnt from different modalities, fast results and their classmates' shared answers. Teachers designed more activities, explained the answers more quickly and knew the pace of their class. Nearpod also catered for learner diversity in different ways. It was recommended that teachers should be trained to use Nearpod lessons and manpower support was given in each lesson.

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Teaching Lower Achievers Metacognitive Strategies for Reading Comprehension

TAI Yin Pan and LAM Si Ni

Introduction

A lesson study was conducted to explore employing metacognitive strategies in reading instruction. Two teachers and an external expert from the Education Bureau (EDB) were involved and the lesson was conducted to two lower achieving classes. In the lesson, students were given a framework to help solve the assigned reading comprehension questions which all involved searching for specific information in a text. Students were required to present their answers in class and evaluate other students' presentation to help internalise the framework. A lesson study cycle was run with lesson planning, post lesson conference and reflection of the participants at the end of the cycle. Students' performances in the lessons were satisfactory that they could apply the strategies in solving specific information questions successfully and present their answers clearly.

Literature Review

Reading is one of the four key areas in the English Language subject. Many students find mastering it an insurmountable task. Currently, in major assessments such as Territory-wide System Assessment (TSA), a post-hoc factorial analysis of reading skills, which might not represent the actual components of the reading process (Weir and Khalifa, 2008), is employed and most textbook writers follow suit. Instead, a model that takes metacognitive strategies, including planning, monitoring and evaluation (Fogarty, 1994), into consideration is more informative in reading instructions. Weir and Khalifa (2008) proposed such a model and it can be summarised in figure 1.

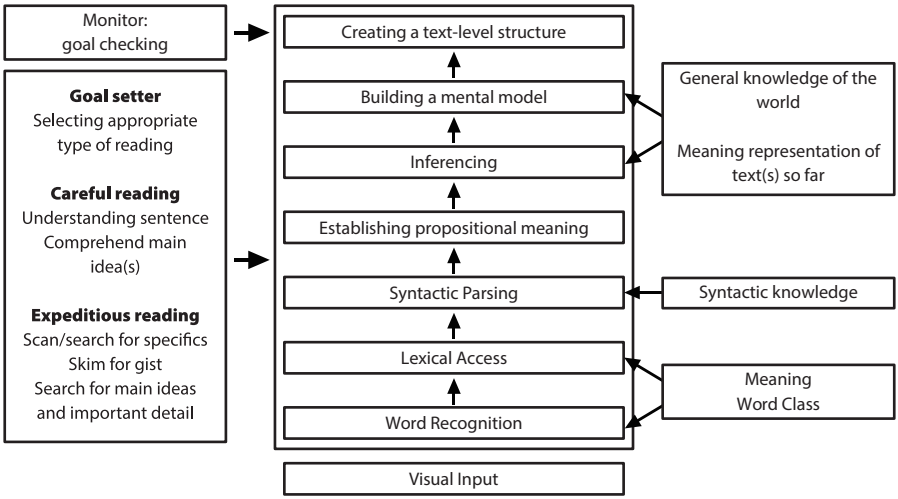


Figure 1
Adapted from Weir and Khalifa's metacognitive processing model of reading (2008)

Xu (2015) suggested that teachers teaching reading strategies both with metacognition of them and for metacognition would be effective. To put the theory into practice, Kim and Cha (2015) explored training students to employ a frame of metacognitive reading strategies and found an increase in their reading scores. Thompson and Kleine (2016) tried teaching students to read tough texts by providing protocols to speak and write about it and aimed to improve their ability to monitor and evaluate during the reading process.

Research Questions

The current study aims to develop a framework of solving specific information questions which built students' metacognition of it. The research questions are stated as follow:

1. Could students work out the answers to specific information questions with reference to a framework built based on Weir and Khalifa's metacognitive processing model of reading?
2. Could students present clearly their answers and the process of working out the answers?

Methodology

Two teachers and an officer from the EDB participated in the lesson study. The co-planned lesson was conducted to two lower-achieving classes of Form Four. Two cycles were conducted.

In the first cycle, the draft of a lesson plan was discussed between the two teachers and the EDB officer in a co-planning meeting. Matter discussed in the meeting included the objectives of the lesson, strategies to cater for learner diversity, the teaching steps and evidence of learning obtainable at each stage of the lesson. The lesson was then conducted in one of the classes. Observation of the lesson was discussed in a post-lesson meeting and suggestions were given to amend the lesson plan.

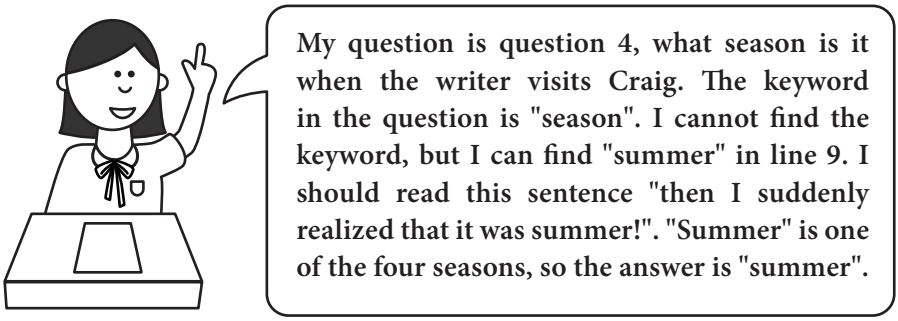
In the second cycle, the amended lesson plan was conducted in the other class by the other teacher. In the post-lesson meeting, the teachers and the EDB officer reflected on the experiences of running the lessons.

The reading comprehension exercise chosen was from p. 83 – 87, Oxford Essential Reading Skills Paper 1 Reading and was of moderate difficulty to the students. A set of worksheet with a framework to solve specific information question was given with examples (figure 2). A cue card was prepared to help students and available to them upon request.

The effectiveness of the lesson was evaluated by observation of the participants in the lessons. A list of evidence of learning was drafted for each step of the lesson.

Figure 2 Framework to solve specific information questions

The Questions	4. What season is it when the writer visits Craig?
Keyword in the Question	"season"
Can I find the keyword?	No.
Can I find a similar word to the keyword?	Yes, in line 9, I can find "summer".
Which part of the text should I read?	Line 9: "Then I suddenly realised that it was summer!"
How do you get to the answer?	"Summer" is one of the four seasons, so the answer is "summer".



Results

In cycle one, the participants agreed that students' performance was satisfactory in general. During the early stage, students were attentive and actively responded to the teacher's questions with correct answers. Students were asked to work on a part of the worksheet individually. They sought help in the process. The teacher walked around the classroom to handle questions. However, the questions were numerous and the teacher could not handle the questions in a timely fashion. Stronger students were encouraged to help weaker students in the group. Students mainly had problems with the questions "Which part of the text should I read?" and "How do you get to the answer?". Group work followed the individual work. Students were asked to present the answer to the question they work on to their fellow groupmates. Students were attentive to the presentation and agreed to their groupmates' answers in general. In some groups, students pointed out the parts that they thought were incorrect and helped their groupmates to correct the answer. In the final teaching step, the teacher selected students from the class to present one of the questions. Some students performed smoothly while some were hesitant in their speech and relied heavily on the worksheet and the cue card. Students listened attentively and would show support to their classmates when they were asked if their presentation was satisfactory. However, when asked the reason of support, they could not comment based on the content of the presentation. They could only give general comments like "good", "good voice", "clear", etc.

During the post-lesson meeting, problems were raised by the EDB officer. The suggested criteria for voting for the best presenter could be better conveyed to students so that they would not choose the best presenter randomly. With reference to handling students' questions during individual work, it was suggested more frequent feedback could be given to the whole class after the individual work.

In the second cycle, the lesson plan was modified according to the suggestions. When students were working on the worksheet individually,

the teacher also walked around the classroom to answer students' questions. At the same time, the teacher selected questions which she thought would be of interest to other students to explain to the whole class. Some students were seen to amend their answers upon the teacher's feedback. Students' performance in the presentation part was similar to those in the previous lesson. When students were giving presentations, other students were given a checklist of criteria and were asked to select a reason from the list to support their judgement. They needed a long thinking time whenever they were asked to select the reason and some students would help by shouting out. The reasons they chose were generally appropriate.

During the post-lesson meeting, all participants expressed satisfaction with students' performance because most students were willing to try and could generally complete the task with efforts. They all thought this lesson was suitable as the consolidation of a reading unit.

Discussion

Students worked out the answers to specific information questions with reference to a framework based on Weir and Khalifa's metacognitive processing model of reading (2008). The design of the worksheet led students to employ different strategies in the cognitive processing model of reading. Students had to perform an expeditious reading to locate the keyword in the question. Searching for the keyword in the text might be a simple word recognition task or tap into students' lexical knowledge as students need to find a synonym of the keyword. Then it was a monitoring process to compare the type of information required by the question to the surrounding text in order to locate a relevant part of the text. Finally, inferencing was needed to obtain the answer from the relevant text. Students needed to employ general knowledge and world knowledge in the process. In the lessons, students performed satisfactorily in general. While some had problems working out the inference to get the answer, they completed the task with the help of stronger students or the teachers. The weaker students may need more practice to strengthen their inferencing skills.

Students sometimes presented their answers clearly and the process of working out the answers. Students' mediocre performance in the presentation could be partly explained by their average speaking skills and pronunciation. The presentation part was aimed to reinforce students' familiarity with the framework for solving specific information questions. Some students had a good grasp on using the framework and therefore they had fewer difficulties in presenting their work, while other students had yet to fully understand the task and therefore they were less fluent in their speech. The audience of the presentations also showed a lack of ability to point out the presenters' strengths and weaknesses. Aside from listening skills, they did not show the level of understanding of the framework which is enough to evaluate others' presentation. In general, students' performance in this part was acceptable and they might need more training in order to perform better.

Conclusion

Students partly grasped the usage of the framework to solve specific information questions, which involves complex metacognitive processes. Using the framework could help students systematically solve the questions and teachers could easily show them the specific part of the thinking processes that students struggle with. With more training, students could have a better grasp of the framework and solve these questions effectively and efficiently. A similar framework for other question types such as True/ False/ Not Given questions could be developed. The presentation of the answers could be improved or replaced by another task which also allows students to evaluate others' application of the framework.

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Integrated Science (Chemistry Part) – Ionic Bonding

TSUI Kwok Leung

Problem Clarification

Catering for learner diversity is one of the major concerns of our school. At Form three, students' abilities in learning Chemistry vary greatly. This action research was carried out in a Form three weaker class. Even though the size of this class is a bit smaller than the other three classes, it is still challenging to help them learn Chemistry due to students' diverse educational needs. On the one hand, students were not motivated to learn Chemistry, which only counted one-third of the Science examination marks. On the other hand, most of the students were weak at English. Therefore, they did not have the confidence in learning an abstract science subject in English. This study aims to investigate how scaffolding can help weaker students learn ionic bonding more effectively and in turn enhance their confidence and motivation.

Planning

With the help of the School-based supporting service (catering for learner diversity supporting service) from the Education Bureau (EDB), collaborative lesson planning and lesson observation are selected as tools to deal with the problems stated above.

During the collaborative lesson planning, two science teachers and the officer discussed problems that students may encounter and the relevant ways to cater for learner diversity in class. The researcher is the Chemistry teacher of the class and he designed and conducted the lesson. It is expected that after the lesson, students can draw the electron diagram of some ionic compounds correctly and tell the main point of formation of ionic compounds.

Programme Action

The scaffolding approach adopted in this double-lesson is to break down the abstract process of ionic bond formation and ionic compounds into several visual chunks and provide some frameworks to facilitate student learning.

Firstly, a simplified note about ionic bonding with some single-word gaps was distributed to students (Appendix 1). They were required to watch a very short video clip about the formation of ionic bond from metal to non-metal atoms and then fill in the blanks with the words provided by the teacher.

Secondly, there was a simple demonstration showing how elements form compounds by using a plastic bottle holding in the air and then releasing it from hand. This was to illustrate a very simple idea that most of the unstable substances will become more stable naturally after a chemical reaction takes place.

Thirdly, under the guidance of the teacher, students were required to draw an electron diagram of sodium chloride (a very simple example – NaCl). In the electron diagram, students must show how sodium and chlorine atoms tend to react by transferring electron from sodium to chlorine atom in order to form sodium chloride – ionic compound.

After that, students were given another example of ionic compound, lithium fluoride, and they were required to draw an electron diagram to represent the formation of that particular ionic compound. It was followed by the explanation of the attractive forces between positive and negative charged ions, ionic bonding.

Finally, students were asked to complete three more electron diagrams of different examples of ionic compounds as homework.

Progress Evaluation

After the lesson observation, the two teachers and the staff from the EDB gathered and evaluated the lesson. The findings of the evaluation were as follows,

- Not all the video clips prepared were used in the lesson due to the time constraint.
- Most students were able to finish drawing the electron diagram after learning it from a similar example.
- Several students were eager to answer the questions and they were able to express the idea of formation of ionic bond.
- Most students were capable of completing the tasks under the guidance of the teacher.
- There was not enough time for the final conclusion and elaboration.
- Some students finished their homework just an hour after the lesson.
- The scaffolding tasks were generally effective in helping students to acquire the knowledge of ionic bonding. Therefore, this scaffolding approach would be continued in the next school year in all the Form three classes.
- Some gifts could be used to encourage students to actively participate in the learning activities.

