Quasi-Experimental Research into the Effects of an International Collaboration Project on Hong Kong Secondary School Students’ Learning Motivation

Patrick Hak-Chung Lam
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Patrick Hak-Chung Lam, Shatin Tsung Tsin School, Hong Kong

Abstract: The aim of international collaboration programme (ICP) with the use of Web 2.0 technologies including Knowledge Forum, Slide, Wiki, Google Documents and some others is to raise learning motivation of a group of students in Hong Kong. Learning motivation is assessed in this 6-month quasi-experimental research study. The ICP includes international collaboration project work amongst 40 Grade 8 students of Hong Kong and Barcelona. Learning motivation is compared between the experimental group and the control group in Hong Kong, with the use of Collaborative Inquiry-based Project Questionnaire (Chow and Law, 2005). The control group includes 20 randomly selected students while the intervention group contains 20 ICP participating students. Focus group interviews with programme students and teacher are also conducted. Secondary data collection includes a collection of students’ online reflective journals. Findings, implications and recommendations are further discussed in the last section of the paper.

Keywords: Learning Motivation, International Collaboration, Quasi-Experimental Research, Web 2.0 Technologies

Introduction

Learning motivation has been an important issue in the field of education. Learning motivation can be raised by the use of Web 2.0 technologies (Blees & Rittberger, 2009). It is believed that open-ended inquiry mode of learning helps to raise students’ learning motivation (Chow & Law, 2005; Dede, et al., 2005). This paper attempts to illustrate how an international collaboration programme (ICP) with the use of Web 2.0 technologies, including Knowledge Forum, Slide, Wiki, Google Documents and some others, is organized to raise learning motivation of a group of students in Hong Kong. The ICP includes international collaboration project work amongst 40 Grade 8 students of Hong Kong and Barcelona. Their learning motivation is measured with Collaborative Inquiry-based Project Questionnaire (Chow and Law, 2005) between the experimental group and control group. Focus group interviews with programme students and teachers as well as students’ online reflective journals are also studied.

Literature Review

Learning Motivation and Inquiry Learning

Motivation refers to the inner psychological process that provides direction and vigor for a behaviour (Reeve, 1996). The self-determination theory focuses on how to support human natural tendencies to learn. It suggests that all humans are motivated when their three basic
needs, namely relatedness, competence and autonomy, are fulfilled. Chow and Law (2005) argue that the mode of collaborative inquiry-based learning help raise learning motivation. They developed an instrument called *Collaborative Inquiry-based Project Questionnaire* to investigate the impact of the changes from the learning of well-defined content to open-ended inquiry and from individual learning to group-based learning on learning motivation.

**Web 2.0 Technologies**

Web 2.0 technologies, with their popularity over the past few years, provided a lot of opportunities to reshaped the educational goal (O’Reilly, 2005). A lot of innovative pedagogies with these web applications have been designed and implemented. A lot of studies show that Web 2.0 applications can motivate students by creating a creative, self-regulatory, challenging and stimulating learning environment (Barlow, 2008; Chang 2005; Keller, 2008; Wang and Reeves, 2006).

Alm (2006) furthers that Web 2.0 technologies are able to motivate students by supporting the basic human needs of relatedness, competence and autonomy. Web 2.0 applications connect learners in a minimum distance. Teachers and students are able to interact regardless time and space. Within this borderless collaborative environment, the need of relatedness can be fulfilled. Besides, concerning the needs of competence, learners are challenged optimally in Web 2.0 environment because of its user-friendliness, abundant on-line materials, customization functionality and efficient feedback process. Finally, as Web 2.0 allows learners to generate their own learning content, a full autonomy is given in the learning process.

Another great opportunity of Web 2.0 environment is global classroom. With practical case studies, Boss and Krauss (2007) and Wan and Lam (2009) explain that students are motivated in the cyber environment in which they are actively interacting and collaborating with students in the community or that across the national border.

**Background of the Study**

The international collaboration project was known as “*World Healer*” which was organized from November 2008 to April 2009 as a pull-out extended learning programme of Liberal Studies at Grade 8. There were various learning objectives. First, students were able to acquire the concepts of ecological footprint. They were expected to develop ICT competencies and 4Cs (creativity, communication, collaboration and critical thinking skills). Moreover, through inquiring the global issues and exchanging ideas with international students, the students were able to develop the sense of global citizenship. The students were selected to participate in the course in order to increase their learning motivation.

The 20 participants (two withdrew from the programme in mid-way due to time conflict with another remedial class) were selected by the school in accordance with their low learning motivation across subjects. The author was the major instructor who was a principal of another school. Two other in-service teachers were observers. The class was held once a week for 90 minutes. This programme was synchronized at two schools in Hong Kong and Barcelona as it was an international collaboration project, whereas English is used as a second language and all the learning activities were conducted in the same way. The programme
was a part of the formal curriculum in Barcelona while it was a pull-out programme in Hong Kong. A number of Web 2.0 technologies were integrated in the learning journey.

At the preparatory stage, in order to facilitate international collaboration, in November 2008, the students sent souvenirs to their overseas partners. Afterwards, the Barcelona Corner and Hong Kong Corner were set up at the Hong Kong and Barcelona schools respectively. A Wiki (http://worldhealer.wikispaces.com) was established for collaborative planning, sharing progress and keeping hyperlinks of student assignment. The Wiki contained the course outline, theme song, school introduction, lesson materials, lesson plans, all students’ works as well as the episode and reflection of the two video conferences.

The second stage was the inquiry of ecological footprint. In late November 2009, each student completed his or her own on-day life documentation. They presented their own life routines by using Slide (http://www.slide.com) and share them at the Wiki. Afterwards, the students were divided into groups of four to examine their ecological footprint by using an online survey known as “Zerofootprint KidsCalculator” (http://www.zerofootprintkids.com/kids_home.aspx). With different life-styles between the countries and amongst the group, diverse findings were obtained and summarized in the Wiki. A video conference was organized on 13 January 2009. With using Skype, the students introduced their schools and cities, explained their ecological footprint findings and examined indigenous environmental issues.

The third stage, from February to March 2009, was the knowledge building stage. With reviewing their own life documentation and previous ecological footprint surveys, the students should develop a sustainable life-style collaboratively. All Barcelona and Hong Kong students constructed their knowledge in a common database on the Knowledge Forum (KF). KF is an on-line collaborative knowledge building platform developed by The University of Toronto and supported by The University of Hong Kong in this project. The students spontaneously came up with a wide range of topics, including transportation, housing, consumption and diet and discussed in detail. The students were also asked to finish a weekly reflection in Google Documents (Form). It reinforced good practices and their strengths in the previous week as well as helped them plan the week ahead.

Stage four was the consolidation stage. In April 2009, the students reviewed all the notes on the Knowledge Forum and designed their ideal sustainable life-style. They presented their individual project in form of either an interactive poster (http://www.glogster.com) or an e-book (http://issuu.com). A video conference was organized on 28 April 2009. With using VIA, a video-conferencing software, the students shared the local current environmental issues and explained their own sustainable life-style. Four outstanding students were selected and sponsored to participate in a study tour to Barcelona from 26 June to 6 July 2009 in order to extend the cultural exchange experiences.

Research Methodology

Research Questions and Hypothesis

In the present study, the following research questions were pursued. First, we examined the effectiveness of the programme World Healer that adopts Web 2.0 technologies and international collaboration in fostering motivation. On the basis of the results of previous studies
in the literature, it was expected this approach to be effective in enhancing motivational aspects. In particular, we formulated the following hypotheses ($H$):

$$H:$$ The programme *World Healer* is able to increase students’ learning motivation.