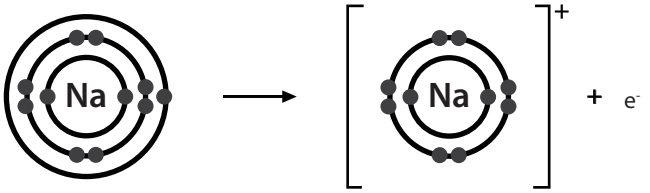
Appendix 1 – Classwork

Form 3 Chemistry – Classwork
Ionic compounds – ionic bond

Name: _____ F.3 ____ Class Number ___ Date:_____

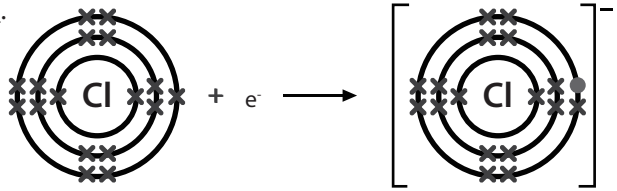
https://www.youtube.com/watch?v=Bfg9pq3Whmw
https://www.youtube.com/watch?v=bnudaqeTyto
https://www.youtube.com/watch?v=900dXBWgx3Y

Metals (金屬):
The atoms of Group I, II and III elements (metals) will lose their outermost shell electrons to obtain a noble gas electronic arrangement.
e.g. Sodium atom with electronic arrangement of (2, 8, 1) loses one outermost shell electron to form sodium ion (Na^+) with electronic arrangement of (2, 8) which is the same electronic arrangement of neon atom.



sodium atom sodium ion

Non-metals (非金屬):
The atoms of Group V, VI and VII elements (non-metals) will gain electrons to obtain a noble gas electronic arrangement.
e.g. Chlorine atom with electronic arrangement of (2, 8, 7) gains one electron to their outermost shell to form chloride ion (Cl^-) with electronic arrangement of (2, 8, 8) which is the same electronic arrangement of argon atom.



chlorine atom chloride ion

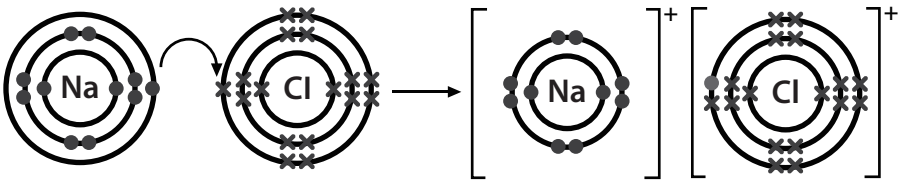
Ionic compounds (離子化合物):

https://www.youtube.com/watch?v=Qf07-8Jhhpc
https://www.youtube.com/watch?v=upg-FUHp6ys
https://www.youtube.com/watch?v=5IJqPU11ngY
https://www.youtube.com/watch?v=wsadD1ari-o

Atoms of sodium and chlorine can each obtain a stable electronic arrangement by the transfer of one electron from the sodium atom to the chlorine atom. In the process of electron transfer, each atom becomes an ion with an electronic arrangement of an atom of a noble gas.

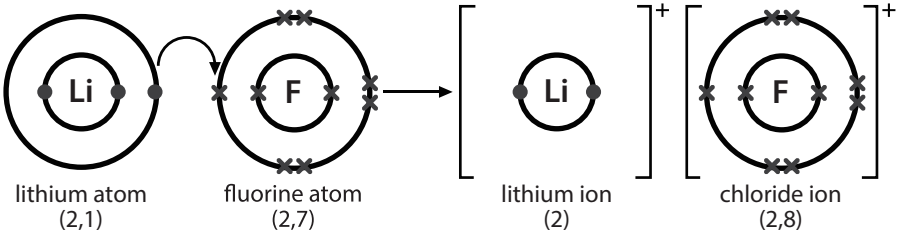
A metal and a non-metal can react together because the electrons lost by atoms of the metal can be taken up by atoms of the non-metal.
This transfer of electrons results in an ionic bond.
**(electrons transfer from metal to non-metal to form ionic compounds)

Example 1: Draw the electron diagram to show the reaction between sodium and chlorine.



The formula of sodium chloride is NaCl.

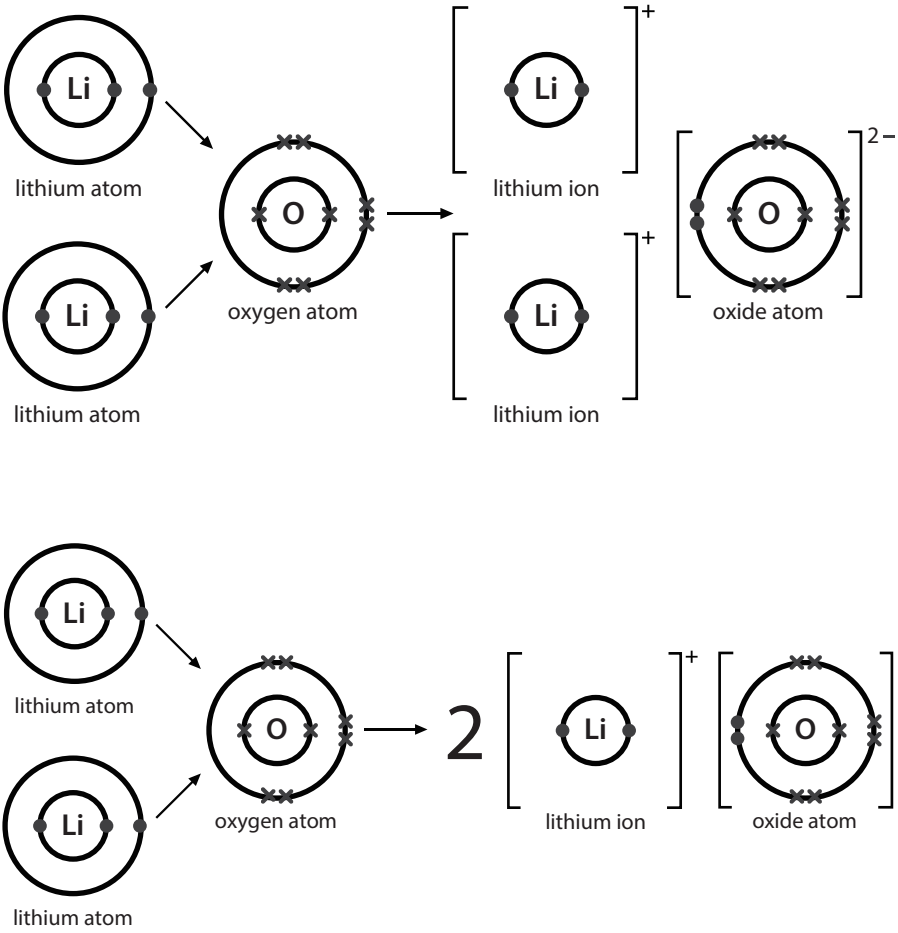
Exercise 1: Draw the electron diagram to show the reaction between lithium and fluorine.



There are strong attraction between positive and negative ions. This attraction, which holds the ions together, is a chemical bond called an ionic bond.

An **ionic bond is the **strong attraction** between **positive** and **negative** ions.**

Ionic bond in lithium oxide:
A lithium atom has an electronic arrangement of (2,1). It tends to lose one electron to obtain the electronic arrangement of a helium atom (2).
An oxygen atom has an electronic arrangement of (2,6). It needs to gain two electrons in order to obtain the electronic arrangement of a neon atom (2,8).



Therefore, the formula of lithium oxide is Li2O.

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以「自設問題」提升學生的歸納及深層理解文章能力

尤學賢、胡家瑞、張仁軒、張嘉賢

摘要

本行動研究旨在透過閱讀理解策略教學，並配合教師的指導，藉以提升學生的閱讀能力，並有助於他們日後的學習。本研究的研究對象為本校全級共91位中三級學生，通過教學設計、實踐、反思及學生前測、後測，探討「自設問題」的閱讀理解策略教學對學生中文閱讀能力之影響。研究結果顯示，「自設問題」的閱讀法能提升學生歸納篇章內容的能力，學生在後測中的成績較前測有所進步。而根據課堂觀察，「自設問題」亦能提升能力稍遜學生的學習動機，學生更主動參與課堂，在課堂中更積極參與討論，回應問題時亦漸見自信。學生於面談訪問中亦表示，透過追問過程，自己能更深入了解文章，並能自行歸納文章內容大意。

目的

課程發展議會在《中學中國語文建議學習重點（試用）》（2007）指出，閱讀能力包括認讀文字、理解（理解段意和內容層次、理解作品的主旨、理解作者的思想和感情）、分析和綜合（分析寫作目的、作者的觀點；分析作品結構、寫作技巧）、感受和鑒賞、探究和創新、掌握視聽資訊等重點。在中文科閱讀範疇的教學上，教師多把重點放在指導學生對篇章或教材的理解，而較少以閱讀理解策略為切入點。認識及運用閱讀理解策略能讓學生更有效地進行閱讀理解，而且學生能把所掌握的閱讀理解策略，甚至應用於課堂以外的閱讀上，提升學習效能。

根據學生能力國際評估（2015）的報告顯示，香港學生的閱讀素養綜合分數全球排名第二位，僅次於新加坡，可見香港學生在閱讀方面有一定能力。然而，過去數年，香港中學生在中學文憑試中文閱讀卷一的表現卻未如人意。本校學生於校內閱讀能力考核中表現尚可，唯大部分學生均著重背誦課文問答，於課外閱讀篇章部分，從學生的答題表現可見，他們理解能力仍有待提升，尤其在歸納段意、主旨方面，有很大改善空間。是故，是次行動研究在第三學習階段的後段（即中三級）施行，學生已具備一定能力去理解篇章的結構和內容、作品的主旨、作者的思想

和感情。研究員期望透過有系統地把「自設問題」策略滲透於教學的過程當中，再配合適切的指導，使中三級學生的歸納及深入了解文章的能力均有所提升。

文獻綜述

1. 閱讀理解的複雜性

不少研究指出，閱讀理解過程有其複雜性。Gagn（1998）認為，閱讀的認知歷程隱含著文字解碼和閱讀理解兩項主要的過程，並且把閱讀理解歷程分為「解碼」、「文意的理解」、「推論的理解」和「理解監控」四個階段。所以，學生在閱讀過程中若有某一個階段無法順利進行，將對於文章的理解產生困難（Gagne, Yekovich, Yekovich, 1998）。香港大學教育學院的 PIRLS 2006 全球學生閱讀能力進展研究計劃中亦指出，閱讀理解的過程包括了能尋找明確的資料、直接推斷、解釋篇章及發表意見、評估內容、語言和文章的要點四項（香港大學教育學院比較教育研究中心，2008）。由此可見，閱讀理解過程有其複雜性，可預期學生對文章或篇章進行理解時，會遇到不少困難。要讓學生閱讀理解能力提升，教師就必須善用日常的教學機會，在教學過程中讓學生掌握和有效的運用閱讀理解策略，讓學生有更明確方法進行閱讀理解。

2. 閱讀策略——自設問題

Dole, Duffy & Pearson（1991）指出閱讀理解教學應教授一套學生在閱讀文章時可用的策略，目的是發展學生自覺控制的意識，使學生在閱讀時可以運用一系列策略來理解文章。Dole等人綜合有關閱讀理解教學和閱讀理解策略的研究，將有效的閱讀理解策略歸納為五項：決定文章重要訊息、撮寫資料、作出推論、自行擬寫問題和監控理解。就自行擬寫問題方面，Singer & Donlan（1982）嘗試教中學生閱讀故事時按照故事的結構形式自己擬寫題目，例如故事的主要人物是誰、故事主角如何帶動情節發展等。結果發現學生訓練「自設問題」較只回答問題，更能改善學生對文章理解的深入程度，並促使學生主動閱讀。Cook及Mayer（1983）指出，自設問題能帶動學生四個編碼過程，分別為「選取」（專注選取資訊的過程）、「獲取」(將資訊轉移到長期記憶的過程）女、「建構」（連繫文章中不同的資訊）和「綜合」（把已有知識與文章得到的資訊建立內在的連繫）。因此，「自設問題」能促進學生

主動學習，引發獨立思考。學生自擬的題目愈多，愈能帶動更多的編碼過程，從而加深對文章的理解。而學生所設計的問題層次愈高，對文章的理解和記憶也愈有幫助。

綜觀以上的研究發現，「自設問題」能提高學生閱讀的自主性及參與度，並藉著追問的過程，讓學生思考文章的深層意思，加深學生對文章理解及記憶；而透過概括問題的答案，從中整理文章的重要信息，「自設問題」亦可訓練學生的歸納能力。因此，探究「自設問題」方法對學生中文閱讀能力之影響實在有其研究價值。

研究對象及方法

是次研究以中文科閱讀教學為重心，目的是讓學生從「自設問題」方式掌握對文本的理解。研究對象為中三級學生，研究員將他們分為實驗組及控制組。控制組的教學方式以教師為中心，即教師設問題，學生作出回應。此外，教師在適當的時候指導學生對篇章的理解。實驗組的教學方式是由學生掌握學習主導權，學生運用「自設問題」的方式理解篇章，教師擔當輔助學生的角色，如適時糾正學生的錯誤，或引導學生如何設問、追問等，讓學生有更大的發揮空間。

中三級四班學生（共91人）為是次研究對象。其中3A及3C班為實驗組，另外3B及3D班為控制組；實驗組有學生48人，控制組有學生43人。由於中三級的編班原則以A班為精英班，B、C及D班則以混合能力來編班，因此，實驗組以3A班學生的能力比3C班學生的能力高。

在研究方法方面，是次研究運用李子建的「4-P模式」促進教師專業發展（2004）。4-P是指澄清問題、計劃、計劃行動及進展評鑑。於澄清問題階段，研究員應確定研究問題及尋找相關的理論。在計劃階段，研究員應解決問題或計劃改善情境的具體行動步驟。實行計劃後，研究員可作進展評鑑。

研究問題

研究員計劃通過運用「自設問題」進行教學，論證運用這種教學方式能幫助中三級學生提升歸納及深層理解文章能力。研究員認為「自設問題」能夠讓學生學習提問問題的角度和方向，針對問題作出回應。若然學生所回應的答案有不足之處，教師鼓勵其他學生追問，啟發學生的思維。當學生經過若干次提問及回應後，可自行整理他們所討論的重點。這個過程能訓練他們的歸納能力，有助他們掌握文本的內容及中心思想。

研究計劃

為了瞭解教學策略的成效及學生的學習狀況，研究員按李子建的「4-P模式」制定計劃，有助教師因應施教的情況而調適教學策略，包括於第一階段訂定行動研究題目、初步構思學習重點及選取「前測」內容。於第二階段，研究員為學生進行「前測」、分析學生「前測」成績、設計「自設問題」工作紙、進行教學、同儕觀課及檢視教學成效。於第三階段，研究員修訂教學內容及調適教學策略。於第四階段，研究員分析學生「後測」的成績及各項數據資料、並檢討研究成效，最後撰寫研究報告及後續計劃。

研究員參考蘇月華、余婉兒和文英玲的《中文閱讀理解能力訓練》（1998）及西方文獻（Cook, & Mayer, 1983; Rosenshine, Meister & Chapma, 1996）。其中以蘇月華、余婉兒和文英玲所提出的「問題五指關」讓學生較易掌握提問方向，故以此作為自設問題的基礎。研究員認為中三級學生具備一定的能力，不一定以「表面說」作為自設問題的起點，可因應學生的學習需要和能力再作調適。另外，研究員亦認為可在自設問題中加入追問元素，使各問題之間有連貫性，能讓學生逐步深入了解文章，並訓練學生整理各題答案，提升他們的歸納能力。

在教學方面，研究員選取幾篇課文（以記文及議論文為主），結合所選用的閱讀理解策略設計相關的教學活動。此外，本研究亦參考「全港性系統評估」（TSA）的閱讀評估設計理念，認為與「自設問題」的理念吻合。

在數據分析方面，本研究設前測及後測及學生面談，目的是考核學生對文章的理解，從學生的評估成績了解他們運用閱讀策略的表現。除了評估實驗組及控制組在是次行動研究的前期及後期的轉變，也比較運用自設問題和傳統教學的成效。研究員利用2016年的「全港性系統評估」的閱讀評估的第1至13題作為前測和後測的評估題目，考核學生對兩篇白話文的理解。前測和後測的考核篇章內容、評估題目數量、評估比重及所評估的「閱讀理解策略」都大同小異。考核內容的程度和數量一致，能準確了解學生應用閱讀策略的成效。

在選材方面，研究員在行動研究第二階段及第三階段分別採用記敘文及議論文。第二階段所選用的教學篇章是＜目送＞、＜風箏＞、＜孩子，我為甚麼打你＞及＜秋燈＞。第三階段所選用的教學篇章是＜最苦與最樂＞、＜不完滿才是人生＞及＜幽默的境界（節錄）＞。學生在記敘文的篇章所提問的方向主要分幾類：人物之間的關係；敘述了甚麼事件；事件與主題的關係；透過事件表達了甚麼感情；人物之間的感情等。另外，學生在論說文的篇章所提問的方向則主要圍繞論點、論據、論證而展開提問。

計劃行動

研究員在研究期間的每節課均以「自設問題」的教學策略授課，讓學生逐步熟習如何「自設問題」，從而研究這個策略是否能夠提升學生的閱讀水平。研究員先向學生講解設題指引，以記敘文為例，研究員先向學生講解記敘文三大要素、提問方向及提問方法（詳見附件一、二）讓學生初步了解設題理念，並列舉問題示例，引導學生設定問題。在設題初期，研究員會先於黑板或投影機羅列學生的問題，讓學生互相觀摩、回應或質詢，起初學生普遍感到疑惑，不知從何入手，但經過同儕的協助與評價，大部份學生能逐漸掌握答題方向。當大部份學生掌握設題方法後，他們便須回答問題，並就答案繼續追問。由於已有問題基礎，故此追問比首設問題更易掌握，經過三至四次的答問與追問，學生最後須根據上述答案歸納段旨，進一步理解文章的重要信息。

研究員在教授＜目送＞後便召開檢討會議，在討論過程中發現無論3A還是3C的學生的設題深度均比預期高，與會者均認為工作紙可減少指引，把設題及答題的主導權完全交予學生，故此修訂了工作紙的設計（見附件三、四）。研究員及後便利用這份工作紙教授餘下的課文，並逐漸由學生主導設題、答題與追問，透過互相質詢及修訂，最終由學生自行歸納各題答案及段旨。研究員期望學生透過反覆的追問與回答，在過程中不斷思考文章內容，從而發掘出文章的深層意思。而在最後歸納各項答案的過程中，亦有助提升他們歸納文章信息能力。

研究結果

前測及後測均考核2016年的TSA閱讀卷，主要考核「能歸納篇章內容」能力。為確保是次研究的準確性，全級參與教師均不會與學生核對及講解試卷及答案。試卷設10道題目，滿分為10分，學生在前測平均得分為7.55分，後測則為7.65分。

前後測平均分與及格率統計：

基本能力	前測		後測		前後測比較		P值#
測BR3.3能歸納篇章的內容要點(10分) (標準差)	平均分	及格率	平均分	及格率	平均分(+)	及格率(+)	
	7.55 (1.53)	7.55 (1.53)	7.65 (1.74)	80.00%	+0.1	+5.00%	0.03

P值<0.05，統計學上證明教學法有效提升歸納能力。

數據可見，學生的平均分與及格率皆有提升。在平均分方面，後測較前測提升0.1分。在及格率方面，後測較前測提升5%。由此可見，自設問題的閱讀法能提升學生歸納篇章內容的能力。

在教學完成後，研究員以面談方式揀選兩位學生訪問，希望了解學生對「自設問題」閱讀方法的觀感，並探討教學法與歸納與深層理解能力的關係。訪問內容主要包括「自設問題」閱讀方法對「課堂學習趣味」、「學生的課堂參與度」及「學生學習主動性」的影響。另外，訪問內容亦會包括「自設問題」閱讀方法對理解文章及追問內容的影響。

兩位學生皆在後測中分數有所提升，學生表現如下：

學生甲及學生乙在前測中取得6分，屬班中表現一般的學生。至於後測，學生甲取得8分。學生甲表示：「在『自設問題』閱讀方法下，我會更主動參與課堂，也更深入思考課文內容。」、「另外，在追問的過程中，我會更容易歸納課文內容要點。」學生乙在前測中取得6分，屬班中表現一般的學生。至於後測，學生乙從6分進步至9分。學生乙表示：「在自設問題的課堂內，我會更有更大主動性去回答問題。」、「在自設問題的閱讀方法下，我能夠更詳細探討課文內容，也能運用於平日的閱讀上。」

進展評鑑

在研究初期，大部分學生不太習慣這種教學模式，他們在課後反思表示擔心難以擬訂合適的問題，亦害怕答案錯誤或追問不當。然而，研究員在教學過程中發現，無論學生開初提問甚麼問題，只要是與文章內容有關，最終均能發展出深層次的理解及反思。在研究的中後期，學生逐漸掌握提問技巧、作答及追問策略，對這種教學策略漸趨正面，在追問及回答的過程中積極討論學生的設題方向及答案，對文章的理解亦漸見深度。最令人鼓舞的是部分能力稍遜及怯於表達己見的學生在研究過程中積極參與課堂，對同學的意見及答案加以評論，可見「自設問題」的教學策略能令能力稍遜的學生提升學習動機。惟部分能力較強的學生卻表示不太習慣這種教學模式，他們普遍認為在一般的閱讀過程中已能掌握文章的大意及內涵，「自設問題」反而窒礙了他們的思考。研究員經討論後發現這些學生普遍以為「自設問題」須以初階提問為起點，然而，研究員在教學過程中發現，首輪提問無論屬「複述文章內容」一類的初階問題（例如文章主要描述哪些人物的關係？），還是屬較高階如「伸展文章意念」（例如人物的某種行為表達了甚麼感情？）的一類問題，透過學生間的追問及回應，最終仍有助釐清文章脈絡。總括而言，「自設問題」能夠增強能力一般以至稍遜學生的學習動機及閱讀自信。而且，在研究過程中，學生須不斷串連不同答案，從中歸納出文章的重要信息，因此學生的歸納能力漸見鞏固。但值得留意的是，每個學生的能力有異，閱讀習慣及能力均有所不同，進行「自設問題」教學時，宜多利用不同教材作範例，高階及初階提問兼備，以照顧不同學生的學習需要。

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附件一：學生甲習作樣本（一）

記敍文三大要素：人物、事件、感情
提問方向：人物之間的關係；敍述了甚麼事件；事件與主題的關係；透過事件表達了甚麼感情；人物之間的感情……
提問方法：六何法——何事（What）、何人（Who）、何時（When）、何地（Where）、為何（Why）、如何（hoW）

	提問部分	提問一	回應一	提問二	回應二	提問三	回應三
A. 微觀分析	題目	1.文章的題目為《目送》，作者目送甚麼?	背影	誰的背影？	父親和兒子	為甚麼要目送他們的背影？	兒子:關係漸漸疏遠 父親:早晚會離開自己
		整理：作者因為與兒子和父親漸漸疏離又好無奈地不斷目送他們的背影					
	1-4 段	提問一	回應一	提問二	回應二	提問三	回應三
		作者敍述了與兒子相處的哪些事?	1.送他上學 2.送機 3.送上大學	兒子有何反應？	1.兒子會回頭 2.強忍心情 3.不理會作者	兒子與作者的感情有何轉變?	由親密變疏離。
		整理：作者透過記敍與兒子相處的三件事從兒子的反應表達出他們的感情由親密變疏離。					

額外追問(__)：

回應：

附件二：學生乙習作樣本（一）

記敍文三大要素：人物、事件、感情
提問方向：人物之間的關係；敍述了甚麼事件；事件與主題的關係；透過事件表達了甚麼感情；人物之間的感情……
提問方法：六何法——何事（What）、何人（Who）、何時（When）、何地（Where）、為何（Why）、如何（hoW）

	提問部分	提問一	回應一	提問二	回應二	提問三	回應三
A. 微觀分析	題目	1.文章的題目為《目送》，作者目送甚麼?	背影	誰的背影？	父親和兒子	為甚麼要目送他們的背影？	兒子:關係漸漸疏遠 父親:早晚會離開自己
		整理：作者因為與兒子和父親漸行漸遠，又好無奈地不斷目送他的背影					
	1-4 段	提問一	回應一	提問二	回應二	提問三	回應三
		作者敍述了與兒子相處的哪些事件？	一、送他上學 二、送機 三、送上大學	兒子有何反應？	一、兒子會回頭 二、強忍心情 三、不理會他	兒子和他的感情有何轉變？	由親密變疏離
		整理：作者透過記敍與兒子相處的三件事，從兒子的反應表達出他們的感情由親密變疏遠					