**Research Methods**

To answer the above research questions, quasi-experimental approach was used to discover the causal relationship between the use of Web 2.0 technologies with international collaboration in the programme known as *World Healer* and students’ motivation. The programme is an independent variable while students’ learning motivation is the dependent variable. With reference to the literature, as the hypothesis, the programme *World Healer* is able to raise students’ learning motivation.

There were experimental group and control group. The participants of the experimental group included 20 students attending *World Healer*. They were selected by the school because they were considered as low-motivated students. Two of them withdrew in the middle of the course unfortunately due to time conflict with another remedial class. Another 20 students at the same year level (four from each class) were randomly selected as the control group. This group was considered as the average in terms of learning motivation. They had not attended *World Healer*. In early May 2009, both groups were asked to complete the *Collaborative Inquiry-based Project Questionnaire* (CIPQ) (Chow and Law, 2005) to collect the data about students’ self-efficacy of learning, purpose of learning, and perceptions of class work and group project work. *CIPQ* is of high reliability and validity. *Collaborative Inquiry-based Project Questionnaire* (Chow and Law, 2005) was used. The former group referenced to the programme *World Healer* while the later one referenced to Liberal Studies when these two groups of students were completing the questionnaire. The questionnaire contained 40 questions. The first 20 questions, as Part I, focused on the students’ self-efficacy of learning. The questions were at a 7-point scale, ranging from 1 (not confident at all) to 7 (very confident). The second part focused on purpose of learning (4 questions), class work (4 questions) and group project work (12 questions). The questions were also at a 7-point scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

Focus group interviews were organized with the experimental groups and a *World Healer* observing teacher. Two student focus groups of a total of 8 students (44.44% of the total number of participating students) were invited for one-hour semi-structured interviews with semi-structured interview guidelines. They were randomly selected by one of the observing teachers. The interviews focused on their learning experiences and perception of *World Healer*. It also explored how the pull-out course differed from their normal Liberal Studies lessons, and explored if their motivation varied. There were two teacher observers. One of them who attended all sessions actively was invited for an individual interview. He also taught the formal curriculum Liberal Studies to some of them. It aimed to discover if the students were motivated by *World Healer*. The questionnaire and interviews served as the primary data.

Secondary data were also collected for triangulation. Secondary data included the students’ assignment, final projects and students’ reflective journal entries. Data analysis was carried out with the following procedures. Statistical data from the questionnaire were processed with the use of SPSS package. Moreover, all focus group interviews were transcribed by the
researcher and verified by another experienced researcher. Each interviewee was renamed as a number. Qualitative analysis was conducted through coding the raw data. During the process, the interviews were colour-coded and grouped into themes and issues that were numbered and generated. Each code was supported by typical and representative quotes. These data were thereafter analyzed with the secondary data mentioned above. The statistical data should be analyzed and interpreted with special care because the student nature of the experimental group and that of the control group was fundamentally different in this research. The experimental group was considered as low motivation group while the control group was at average in terms of motivation. Without the treatment (the programme World Healer), the control group theoretically obtained much lower scores than the experimental group. Therefore, it was assumed that the motivation of the experimental group increased even if both groups obtained similar scores in the questionnaire. If the experimental group obtained higher scores than the control group, the treatment would be considered as very effective to increase their motivation.

Findings and Discussion

Questionnaire

In CIPQ, Part One contained 20 questions about students’ self-efficacy in learning. A summary is shown in Table 1. The experimental group obtained a higher mean score than the control group (experimental group = 5.20; control group = 4.675). The experimental group had a higher score than the control group over 12 questions. In the rest of 8 questions, both groups obtained the same mean score. The top three items of the experimental group were the ability of analyzing both sides of the argument, the understanding of teachers’ explanation and being open-minded. The mean score of these items was 6 out of 7. Amongst the 20 questions, the mean scores ranged from 5 to 6 out of 7. This indicated that the experimental group had a high self-efficacy in learning throughout the programme. It was noted that there were three questions contained significant difference between the groups. This part revealed that the motivation of the experiment group was high.