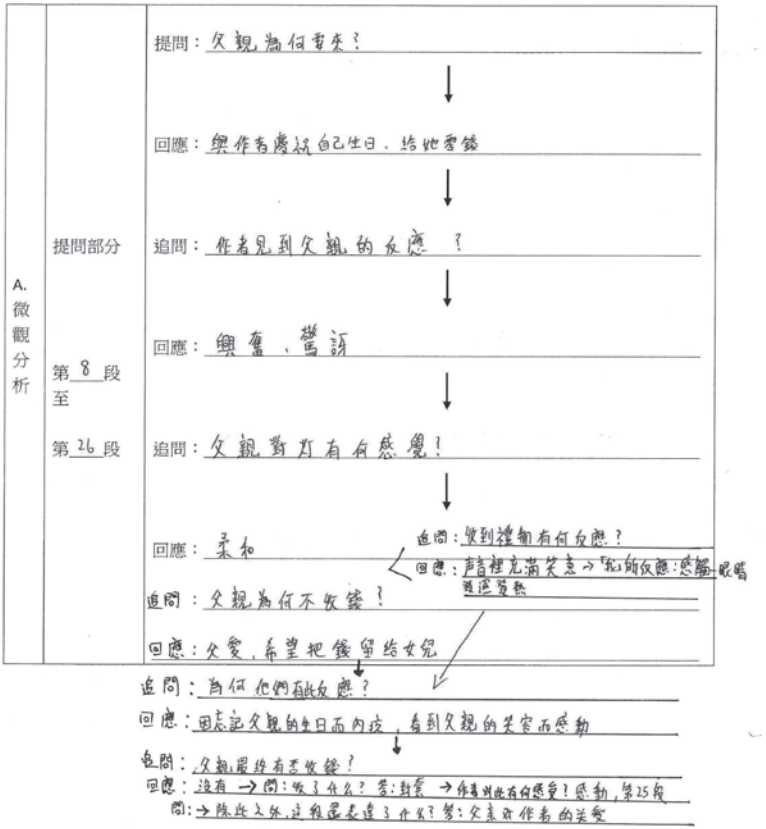
附件三：學生甲習作樣本（二）

設題指引：

1. 論說文三大要素：論點、論證、論據
2. 提問方向：作者提出了甚麼論點；運用了甚麼論證手法；如何論證觀點；觀點是否合理；例子是否貼切……
3. 提問方法：三何法——甚麼（What）、為何（Why）、如何（hoW）

A. 微觀分析	提問部分	提問：文章說明甚麼觀點？ ↓ 回應：不完滿才是人生 ↓ 追問：如何論出不完滿才是人生？ ↓ 回應：皇帝、大臣、老百姓、知識分子（舉例論證） ↓ 追問：這些例子論證甚麼觀點？ ↓ 回應：不同地位，不同階級，不同年代，不同身份，都會遇到不完滿的情況
	第___段至第___段	整理：作者透過舉出皇帝、大臣、老百姓、知識分子，說明即使不同地位、階級、年代、身份都會遇到不完滿的人生，

附件四：學生乙習作樣本（二）



多項式的因式分解

黃邕暉、胡永國、梁柱安

研究目標

多項式因式分解為新高中數學教材之一，是學生學習如何求方程式的解的先備知識，因此這個主題相當重要（課程發展議會，2015）。學生對於沒有提供因式的題目，有時會不知如何思考，或是不知該選用何種方法較合適而快速，因此本研究將對單變數多項式因式分解進行整理及探討。周亭吟（2016）於《國高中因式分解方法論》指出，關於因式分解的方法論，除了運用基本乘法公式以外，還有十字相乘法、牛頓一次因式檢查法、長除法、恆等式、因式定理與餘式定理等。

本研究運用反覆試驗法（Trial-and-error method）及小組協作，促進學生學好數學；學生經過不斷的練習讓他們熟悉當中的技巧，以便內化成為他們的「功力」。今次嘗試以此方法在「多項式的因式分解」處理「多項式」的問題，以提高學生在同類題型的學習效能。

研究計劃

高中學生在第三學習階段已學會多項式的加法、減法、乘法和簡易多項式的因式分解，亦掌握了分母為一次式的分式運算（課程發展議會，2015）。在本學習單元，學生將進一步學習多項式的除法及較複雜的因式分解問題。長除法是進行多項式除法的一個標準程序。學生應能理解除法算式 $f(x) = g(x)Q(x) + R(x)$ 的意義，及於 $g(x) = ax + b$ 時如何推導出餘式定理。進一步而言，因式定理可視為餘式定理的一個特殊情況。在應用因式定理分解多項式時，教師會引導學生欣賞其功能（例如，解二次以上方程）及了解其局限性（例如，不是所有二次以上的方程都能有效地利用這個方法求解）。吳成龍（2009）指出，綜合除法（長除法）雖然可以分解出一元多項式的整因式，但是有時需要試驗的因子（式）很多，而對每個因式都要做一次相應的綜合除法（長除法），這給計算增加了一些麻煩。

面對以上問題，其中一些可行方法是以「個別操練」的方式讓學生熟習「運用數字、符號及四則運算能力」、「運用餘式定理及因式定理的能力」、「運用長除法的能力」、「運用除法算式的能力」等；以「以強帶弱分組」的方式讓學生建構反覆試驗法的能力。綜觀學生的學習表現，與周瑞進（2009）提出的問題相若：學生容易犯錯在除法運算過程中，多數發生在計算錯誤，原因是技能不夠熟練。

完成此計劃後，我們期望學生能運用餘式定理／因式定理找出一個三次多項式的第一個有提示的因式，然後利用長除法和除法算式把該多式因式分解成一次乘二次的連乘式。對於學能較高的學生，其學習目標還包括運用「十字相乘法」把二次多項式因式分解。另外，我們亦期望學生能應用反覆試驗法找出一個三次多項式的第一個（沒有提示的）因式，然後繼續進行因式分解的步驟。

計劃行動

本研究對象取自三位老師任教的三班中四級班別之學生，其中一班（4B）的數學能力較佳，學習情況亦較積極；其餘兩班（4C及4D）為常態編班的班級，共計96名學生。三個班級各接受一節「多項式因式分解」的教學活動，並透過課堂學習、堂課及家課等蒐集資料。

課前教授：多項式的加法、減法、乘法、長除法和除法算式，以及餘式定理因式定理，學生已經完成以上課題的家課。在課堂上，學生於早段重溫餘式定理、長除法、除法算式等。然後學生透過課堂練習如何配合運用以上的三個重要技巧。此習題較易掌握，給予學生第一個因式，讓同學了解當中的過程。完成後，老師以兩人一組（以強帶弱），提出沒有給予第一個因式的習題，讓同學互相討論，以反覆試驗法找出第一個因式。同學從討論當中互相提醒，亦可合作以餘式定理試出第一個因式，然後把整個多項式因式分解。接着，個人自行練習此類習題，即時應用剛學到的技巧。在部分進度理想的班別，老師給予進階題，讓同學從討論當中建構知識和熟習技巧。於課節尾段，老師跟同學作出總結，提醒同學當中要注意的地方，更以課本練習作鞏固，使同學在面對不同的處境下，仍能把學到的知識融會貫通。

進展評鑑

本研究主要的研究結果與發現，可歸納為下列兩點：

1. 在學生的數學學習情形方面：

學生學習「多項式因式分解」教學模組後，在多項式因式分解的計算方面，普遍能達到預設之教學目標，但個別4C和4D班學生在以上課題的表現則不理想。家課習作的內容顯示，個別學生未能掌握到課堂所學到的技巧，如餘式定理、長除法、除法算式。為照顧學習差異，4C班的習作紙會有步驟提示，4D班於課堂中則有老師提示（附件一）。

經過數次利用餘式定理的嘗試來找出多項式的第一個因式後，學生普遍能掌握如何快捷地找出第一個因式的方法，而且可以在草稿紙上完成試算的步驟。部分同學甚至能以心算找出第一個因式，大大減少了運算時間。

2. 在學生的學習感受方面：

就觀察所得，大多數學生喜歡互動及討論的學習方式，並希望能再多做類似的活動。學生最熟習的部份是「十字相乘法」，感到最困難的部份則為「長除法」。大多數學生肯定「多項式因式分解」課程及老師的上課方式，也希望老師日後於合適的課堂再次讓他們有討論和互相合作的機會。

反思與展望

4C班和4D班學生的學習差異很大，個別同學熟習「餘式定理」、「長除法」、「除法算式」及「十字相乘法」，但有部份同學則未能掌握以上技巧，我們需要增加時間去給予提示和支援。個別學生於反覆試驗法的部份很快能找出第一個因式，而且能繼續餘下的解題，但其他學生卻需要額外時間完成延伸習作。

由於4B班學生的基本能力較其餘兩班為佳及平均，學習差異相對較少，而且學習態度亦較認真，所以老師修改了工作紙的內容，以配合4B班的情況，題目減少了提示，亦加入了較深的題目，讓同學討論及推論出結果。

面對學習多樣性，我們在4C和4D班的課堂中給了較多的提示，亦較多到學生身邊加以指導和協助；相反，4B的同學大多能自行完成課堂習作，老師授課亦較暢順，在學習過程中，學生普遍能主動學習。

對於學習差異較大的班別，我們將會多一點使用「以強帶弱」的分組策略，讓能力較佳的同學協助同儕，以達「教學相長」的效果。對於學習差異較小和能力普遍較佳的班別，我們可以用較短的時間講解教學內容及技巧，然後利用餘下課堂時間進行練習，令學生熟練相關技巧。

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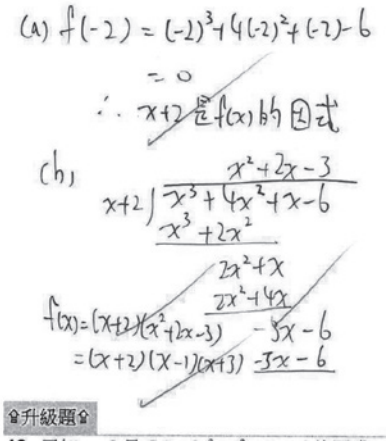
周瑞進（2007）。〈台南地區高一學生多項式題材錯誤類型之調查研究〉（碩士論文）。國立高雄師範大學。取自：http://ir.nknu.edu.tw/ir/handle/987654321/1591。

附件一：學生習作

4B 習作

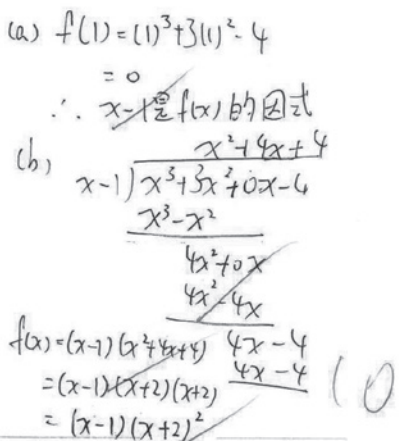
10. 設 $f(x) = x^3 + 4x^2 + x - 6$。
    (a) 證明 $x + 2$ 是 $f(x)$ 的因式。
    (b) 因式分解 $f(x)$。



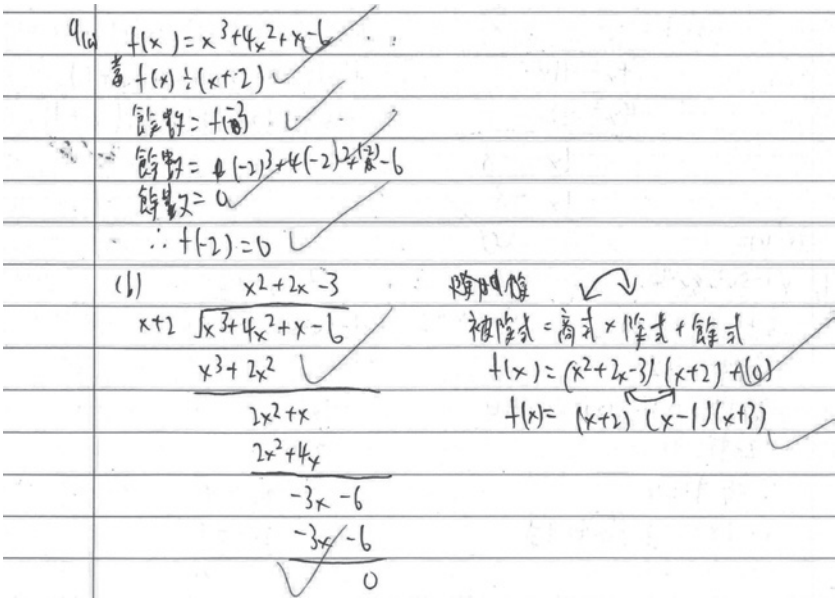
升級題

4C習作

11. 設 $f(x) = x^3 + 3x^2 - 4$。
    (a) 證明 $x - 1$ 是 $f(x)$ 的因式。
    (b) 因式分解 $f(x)$。 ➥習題 6C：8–11



4D習作



均衡飲食與膳食計劃

趙崇和

研究目標

生物科性質為描述性為主，傳統的生物課堂及生物課老師習慣以傳統的講授方法上課。如何在課堂滲入互動、合作學習的元素，以符合現代課堂的要求，正是今次研究的目標。透過網上學習、口頭匯報和互評，學生能主動建構知識。

生物科課程宗旨

在策劃課程前，教師應對課程理念、宗旨及學習目標有透徹的認識和全面的理解，認定發展方向，不時反思自己所教或學生所學的知識能否實現本課程及初中教育的宗旨。本人於設計課程時，首先了解學生在認知、心理和社交方面的發展，並考慮下列因素：

1. 照顧學習差異
2. 照顧不同性向的學生
3. 令學習更具意義
4. 應用所學
5. 結合學習與評估

學習重點

學習重點	認知範疇 (Bloom, 1956)	共通能力
課堂一 (35分鐘)		
1. 認識均衡飲食的定義和好處	認知、理解	
2. 認識飲食指引，例如：食物金字塔等	認知、理解	
3. 指出或說出自己每日的膳食習慣	應用	
4. 利用網上計算個人每日營養攝取量，分析個人飲食習慣是否健康及均衡	應用、分析	自學能力運用、資訊科技能力、數學能力
課堂二 (35分鐘)		
5. 匯報結果	應用、分析	溝通能力
6. 同儕互評	分析、評估	批判性思考能力
7. 擬訂實際計劃，並付諸實踐 (下一周堂上)	應用、創造	解決問題能力、創造力

計劃行動

在課堂一，老師以一食物金字塔模型讓學生可以學習有關金字塔內各種食物比例。老師講解有關均衡飲食的定義和好處。學生在課堂內利用網上計算個人每日營養攝取量，分析個人飲食習慣是否健康及均衡（附錄一）。學生尋找、選擇資料、及組織數據後，在課堂二，以每人每日所需要的能量和均衡膳食作準則，匯報結果和同儕互評。最後，擬訂實際計畫，並在下周堂上付諸實踐（附錄二）。

進展評鑑

口頭匯報能補足傳統的學習方法，除能訓練學生的溝通能力之外，其重點在於有效地向特定的對象傳達信息或展示資料，交流及回應他們所提出的問題（如朋輩、教師），這是學生主動建構知識的其一策略。學生在堂上表現積極，投入課堂，並能主動地互相交流意見及觀點。在下一周上課時間，學生更能運用所學，認真擬訂健康飲食的計劃，且有部分學生會與家人商討，在家中實踐均衡膳食計劃。教師亦可與其他學科合作，進行跨科研習，讓學生把所學融入日常生活中。

教師在課堂活動進行後，可引導學生進行有層次的反思，例如：完成研習後，可讓學生把經驗以記錄形式明確表達，然後反思學習的經驗，再進一步把所學聯繫到其他學習情景及更廣闊的範疇中，能力較佳的學生更可將所學應用於新的環境中。下一次的行動研究，將考慮擴展至以下三個重點：

1. 認識維持健康生活方式的重要性，養成個人及家庭的良好及有規律的飲食習慣，建立身心健康的生活模式
2. 在消費時從多角度考慮，並作出明智的抉擇
3. 加強獨立生活及自我管理能力，以銜接成人生活，提升生活質素

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附錄一

What did you eat yesterday?

Sex: _____(M/F) Age: _____ Weight:_____kg

Breakfast:

Item	Food	Amount	Energy (Calories)
1			
2			
3			
4			
5			
		Subtotal:	

Lunch:

Item	Food	Amount	Energy (Calories)
1			
2			
3			
4			
5			
6			
7			
		Subtotal:	

Dinner:

Item	Food	Amount	Energy (Calories)
1			
2			
3			
4			
5			
6			
7			
		Subtotal:	

Total energy intake per day = _____cal

附錄二

Your designed daily menu

Sex: _____(M/F) Age: _____ Weight:_____kg

Breakfast:

Item	Food	Amount	Energy (Calories)	Fat/ sugar	Dairy/ meat	Fruit/ veg	Cereal
1							
2							
3							
4							
5							
Subtotal:				Food pyramid			

Lunch:

Item	Food	Amount	Energy (Calories)	Fat/ sugar	Dairy/ meat	Fruit/ veg	Cereal
1							
2							
3							
4							
5							
6							
7							
Subtotal:				Food pyramid			

Dinner:

Item	Food	Amount	Energy (Calories)	Fat/ sugar	Dairy/ meat	Fruit/ veg	Cereal
1							
2							
3							
4							
5							
6							
7							
		Subtotal:		Food pyramid			

Total energy intake per day = _____cal

透過3D VR虛擬實體眼鏡，提升學生學習地理科的效能

霍兆霖、何家杰、賈傑偉

摘要

為配合電子學習的趨勢，本校地理科於本學年中四級，以「透過 3D VR 虛擬實體眼鏡，提升學生學習地理科的效能」為研究題目，希望強化教學效能。研究結果顯示，應用「3D VR虛擬實體眼鏡」教學策略能提升學生的學習態度，而學生的學業成績亦有上升的趨勢。此外，以教師學習圈方式來推行課堂研究，能有效提升教師的技巧和專業水平。

研究背景

傳統上，地理科教師利用黑板及講授的課堂教學模式，嘗試解構地理科課程（古鈞元、吳正己、李忠謀，2002）。但地理是探究地球及其特徵、居民和現象的學問，重點是要尋求理解空間，並研究眾多現象、過程、特徵與及人類和自然環境的相互關係在時空上的分佈。所以，在傳統的課堂教學模式下，學生對地理科多變知識的掌控能力有極大的差異（課程發展議會，2007）。

多年前興起的多媒體教學（劉明洲，2009）是一種嘗試利用教學軟體（多媒體電子教室系統）及多媒體具有圖、文、聲並茂的特點，提供最理想的教學環境，傳遞更深一層的意念。教師通常集中於事前準備教材或投影片，希望能令教學流程更加順暢。但利用多媒體「課件」上課，由老師「統治」課室，限制了學生的想像與體驗。因此，尋求新變化，使不同學習動機或能力的學生，都能在地理科學有所成，是地理科教師的巨大挑戰。

甚麼是虛擬實境(VR)？

虛擬實境（Virtual Reality，縮寫為VR），是利用電腦模擬產生一個三維空間的虛擬世界，讓使用者感覺彷彿身歷其境，可以及時、沒有限制地觀察三維空間內的事物。使用者進行位置移動時，電腦可以立即進行運算，將精確的三維影像傳回產生臨場感（吳佩樺，2016）。

Parkinson（2017）曾進行「Is VR the real deal? VR是真正的交易？」的研究，他確定了四組七級和八級的學生，利用VR對珊瑚礁和珊瑚褪色問題進行同樣的考察，目標是研究同學提出的問題類型，學生是否認為以這種學習方式能更加了解珊瑚，以及學生能否提出「更好的」地理問題。結果是學生能在不同方面上皆顯示出對珊瑚的好奇，並提出更廣、更深層的發問。

有報道指合適的教學工具往往令學習事半功倍（魏綺婷，2016）。天水圍伯裘書院打造「虛擬教室」，主要供全校學生上地理課，同學可利用虛擬實景（VR）學習配件，到不同自然生態地方拍攝全景三百六十度影片，回校後可不斷重溫。室內又放置擴增實境技術沙箱，可堆砌不同沙丘，投射器會即時計算沙丘高度和深度，投影相對應不同顏色及等高線。虛擬實境能幫助學生更有效地探究及學習自然生態（Parkinson, 2017）。因此，本校地理科老師嘗試以行動研究探討虛擬實體眼鏡對教授地理科的效能。

研究目的

本行動研究由課堂觀察、訪談、問卷調查等方式來收集相關資料/數據，以驗證實施效果。研究問題如下：

1. 地理科在教學上引入「3D VR虛擬實體眼鏡」對高中學生有什麼影響？
2. 就高中學生在地理科學習上而言，運用「3D VR虛擬實體眼鏡」是否較傳統黑板或電腦簡報方式的效果更好？

於是次研究中，地理科主任帶領兩名老師組成學習圈。2017年2月開始至2017年5月期間，中四級科任老師共同設計教案，並由老師輪流試教，再由第三位同一學習圈的科任老師進行觀課。

研究方法

1. 研究對象

本研究之焦點在中四級的兩組地理科同學，分別以中、英文作為教學語言，而每組學生都包括高能力、中等能力和能力稍遜的學生。兩名老師分別在中四級兩組教授相同課題，在研究期間以相同的教材和課堂形式，教授相同章節，授課期間由第三位老師作課堂觀察。這可避免因內容不同而造成研究結果不準確。

2. 研究大綱

本研究是教育行動研究。研究小組基於規劃、行動、觀察和反思的行動研究精神進行。同時，該研究亦可分為質化和量化兩研究部分，分別會透過課堂觀察、訪問和問卷調查來分析參與研究的學生在表現上是否有所改善。

由於受到人力資源及時間所限，是次的研究對象只聚焦於中四級兩班共35位學生。至於搜集資料的方法，則是採取質化與量化相結合的研究方法，包括：1.透過量化問卷調查，了解學生在本行動研究前後，在課堂參與及學習動機上的轉變；2.對學生的個別質化訪談，深入了解引入「3D VR虛擬實體眼鏡」對學生的課堂參與及學習動機所帶來的影響；3.教師量化問卷調查和質化訪談，了解教師對實施「3D VR虛擬實體眼鏡」的評價、觀感、觀察及意見；4.共同備課、同儕觀課和課堂實地觀察，以互相印證從學生問卷調查、老師意見調查、老師訪談、學生訪談及文件分析（包括教案、教材及考試成績）所得的研究資料。

地理科任教老師，會先共同備課，然後分別在中、英文組進行試教，第三位老師則參與觀課，並於課後進行同儕評課，除了肯定教師的良好教學實踐之外，亦力求改善課程內容、教學的安排及合作學習的教學策略，以便實施第二輪教學。為使教師改變教學策略的觀念，教育局的研究報告建議「學習圈」模式來支援，以學校內的不同科組分享教學經驗，每次共同探討某一特定教學課題，讓教師互相觀摩、評鑑課堂教學和策略運用，提升參與教師的專業水平（教育局，2010）。

2017年2月是研究的計劃期；2017年3月至5月是實施期，過程中會有系

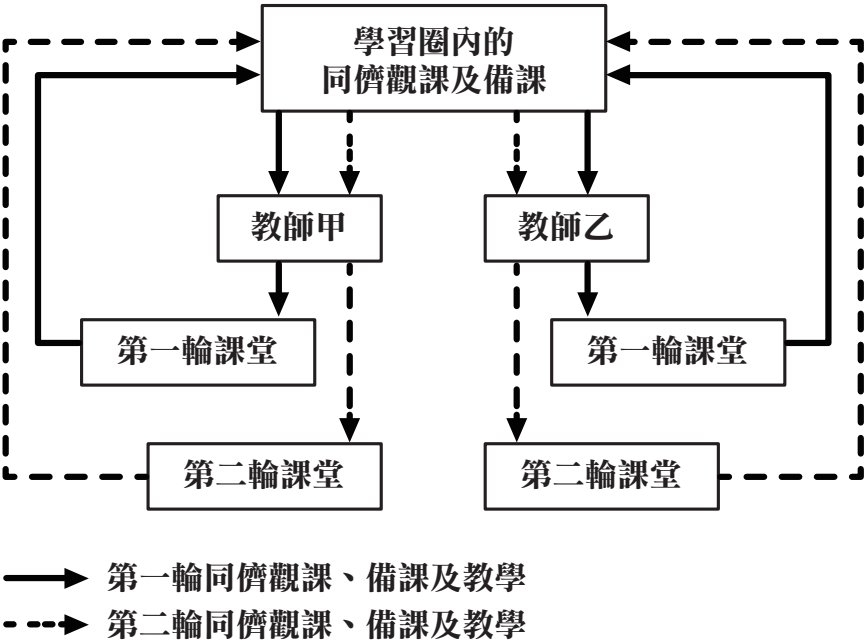
統地收集評估數據，並持續地作出檢討和改進；而由2017年5月至6月，研究小組總結與反思是項教育行動研究的成效。

3. 研究階段

本研究分兩階段進行，首階段以傳統黑板或電腦簡報方式進行課堂教學，分別於中四地理的中、英文課節進行，都是關於中四必修單元：管理河流和海岸環境，同學於課堂後掌握「在不同河段中有哪些主要作用在運作」。課堂由第三方老師作課堂觀察，加上訪談、問卷調查等方式來收集相關資料/數據。

而第二階段以「3D　VR虛擬實體眼鏡」方式進行課堂教學，同樣於中四地理的中、英文課節進行，都是關於中四必修單元：管理河流和海岸環境：一個持續的挑戰，同學於課堂後掌握「管理策略：「硬」策略和「軟」策略，例如建造堤壩和防波堤、海灘保育、土地利用分區」。由老師作課堂觀察，加上訪談、問卷調查等方式來收集相關資料/數據，以驗證實施效果，包括有助於提升同學的認知，確定同學的能力，加強評估的客觀性和準確度。

圖1：學習圈的運作流程 教育局（2010）



研究分析及結果

本研究小組經過實踐和研究，並基於問卷調查（附件一）、訪談、筆記摘要分析及課堂觀察的結果，得知中四級學生在學習動機和課堂參與方面出現了以下的轉變。

對地理科的喜歡程度方面，以「3D VR虛擬實體眼鏡」方式課堂教學之後，中四級學生對「我對地理科的喜歡程度」的認同感大幅提升。喜歡的百分比（非常喜歡及喜歡）由前測的77.13%大幅上升至後測的97.14%，不喜歡的百分比（不喜歡及非常不喜歡）則由25.7%大幅下降至2.86%。由此可見，在實施「3D　VR虛擬實體眼鏡」方式課堂教學之後，學生問卷的分析結果與學生訪談的結果脗合（附件二），同學1、3、5、6、7及8在訪談中都認為上課是一件有趣的事，並進而樂意參與老師要同學進行的課堂活動，可見「3D　VR虛擬實體眼鏡」方式課堂能有效地提升學生的學習動機。