Part Two was divided into three sections. The first section, consisting of four questions, focused on the purpose of learning. There was no significant difference between the experimental group and control group. It was found that intrinsic motivation was dominant. In both Question 21 (I try to do well in school because that’s what I’m supposed to do) and Question 23 (I try to do well in school because I enjoy doing my school work well), both groups obtained a mean score of 6 out of 7 (with similar standard deviation). Both groups gave a lower ranking for the external factors like rewards (same score=4). Another external factor, pressure from parents, was also considered at a lower priority when considering the purpose of learning even though the control group showed a greater concern (mean=5) than the experimental group (mean=4.5).

The second section of Part Two was about the reason for doing class work. At each of the four questions, the experimental group and control group had the identical mean with similar standard deviation. There was no difference between the groups. In Question 26 (I do class work because I want to learn new things), both groups obtained a mean score of 5 out of 7. This also echoed the intrinsic motivation of the students, even amongst the less-motivated experimental group.
The third section of Part Two focused on group project work. Amongst the 12 questions, both experiment group and control group obtained the same mean score at eight questions. Both groups had a positive view about group project work as it facilitated their learning of the subject content, inquiry of complex issues and discussion of diverse opinions. Moreover, revealed by two other questions, the experimental group had slightly less pressure from their peer than the control group during the group project work. Finally, revealed by two other questions, compared with the control group, the experimental group expressed their greater appreciation for group project work as they had the courage to inquire complicated issues actively. Particularly at the item 39 (I had the courage to inquire complicated issues actively), significant difference existed between the groups, where \( p < 0.05 \).

**Student Interviews**

Two focus group interviews were conducted to eight students who participated in the programme *World Healer*. They expressed that through the programme, they were able to acquire various environmental issues and a lot of knowledge about environmental conservation. Moreover, they could develop their research skills and information and communication technology (ICT) skills by searching information in the Internet and using various free on-line softwares. Besides, they could develop environmental consciousness and value cultural diversity. The students explained that they learnt actively throughout the *World Healer* by its dynamic mode of learning. The learning journey, as described by the students, was open and dynamic that self discovery and collaboration were encouraged. Reflection was also considered as an important element in the learning process. All of them appreciated the video conferences, the use of free on-line software and *Knowledge Forum* as an on-line collaborative knowledge building platform in particular. One of the students explained his enjoyment at the on-line knowledge building:

“*I feel that KF activity can enhance our sense of belonging because we have to write our views and there are many people, including your members, those participating in the activities, going to discuss the feasibility of the activities ...I can gain sense of satisfaction as my idea is valuable and recognized when the other people agree with your views.*”

All of them preferred the mode of learning found in *World Healer*. First, they perceived that the programme could help them develop deep understanding of the subject matters. It was not only because the course content was closely related to their daily lives, but also due to the fact that self discovery was facilitated throughout the programme. Second, all of them expressed that the class allowed active interaction between students and teachers and amongst students. They were actively engaged in searching information, sharing and discussion.

The students reported a great difference of their behaviour between normal lessons and *World Healer*. At their normal lessons, the students were bored by teachers’ didactic teaching. They were not attentive. They were asked to listen and copy notes. The subject content was well-defined with “model answer” (claimed by an interviewee). Teachers usually spoke very fast without considering the level of understanding amongst students. In that environment, the students were shy and reluctant to express their ideas. On the other hand, all interviewed students claimed that they participated very actively in *World Healer* for a number of reasons.
First, the overall approach was self discovery. This student-centred approach allowed them to learn according to their own learning pace and interest. Second, interaction such as discussion and sharing were facilitated frequently. Third, without any pressure, they had more courage to express because they believed that they were learning together as a team. Fourth, individual differences were catered because individual progress was taken care of. Fifth, timely and efficient feedback from teachers and peers fostered their learning. Sixth, self discovery facilitated deep learning and develop long-term memory. Seventh, the weekly reflection facilitated their learning. One of the students summarized World Healer as follows:

“ I discovered that learning can happen with fun. It is because in the whole process of the programme, it’s like a curriculum that teaches us to discover new things. That means, from the beginning to the end, you won’t feel bored and you can learn. Sometimes we can self-study, or search information, finding answers on our own, etc. It’s hard to find this mode of learning elsewhere. And it allows great flexibility and autonomy to us. So we can experience learning with fun.”

The students also illustrated the differences of learning impacts between their normal lessons and World Healer. All students considered their normal lessons were examination-oriented while World Healer was learning-oriented. Examination, perceived by the students, was necessary because it could reveal their understanding of the subject matter in certain extent. It was also a measure for further academic or career pursuit. On the contrary, without examination, formative assessment and authentic assessment were used in World Healer. The students realized that they were assessed by the projects, weekly reflection, on-line discussion discourse and classroom participation. Half of the students strongly opposed the practice of examination. The students perceived that in the environment without the pressure of examination, they were more motivated. One of them explained,

“ Examination cannot help us to develop intrinsic motivation. We are just forced to do it. We usually completely forget the content after the exam. But in World Healer, we self-initiate to acquire knowledge.”

Teacher Interview

One individual interview with a teacher in the programme World Healer was conducted as the interviewee participated in all sessions of the programme as observer and collaborator. He also taught some of the students in formal curriculum. He appreciated that the students participated in World Healer actively. The active engagement in the programme was greatly different from their behaviour during normal lessons. During the normal lessons, the students had not received proper challenge. They were not attentive and they had a lot of conflict with others. However, according to his observation at World Healer, the students were very focused. They completed the assignments seriously and punctually, which was very rare at their normal class.

The teacher attributed the experimental group’s high motivation to the creative mode of learning at World Healer. First, it facilitated a lot of meaningful discussion and encouraged free expression of opinions. The lessons were interactive. Second, the students were amazed by their ability of using various web tools and digital devices to present their learning. Third,
the subject matter was very close to their daily lives. It was a key motivating factor for the students to contribute a lot of good notes in Knowledge Forum.

When the teacher was asked if World Healer motivated the students’ learning, he assured the value of the course. Based on his observation, he had several findings about the changes in the students. The programme motivated the students as a lot of changes amongst the students were witnessed. To begin with, after attending World Healer, the students were willing to raise questions during inquiry. Moreover, they were able to discover independently and explain both sides of argument. Finally, the experimental group was low-motivated students mainly before the programme. However, they frequently stayed at the Design and Technology Lab after school for information search and project works.

**Student's Reflective Journal**

All students were asked to complete an on-line reflection on a weekly basis. There were four questions designed by the author. The first one was what they did well over the past week. A majority of them appreciated their abilities of creating good notes and build-on notes in Knowledge Forum, sharing opinions with others without fear, giving advices for their teammates, finding useful information, harmonious discussion and cooperation.

The second question was about the new knowledge, skills and values that they could develop over the week. The students reflected that they acquired new knowledge. It included the factors that contributed to ecological footprint, such as diet, electricity consumption, water, building style and life routines. They were also able to know Spanish and Catalan cultures. Besides, the students reported their improvement of skills on critical thinking and English Language. They also developed the proper writing skills on an on-line knowledge building environment. The students reflected that their ICT competence was enhanced by using some Web 2.0 applications. Furthermore, the students developed positive values. They included appreciation of cultural diversities, global friendship and environmental conservation.

The third question was what area the students should improve. They thought they should be more patient with others during discussion and cooperation. They should participate more actively in the class by expressing more their own ideas. They should find more information. They should contribute more notes on Knowledge Forum and improve the quality of them. They should develop divergent and deep thinking skills. They also reflected the needs of enhancing their English competence.