專心上課方面，實施了新的課堂教學模式之後，中四級學生對「地理科的課堂，我專心上課」的認同感大幅提升。喜歡的百分比前測的80%大幅上升至後測的91.4%，不喜歡的百分比則由19.99%大幅下降至8.6%。由此可見，在實施「3D　VR虛擬實體眼鏡」方式課堂教學之後，學生問卷的分析結果與學生訪談的結果脗合（附件二），同學5、9及11在訪談中都認為課堂變得真實，是一個好的體驗，並專心參與老師要同學進行的課堂活動。同學2更希望長期維持「3D　VR虛擬實體眼鏡」方式課堂教學。學生問卷的分析結果與學生訪談的結果脗合，「3D　VR虛擬實體眼鏡」方式課堂能有效地提升學生的學習動機。

動腦筋解決學習上的疑難方面，實施了「3D VR虛擬實體眼鏡」教學之後，中四級學生對「在地理科的課堂，我愛動腦部筋解決學習上的疑難」的認同感大幅提升。喜歡的百分比由前測的77.16%大幅上升至後測的96.66%，不喜歡的百分比則由34.28%大幅下降至3.4%。由此可見，在實施「3D　VR虛擬實體眼鏡」方式課堂教學之後，大部分中四級學生都認為可在課堂探究尋源，動腦筋解決學習上的疑難，並專心參與老師要同學進行的課堂活動。學生問卷的分析結果與學生訪談的結果脗合，「3D VR虛擬實體眼鏡」方式課堂能有效地提升學生的學習動機。

了解本科知識方面，實施了「3D　VR虛擬實體眼鏡」方式課堂教學之後，中四級學生對「在地理科的課堂，我能了解有哪些主要作用在運作」的認同感大幅提升。喜歡的百分比由前測的85.71%大幅上升至後測的100%，不喜歡的百分比則由14.29%大幅下降至0%。再者對「在地理科的課堂，我能辨別主要形貌」的認同感大幅提升。喜歡的百分比由前測的68.56%大幅上升至後測的100%，不喜歡的百分比則由31.44%大幅下降至0%。而且，對「在地理科的課堂，我能了解主要形貌」的認同感大幅提升。喜歡的百分比由前測的77.13%大幅上升至後測的99.72%，不喜歡的百分比則由22.87%大幅下降至0.28%。由此可見，在實施「3D VR虛擬實體眼鏡」方式課堂教學之後，大部分中四級學生都認為能有助於掌握本科知識。學生問卷的分析結果與學生訪談的結果脗合，「3D　VR虛擬實體眼鏡」方式課堂能有效地提升學生的學習動機（附件三）。

主動學習方面，實施了「3D VR虛擬實體眼鏡」方式課堂教學之後，中四級學生對「我積極參與地理科的學習活動，例如：答問、小組討論及匯報等」的認同感大幅提升。喜歡的百分比由前測的49.39%大幅上升至後測的94.3%，不喜歡的百分比則由50.61%大幅下降至5.7%。再者，對「在課堂內，我會協助我班的同學學習」的認同感大幅提升。喜歡的百分比由前測的59.99%大幅上升至後測的97.14%，不喜歡的百分比則由40.01%大幅下降至2.86%。而且，對「在課堂內，我班同學會協助我學習」的認同感大幅提升。喜歡的百分比由前測的49.39%大幅上升至後測的100%，不喜歡的百分比則由50.61%大幅下降至0%。對「我班同學能互相幫助，互相勉勵」認同感大幅提升。喜歡的百分比由前測的65.71%大幅上升至後測的100%，不喜歡的百分比則由34.29%大幅下降至0%。由此可見，在實施「3D　VR虛擬實體眼鏡」方式課堂教學之後，大部分中四級學生都認為能有助主動學習，並專心參與老師要同學進行的課堂活動。學生問卷的分析結果與學生訪談的結果脗合，「3D VR虛擬實體眼鏡」方式課堂能有效地提升學生的學習動機。

2017年2月初從中四地理科同學中，抽取高、中及低學業成績水平學生各一名，共三名學生所進行的先導訪談中，學生表示教學以「傳統」及「多媒體教學」為主導，教師多數依據教科書教學，而以抄筆記及直接講授為主。學生甚少有課堂參與的機會。更有同學表示由於「對老師及學校都欠歸屬感，以致降低學習動機和課堂參與意欲」，即使有課堂參與的機會

都「不想參與」。簡而言之，學生的課堂參與很低，亦缺乏學習動機。

在2017年5月初再訪談同一批學生，在後續訪談中發現，教師在實施「3D VR虛擬實體眼鏡」方式課堂之後，教學轉變為以學生為本，受訪學生表示在課堂中「協作是常態」，同學亦已「習慣小組教學」。在課堂參與方面，同學認為「3D　VR虛擬實體眼鏡」方式課堂能促使組員「更重視完成學習任務，同學之間會互相合作支援，以參與及順利達成學習目標」，亦認為這種學習模式「較適合」，並引用例子指出「覺得進行模擬考察時有機會多與同學交談，同學亦已經習慣互相支援」。在學習動機方面，同學表示「很喜歡3D　VR虛擬實體眼鏡的教學活動」，並對模擬考察活動留下深刻印象。在學習成效方面，同學表示經歷合作學習活動之外，「對本科內容有更深刻的認識」。所以，學習能提升學習興趣，亦令學生的學業成績有增長的趨勢。

從學生訪談結果分析，實施「3D VR虛擬實體眼鏡」方式課堂能鼓勵教師推動教學範式的轉移，令學生角色由「被動的聆聽者」轉化為「主動的學習者」。受訪同學亦認為合作學習能促進課堂參與和提升學習動機，並對提升學習有一定的成效。

課堂觀察

觀課者總共觀察了四節地理課，透過4節課堂觀察所得，教師所採用的策略主要視乎教學目標和策略的配合而靈活調配。在課堂裡，教師的角色由以往的「知識直接灌輸者」逐漸改變為「輔助學習的促導員」（facilitator），而學生的角色亦漸由被動的接受者（passive learner）逐漸改變為主動學習參與者（active　learner）。整體而言，課堂的教學效果良佳，教師的教學設計大都能提供充足的課堂參與、師生互動和生生互動的機會。

學生的課堂表現與學生訪談、學生問卷及教師問卷的結果脗合。自透過以「3D　VR虛擬實體眼鏡」上課之後，學生在上課時偏離學習的行為減少，而「課前預習」、「小組討論」和「回答問題」，甚至「主動提出問題」的行為有所提升。整體而言，學生的學習動機和態度有明顯的改善。

總結、反思和建議

綜合以上的研究分析，本校透過「3D　VR虛擬實體眼鏡」教學策略，發現中四級地理科學生在改變學習模式後，其學習動機和課堂參與都得到顯著的提升。總結而言，「3D　VR虛擬實體眼鏡」推動「自主」及「合作」學習，對學生的學業成績產生了正面的影響。

在整個研究過程中，本小組發現「3D　VR虛擬實體眼鏡」教學有五大成效。首先，虛擬實景可減少實地考察的時間及人力成本的限制。學生透過眼鏡可走入虛擬世界進行考察，運用這套教材，教師只需到實地拍攝，便可製作出虛擬學習場景短片，並因應教學進度，在不同場景加插問題，讓學生思考，提升教學效能。另外，虛擬實景可增加體驗式學習的機會，使用該教材可增加同學的學習動機，令他們更投入課堂中。再者，提升學生的學習注意力，增強學生意願及學習效率。VR技術不僅可以更高效地輔助教師進行教學，還可以提升學生的學習注意力，增強學生意願及學習效率從而達到學習的效果。學生在課堂上透過VR旅程，隨時可前往世界各地，尤如身歷其境，例如在是次研究中，同學可突破時空限制，透過虛擬探索，前往世界各地不同地域的海岸環境，擴闊學生的世界觀。其次，VR能讓教學從單向到互動學習。使用VR可增加師生互動，激發同學對新技術及題目的學習興趣與研究，從而認識不同景觀，或探究遙遠的人文活動。VR能補多媒體課室的不足，包括增加教師與學生直接交流的機會及推動發現、探究、認識精神。此教學策略亦能達到「教學相長」。VR在「教」過程中的最大作用是輔助教師對於知識和難點的講解，亦令講授範圍得以擴大，不再局限於平面上。最後，在「學」中主要是提高學生的興趣和參與程度，讓學生更主動地學習吸收知識，亦有學生提出更深入的問題。

當然，在整個研究過程中，本研究小組亦面對不少的困難和挑戰，包括：

1. 研究小組需要在學校忙碌的工作之中抽時間收集、整理及分析研究數據和撰寫研究報告，這是相當奢侈的行為，故建議學校盡可能在人力資源方面作出支援，例如調動教學助理協助收集研究資料及處理研究數據。

2. 當同學配上「3D VR虛擬實體眼鏡」，漸漸接近「自我封閉」，同學趨向自我探索，缺乏和老師的互動。
3. 對於大多數學校來說，使用「3D VR虛擬實體眼鏡」需要進行合理的投資。教師將需要進行培訓，以確保教師能夠輕鬆地運用VR眼鏡，並需要一套課堂設備，以及技術人員的支援。
4. 在技術層面：因VR 技術是一種新技術，部份同學可能會產生頭暈或噁心等情況。為免發生意外，在上課前，必須肯定學生經已安坐，才可使用VR虛擬實體眼鏡。此外，下載3D VR虛擬實體眼鏡課所需的軟件需時，建議學生在課堂前已將軟件備妥，可盡量利用課堂時間進行探索。再者，在進行「3D VR虛擬實體眼鏡」課堂模式時，流動電話的溫度會較正常為高，要小心留意保護電話及學生。

教師意見

綜合教師意見調查結果（附件四），可見於課堂應用「3D VR虛擬實體眼鏡」教學策略有助提升學生的學習興趣和投入程度。原因可能是老師在設計應用「3D VR虛擬實體眼鏡」教學策略的活動時，能打破一般課堂以老師為主導的教學模式，轉而以學生為中心的教學模式，讓學生透過互動進行學習。此舉不但為學生提供較生動的學習情景，同學亦可透過以「互動」原則設計的課堂活動，激發同學主動學習，間接提升學生的學習興趣和投入感。

建議

綜合能否提升學生學習地理科的效能，成敗建基於教學模式的轉變，學生能提升其學習效能，但不能忽略支持課程的資料供應。於3D VR虛擬世界，老師不能「自由」增添虛擬考察，或只能依舊使用現有的選擇，是否能滿足本地課程的需要。

若老師/學生能掌握技術，自行根據課程需求，訂制適用於「3D VR虛擬實體眼鏡」的教材，在那裡可以使用自己的360圖像（或其他人拍攝的圖像），將它們合併，並使用簡單工具 — 3D VR虛擬實體眼鏡。同時，「3D VR虛擬實體眼鏡」可大量使用，提升學生的自主學習和學習效能。這便是VR課堂技術的關鍵優勢。

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附件一 學生問卷

地理科行動研究2017
問卷調查
中四級___中 / 英_____　　日期：_____

各位同學： 請根據個人情況，回答下列題目，在適當的方格內加上「✓」。		喜歡程度（4分為最高）			
		4	3	2	1
		非常同意	同意	不同意	非常不同意
1	我喜歡地理科				
2	在地理科的課堂，我專心上課				
3	在地理科的課堂，我愛動腦部筋解決學習上的疑難				
4	在地理科的課堂，我能了解有哪些主要作用在運作				
5	在地理科的課堂，我能辨別主要形貌				
6	在地理科的課堂，我能了解主要形貌				
7	我積極參與地理科的學習活動，例如：答問、小組討論及匯報等				
8	在課堂內，我會協助我班的同學學習				
9	在課堂內，我班同學會協助我學習				
10	我班同學能互相幫助，互相勉勵				

其他意見：_____

附件二　實施「3D VR 虛擬實體眼鏡」方式課堂前後之學生訪談

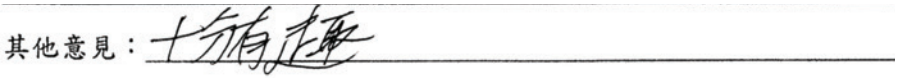
目的：	了解中四級同學在地理科的學習現況 (1) 同學對地理科的喜歡程度 (2) 同學對專心上課方面 (3) 同學動腦筋解決學習上的疑難方面 (4) 同學了解本科知識方面 (5) 同學在主動學習方面
訪問安排：	從中四地理科同學中，抽取高、中及低學業成績水平學生各一名，共三名學生所進行的先導訪談

主要問題：

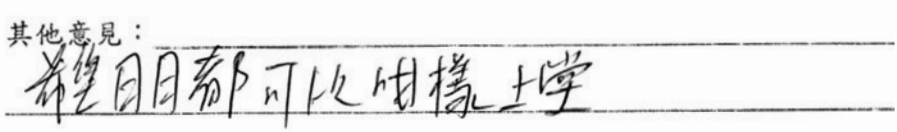
1. 現時的地理課堂的上課情況是怎麼樣的？
2. 現時的地理課堂環境是怎麼樣的？
3. 現時的老師通常是使用甚麼教學策略？
4. 現時的地理課堂有沒有小組討論？
5. 現時的地理課堂有讓你們每個人都參與課堂活動？
6. 現時的地理課堂中印象最深刻的活動是甚麼？
7. 現時地理課堂學習的觀感（1 – 5 分）以5分為最高？
8. 有多大的盼望想參與地理課堂活動？
9. 有甚麼具體活動建議給老師去改善同學的課堂參與？

同學在後測問卷的回應

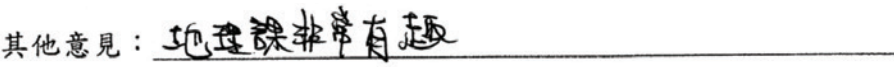
同學1



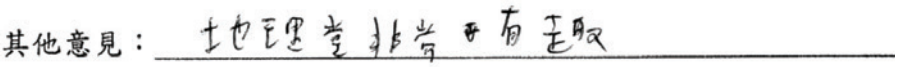
同學2



同學3



同學4



同學5

其他意見：VR非常有趣，非常真實

同學6

其他意見：好有趣，日日要帶住VR上堂..

同學7

其他意見：好很有趣

同學8

其他意見：~~十有~~ 十分有趣，功課要彩色、不要黑白！

同學9

其他意見：好值買，有趣，

同學10

其他意見：有資金去考察。VR有興趣

同學11

其他意見：Good，有體驗，有趣

同學12

其他意見：希望有多些的VR活動。

附件三　實施「3D VR 虛擬實體眼鏡」方式課堂之地理課堂剪影

附件四　實施「3D VR 虛擬實體眼鏡」方式課堂計劃之教師意見調查

一、教學成效評估

	同意	不同意
採用「3D VR 虛擬實體眼鏡」方式課堂之後，學生的課堂參與有提升。	☐	☐
採用「3D VR 虛擬實體眼鏡」方式課堂之後，學生學習動機有提升。	☐	☐
採用「3D VR 虛擬實體眼鏡」方式課堂之後，學生的整體學習成效有提升。	☐	☐

二、對「3D VR 虛擬實體眼鏡」方式課堂的觀感

我的觀感是：_____

我覺得有困難／需要學校支援的是：_____

透過議題探究提升學生的解難能力

潘秀雯、郭燕芳、黃文朗

摘要

香港近年教育的發展方向以培養學生知識、技能、態度為主要趨勢（課程發展議會，2002）。通識教育科的發展，正是配合現今社會學習的需求。通識教育科嶄新學習方法，就正讓年輕一代學會怎樣面對這個日新月異社會中的各種挑戰。通識教育的理念、新的教學方法以及評核的機制，均對現今中學的課程架構帶來前所未有的改變。為更深入了解通識教育科的課程特色，就此，本研究旨在透過研究通識教育科着重的教學策略—議題探究法，是否能夠提升學生的解難能力。

鑑於現時學生慣於單向性的學習模式，難以把學會的能力遷移到其他學習層面上，令學習效果降低。有見及此，是次研究就是透過中二通識課程中一個單元—中國社會，當中一項具爭議性的議題讓學生進行分析、討論，最後得出結論。探究議題就是「應否全面取消中國計劃生育政策？」，期望學生能提升他們的解難能力。

簡介

不少學者認為，以往香港學生的學習模式都是欠靈活、單向式，學生都是被動知識接收者。趙志成及麥君榮（2006）表示：「香港的學生一直受總結性考試主導，填鴨式教育的薰陶，其學習習慣及學習意識（多做抄寫式家課及選擇填充及短答式考試)等與課程文件要求學生有自主學習、有批判式思維的建構觀念相差極遠」（頁6）。學生面對千篇一律的模式，面對不同的困難，實難以解決。故此，學生應透過一些能力導向的訓練，建構不同的學習能力，以及培養正確積極的學習態度，成為自主學習者。

根據生活與社會課程指引（2010），初中人文學科提供基礎知識、概念和視角，來幫助學生達成本學習領域課程指引中列明的學習目標。本校為加強初中人文學科與高中通識教育科之銜接，特設初中通識教育科，並採用議題探究的學與教模式，培養學生獨立思考以探求知識，讓學生

充份掌握共通能力。是次研究就是運用議題探究的策略，幫助學生全面地了解議題，掌握相關事實，分析問題的核心，以客觀持平的觀點作出合理的判斷，讓問題順利解決，亦能夠訓練學生共通能力中的解難能力，體驗通識教育科培養思考習慣的重點。鄭漢文（2004）認為，通識教育科的基本精神就是「好問」，體現學生學會「議題探究方法」，成為自主學習者。

本校學生過去習慣於單向性的學習模式，依賴性強，教師講解的知識，學生多是生吞活剝，強記硬背，未能融會貫通。有違現今學會學習、終身學習的理念。因此，這次研究就是嘗試運用新穎的教與學方法，讓學生建構有助他們學習的能力。本研究透過探討相關社會議題（中國計劃生育的人口政策應否全面取消），提升學生對此議的解難能力。課堂上讓學生探討不同的社會處境—中國人口趨勢以及計劃生育有關問題，從這次議題探究學習經驗培養他們成為具備解難能力的人。於實驗課堂中，研究員先幫助學生回顧已有知識，然後要求學生探究問題、考慮正反利弊、表明立場及理據。而是此研究將透過同儕觀課、學生課堂表現、學生問卷及研究員會議去評價研究成效。

研究背景

是次研究透過議題探究的方式作切入點，讓學生於特定的社會情景，要他們討論有關的議題，即於中國於現今人口問題下，探討中國計劃生育的人口政策應否全面取消。教學中加入議題探究的教學策略，讓學生掌握議題探究的特點，勇於表達意見，並了解、分析及衡量當中建議的優缺點，從而找出有效的解決方法，藉以提升他們的解難能力。

是次研究對象為中二級兩班學生（2A及2B），共55人。中二級的編班制度中，2A班為精英班，為全級考試成績首29名，能力較佳，共29人。2B班為普通班，以混合能力分班，共26人，當中有一名有特殊學習需要的學生。因此，2A班於各範疇的能力表現，理應比其他班別突出。是次研究的首席研究員是2A班的通識科任老師及初中通識科老師，其中一名研究員則是2B班的科任老師，另一名研究員是另一班普通班的科任老師。首席研究員負責計劃、統籌及分析整個計劃。另外兩名研究員負責數據收集、實行及分析計劃。

本校初中通識科多以建構基礎知識為主，學生仍未能熟習運用各項思考方法。就算早前已學會的能力，在另一種情境下，就不懂得運用出來了，這都是未能熟習運用各種學習技巧的現象。此外，學生大多依賴被動，流於抄寫模式，這是與通識科背道而馳的方式。相對而言，2A學生理解力較佳，頗用心學習，有部份學生願意主動尋找資料；2B學生學習能力及動機較弱，多等待教師的答案就算，不肯主動去學習。

這次議題探究共需要每班各兩課節，兩班都會於同一星期進行。為照顧學習多樣性及預計實行時遇到的困難，2A班先進行議題探究的教學，讓普通班的研究員能參考及以此調適課程。2A班開展課堂時，2B班科任教師及其餘一位同級通識教師會作為課堂觀察者。當2B開始課堂，其餘教師則作為觀察者。因為2A班會先進行並完成課堂教學，一發現教學設計有何不足，教師會作出修訂，再於2B班進行教學，因此，當中的教學設計可能會有少許不同。

研究方法及問題

是次研究運用李子建（2008）的「4-P模式」去促進教師專業發展。4-P是指澄清問題、計劃、計劃行動及進展評鑑。於澄清問題階段，研究員應明確理論及確定研究問題。在計劃階段，研究員應解決問題或改善情境的具體行動步驟。實行計劃後，研究員可作進展評鑑。

澄清問題

是次研究的問題如下：

1. 議題探究是否能於初中通識教育課堂中引起不同學習能力學生的學習興趣？
2. 議題探究是否能於初中通識教育課堂中提升學生的解難能力？

文獻析評

Evans，Newmann and Sax（1996）提出，以議題探究教學模式側重於學生分析及評論具爭議性的問題，這個問題是沒有結論的，亦沒有「正確」的答案。議題探究教學模式是根據不斷的推論，深思熟慮的研究，得出有理據支持，超越真理的觀念。最後議題探究能讓學生於社會中增強自己的力量，幫助他們解決生活中會遇到的問題，以及為個人和社會建構道德基礎。通識教育科所採用的「議題探究」法，便是由學生自己發現問題，並在搜集、參考不同來源的資料和意見後，反思個人對問題的見解，提出建議或解決問題的過程。在議題探究的過程中，學生可以了解不同人士（例如：政府、民間團體、父母、青少年等）對議題的看法，從不同角度（例如：經濟、文化、科學等）了解議題，學習尊重證據、持開放態度處理不同觀點，以及確立自己對不同議題的看法。

議題探究很大程度上建基於活動為本的教學模式。Hahn（1996）指出，議題探究中的知識是不斷變更，這是由於社會上的議題日新月異，所以在建構知識的教學過程中，教師需要建立有利於學生探究的真實情境任務及問題為本的設計。假如欠缺了這個學習情境，偏離現實情況，不管教學步驟有多仔細，學習成效都會事倍功半。要有效實踐議題探究，需要一個具探究性、開放討論和意見表達的環境。議題探究必須建基於師生間互動的基礎，由教師規劃搭建鷹架，讓學生從活動、交流、探究中掌握基本技能及知識，引發學生自主建構學習的動機、信心與情緒。而且，實踐議題探究亦需要真實的議題情境，而情境本身往往涉及不同的層面或系統，所以學生必須運用跨系統思考，才能宏觀地審視整個社會生態環境，多角度地掌握議題的核心或爭議點。

課程發展議會指出議題探究在通識教育科上是十分重要的。通識教育科旨在透過探究各類議題以擴闊學生的知識基礎，加強學生的社會觸覺（課程發展議會與香港考試及評核局，2007）。採用議題探究的教與學方法，鼓勵學生獨立學習以追求知識。透過探究與本課程主題相關的議題，學生可學習找出不同主題和學科之間的聯繫，以及了解知識的複雜內涵和組織。議題探究的教學是讓學生發展解難能力不可或缺的一個教學策略。要培育學生的解難能力，就要從新思維模式出發，讓學生勤於思考、用想像力去踏進另一領域。這正就是要透過議題探究的學習環

境，讓學生運用、建構解難能力。傳統課堂教學的主動權一般掌握在教師手中，教師只管問，學生只管答，思維便局限於狹小的空間裡。學生缺少質疑及思考的時間，只能養成單一的線性思維方式，形成照本宣科的習慣（今日校園，2014，185期）。這樣的教學方法令學生既不能培養獨立思考能力，自主解決困難的能力亦談不上了。

研究設計

評估課堂效能方面，是次行動研究運用了多方面的評核方法，包括：課堂觀察、問卷調查、習作評核，讓議題探究教學有較客觀的檢討。進行議題探究課堂之前，參與研究員先進行課前會議，確保兩班學生的教學進度一致，並同意及澄清研究問題，亦討論及確立研究課教案。課堂進行時，教師會對教學的流程、學生的反應多加留意。完成課堂後，研究員會分析學生作品（附件一），而學生亦會完成一份課堂問卷（附件二），從中可得知學生對運用議題探究的方法對他們是否有效，是否喜歡這種教學策略，並且可以知悉議題探究能否協助學生建構他們的解難能力。另外，研究員於每次研究課後亦會進行課後會議，檢討課堂成效。

兩班學生於研究前已初步了解中國計劃生育政策的意義。完成兩節議題探究課堂後，學生應該能夠分辨到計劃生育所引起的社會問題，以及應否全面放寬計劃生育政策這個具爭議性的議題。第一節課堂開展，教師會引導學生運用圖片，找出中國計劃生育政策引起的社會問題。當中透過小組討論，學生進行判斷、篩選，明白到計劃生育政策導致的種種問題。第二節課堂開展，學生就着這些問題，再進行討論－應否全面取消中國計劃生育政策？學生要思考及分析計劃生育政策的理念，探討這個解決人口增長方法的好處及壞處，與組員討論及互相聽取意見，最後得出結論，再把組內意見向全班滙報。當各組進行滙報時，班內各組亦會把自己及其他組別的意見作分析、比較，鞏固自己所學。這就是建立高層次思維和培養獨立解決問題的能力。

計劃行動及成效

2A及2B班的討論活動因應他們的學習能力而作出調整。2A班進行議題探究課堂時，不同的組別會根據不同的持份者進行討論，因此對應否全面取消計劃生育政策的理據都是從既有的持份者角度作分析。教師觀察

所得，學生可能對持份者的想法不太熟悉，所以當分析他們應有的意見時會有阻礙，需要教師從旁提點，才能完成討論，此乃意料不及之事。然而，學生於課堂期間的表現較平時用心積極，教師亦能從學生的反應得知他們對議題的了解程度。另外，學生作品亦顯示他們基本上能了解、分析議題及作出建議（附件一）。

於課後會議期間，研究員都認為2A班能力比較高的學生討論時尚且遇到困難，當2B班同樣進行時，困難就更加大了。於是，研究員決定不需要2B班學生就不同持份者意見進行分析，只就自己的意見表達出來即可。學生於課堂中的反應顯示，其實兩種學習過程都不太會影響訓練學生的解難能力。

完成兩節議題探究課堂後，學生填寫有關問卷。問卷回收率達100%，結果分析參考附件二。比較2A班及2B班學生對議題探究教學法的觀感，可見2A班所顯示的百分比較2B班為高。超過70%2A班學生喜歡於通識課堂使用議題探究法（題1）、議題探究法令他們學懂怎樣運用解難能力（題2）、議題探究中的議題引起他們的學習興趣（題3）、議題探究創造了一個靈活的學習環境，可幫助他們學習怎樣運用解難能力（題4）、議題探究中鼓勵多角度思考，能令他們全面掌握問題，有效解決困難（題6）、透過運用議題探究的教學方法，能提升他們的解難能力（題8）。由此可以證明，大部份2A班學生都認為議題探究這課堂策略，能幫助他們學會解難能力。2B班學生對這次議題探究教學的觀感，超過70%的只有兩項。議題探究創造了一個活動的學習環境，可幫助他們學習怎樣運用解難能力（題4）、透過議題探究的教學策略，幫助他們理解中國實施計劃生育政策的意義（題7）都可看出，運用議題探究可以幫助他們學習如何解決困難。

相對來說，2A班學生對議題探究的觀感，其中有兩項選擇不同意的百分比較高。他們認為議題探究課堂中，分析及討論同學的意見並未能幫助他們理解計劃生育政策的意義（題7）、運用議題探究法不能幫助他們提升解難能力（題8）。這可以反應出，2A班討論的時候，要根據不同的持份者表達特定的建議，是他們困惑的地方，在這種概念並不清晰的環境下，向組員作出提問及回應是很艱鉅的工作。2B班學生回答此題目3（未能令他們學習如何回應及提問），表示不同意的人數百分比反而較2A低。因為當2B班進行議題探究討論時，不需要有持份者身份限制，不

用先解讀持份者應有的立場，他們只要表達自己的意見即可，思維沒有被窒礙，是讓學生容易完成任務的因素。

研究員隨堂觀察，以及問卷調查得出結論均認為，是次議題探究能訓練學生的解難能力。研究員觀察課堂進行時，學生能辨別問題的重點，明白要討論應否全面取消中國計劃生育，探索可行的策略，若果取消計劃生育會帶來的好、壞處，保留政策的優、缺點，評估和回顧策略的推行和效能。學生要向全班同學滙報，同學都留心聆聽匯報組別的立場，以及其理據。學生向滙報組別發問，當中可見思維建構的過程。學生討論的過程和結果，展示於課堂討論工作紙上。當中就爭議性情境，激發學生好奇和探新的動機，激活他們的思維，開闊思路。由教師提出多項有創意的問題，然後師生協力尋找解決問題的多種方法，從而培養創新解難能力。

進展評鑑

議題探究是新穎的方法，讓學生建構解難能力的有效教學策略。研究員選取一些具爭議性的社會議題為課程的教學探究內容，要求學生分析及評論有關議題。課程並不着重有對或錯的答案，而是處理這個議題當中的過程。透過這種有意義的學習經歷，學生判別當中的自信，了解其因果關係，評估有關方法的成效，引導學生思考解決議題方法的可行性，經過深思熟慮的考量，最後得出有充分理由的解決方案，整個過程都是能夠令到學生促進其解難及決策能力的發展。楊思賢、林德成、梁偉倫、羅耀珍（2013）引述杜威於1916年所述，認為現實環境不斷改變，指着眼於一套固定的知識，用處不大。杜威認為，學校是一個民主社會的縮影，學生應在當中學習來日生活所需的所有技能，包括解難能力、科學化的學習方法及與人合作的技巧等。

通識科課堂會多運用小組討論作課題探究的教學方法，以學習者為中心，教師協助學生建構各種技能。「在很多班級裏，同伴關係強烈支持用一種創造性的氣氛去提升教與學的效果。」（Schmuck R. & Schmuck P.，2001；廖珊、郭建鵬譯，2006，頁31）因此，小組討論進行時，各組員共同解決不同的議題，互相交流、互相提點，都是有效提升學生發展解難能力的效果。楊思賢、林德成、梁偉倫、羅耀珍（2013）表示：

「有正面的人際關係及互動、舒適、有秩序，學生在其中能獲得他人的欣賞、認同、尊重及支持等，都是良好的學習環境的要素。在這種環境下，學習才會達到最佳效果」（頁98）。由此可見，透過小組討論，學習的主導權歸於學生，學生在組內互相交流，令他們培訓解難能力的效果事半功倍。

在議題探究的學與教模式中，探討議題往往是取材自生活化的例子，讓學生更投入為這些社會議題提供建議及解決方法。議題為本的課堂設計，並不是紙上談兵，要給予學生特定的情景，才能讓他們容易訓練各種思維。因此，是次議題探究需要學生探討中國計劃生育的意義，都是一個特設的社會環境，讓學生更能投入這種設置的體驗，發揮他們的解難技巧。「學生們通過問題情境探究並學習如何處理人類關係問題。通過這種途徑，學生們可以學習情感、態度、價值觀念及解決問題的策略」（Joyce，Weil and Calhoun，2000；荊建華譯，2002，頁69）。培養學生的思考習慣、解難能力，首要條件是先要有基礎概念知識。鄭漢文（2004）認為通識教育科可分為態度（Attitude）、能力（Skill）及知識（Knowledge）三種取向。當這次議題探究課堂進行時，學生多集中進行分析討論，但基礎知識如不同持份者特有的概念往往被受忽略。造成了2A班未能明白不同持份者的特質，未能確切分析他們的想法。正如曾榮光（2006）所言，「堅實的相關知識是任何『議題探究』教學以致通識教育的必要條件。因此，應為高中通識教育及有關的『探究議題』建構堅實的知識基礎，使議題探究與討論不致於泛泛而談」（頁17）。建構解難能力，知識的累積、概念的澄清，都是一個先決條件。由此可見，初中通識既然是作為高中通識科的準備，那就先要加強知識的傳授及建構，才能作一連串能力的培訓。

總結

單向的技能培訓未必符合社會發展需要，未來需要多元化及具備多角度創作思維的人才，解難培育更會是學生發展獨立思維的一個重要元素。通識教育科是一種思想的培養，而學習者也需要一定的技能，包括對邏輯思考與探索研究方法（曾榮光，2006）。因此，若能培養學生思想習慣，讓他們樂於探究各類議題，學生的知識基礎就能擴闊，亦能加強他們對社會的敏感度。透過通識教育科的學習經歷，訓練學生的解難能力，幫助他們成為終身學習者，迎接未來的種種挑戰。

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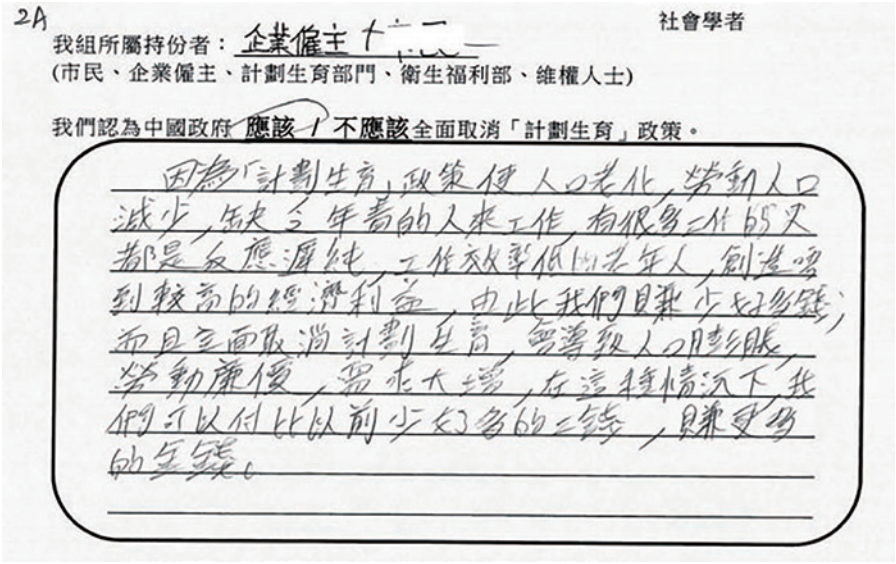
附件一 學生作品



2A 社會學者

我組所屬持份者：企業僱主 十二一

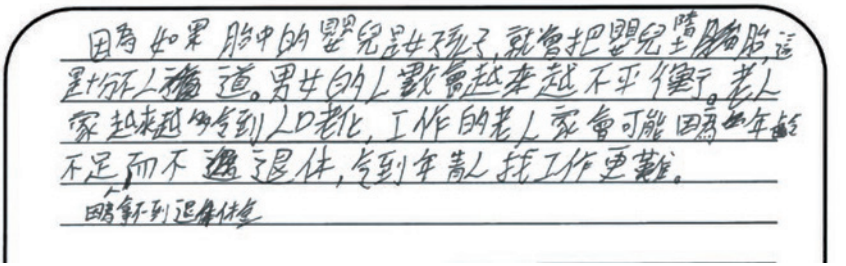
(市民、企業僱主、計劃生育部門、衛生福利部、維權人士)

我們認為中國政府 應該 / 不應該 全面取消「計劃生育」政策。

因為「計劃生育」政策使人口老化，勞動人口減少，缺乏年青的人來工作，有很多工作的人都是負擔純工作效率低的老年人，創造唔到較高的經濟利益，由此我們賺少好多錢，而且全面取消計劃生育，會導致人口膨脹，勞動廉價，需求大增，在這種情況下，我們可以付比以前少好多的工錢，賺更多的金錢。

2B

我們認為中國政府 (應該) / 不應該 全面取消「計劃生育」政策。



附件二 問卷結果

2A班問卷分析

你有多認同以下各項是你在通識課堂運用議題探究的情況？		同意程度%				
		非常不同意	不同意	中立	同意	非常同意
1	我喜歡於通識課堂使用議題探究法。	0	3.5	13.8	41.4	41.4
2	議題探究法令我學懂怎樣運用解難能力。	0	3.5	17.2	51.7	27.6
3	議題探究中的議題引起我的學習興趣。	0	6.9	20.7	55.2	17.2
4	議題探究創造了一個互動的學習環境，可幫助我學習怎樣運用解難能力。	0	3.5	17.2	44.8	34.5
5	議題探究中的情景，令我更能專注投入解決當中出現的問題。	0	3.5	20.7	34.5	41.4
6	議題探究中鼓勵多角度思考，能令我更全面掌握問題，有效解決困難。	6.9	0	24.1	44.8	24.1
7	透過議題探究的教學策略，幫助我理解中國實施計劃生育政策的意義。	3.5	6.9	27.6	41.4	20.7
8	透過運用議題探究的教學方法，能幫助我提升解難能力。	3.5	6.9	17.2	37.9	34.5

2B班問卷分析

你有多認同以下各項是你在通識課堂運用議題探究的情況？		同意程度%				
		非常不同意	不同意	中立	同意	非常同意
1	我喜歡於通識課堂使用議題探究法。	7.7	11.5	26.9	30.8	23.1
2	議題探究法令我學懂怎樣運用解難能力。	11.5	7.7	30.8	26.9	23.1
3	議題探究中的議題引起我的學習興趣。	7.7	7.7	23.1	38.5	23.1
4	議題探究創造了一個互動的學習環境，可幫助我學習怎樣運用解難能力。	3.9	7.7	19.2	46.2	23.1
5	議題探究中的情景，令我更能專注投入解決當中出現的問題。	3.9	7.7	23.1	30.8	34.6
6	議題探究中鼓勵多角度思考，能令我更全面掌握問題，有效解決困難。	7.7	7.7	26.9	30.8	26.9
7	透過議題探究的教學策略，幫助我理解中國實施計劃生育政策的意義。	3.9	3.9	19.2	34.6	38.5
8	透過運用議題探究的教學方法，能幫助我提升解難能力。	11.5	7.7	30.8	30.8	19.2

書　　名：Journal of Action Research 2017
出　　版：香海正覺蓮社佛教梁植偉中學
版　　次：2017年11月
國際書號：978-988-78482-8-8

ISBN 978-988-78482-8-8

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