The last question was about their plan in the following week. Apart from searching more information about sustainable life-style and environmental conservation measures, some of them would like to share and discuss more with their teammates. Some would like to enhance their English speaking and writing skills. Some would also like to contribute more and better notes on Knowledge Forum. Some would like to know more about Spanish culture. It is interesting that the teacher neither highlighted the students’ weaknesses nor formulated any improvement plan for the students. It was the students who reflect their strengths, weaknesses and achievement in order to plan ahead.

Reflection was also conducted after each of the video conferences. Each student was asked to write about 50 words about their feelings. All students appreciated the video conferences with Barcelona students as the conferences were interesting and meaningful. They believed that it motivated their learning because it was a fresh experience and they needed to share
with overseas partner. They were all excited and they looked forward to having more video conferences in the future.

**Summary**

The treatment (the programme *World Healer*) is able to increase students’ motivation. As shown in the questionnaire, amongst the 40 questions, the experimental group either outperformed or leveled with the control group. The experimental group had a higher self-efficacy than the control group in general. The experimental group had intrinsic motivation of learning. The students attributed their learning motivation to internal factors such as task factor, social learning factor and project work factor. They put the external factors like reward and family and group pressure at lower priorities.

Both student and teacher interviews revealed that the students were motivated by Web 2.0 applications and international collaboration. First, interaction and connectedness were facilitated. Collaboration was not only encouraged amongst individuals, the class also connected with another overseas class. The sense of relatedness was developed. Second, the experimental group was given full autonomy throughout the learning journey. The students mastered their learning pace and they were even given choices of project works in terms of content and format. Formative and authentic assessment replaced the traditional examination. They were able to formulate and adjust their plan on the basis of the weekly reflection. Third, optimal challenges were given to students. It was because the subject matter related to their daily lives that they were able to find abundant information. The students were also given challenging but achievable tasks with various user-friendly Web 2.0 technologies. The students needed to go beyond “classroom-bound comfort zone” (Alm, 2006) to search information, complete project and even communicate with overseas students. The programme *World Healer* was able to motivate students by satisfying their basic needs summarized by Ryan and Deci (2002), namely relatedness, autonomy and optimal challenges.

To conclude, Web 2.0 technologies facilitate more interaction and participation of students in learning. They also provide opportunities for international collaboration. As a result, lifelong learning and connectedness as pedagogical orientation, considered as 21st Century education by Law, Pelgrum and Plomp (2008) are fostered. This student-centred learning approach, compared with traditional way of teaching, can better motivate the students. It is because this liberal way of learning encourages self discovery, learning for deep understanding, commitment to learn and learning with fun. As a result, intrinsic motivation can be developed.

**Implications**

With reference to the findings of the present study, researchers and educators can infer some implications for educational practice on different levels. On learning and teaching level, the implementation of Web 2.0 technologies with international collaboration in formal curriculum has been a motivating and promising experience for both students and teachers as it supports human basic needs of relatedness, optimal challenge and autonomy. The success of this kind of learning mode lies on the rapport amongst teachers, the school and the government.

On teacher level, teachers hence should be engaged in continuous professional development. Teachers should equip themselves with Web 2.0 technologies and understand their opportun-
ities for education. With their user-friendly nature, however, the frustration on the technical know-how is eased. In order to facilitate the above curriculum and pedagogical reform, teachers’ essential qualities are redefined and related professional development should be addressed. In the Technological Pedagogical Content Knowledge (TPCK) framework (Mishra and Koehler, 2006), teachers should master the interplay of three primary forms of knowledge: content knowledge, pedagogical knowledge and technological knowledge. With incorporating these components, the teachers represent a form of expertise different from, and greater than, the knowledge of a disciplinary expert (such as a geographer), a technology expert (a computer scientist) and a pedagogical expert (an experienced educator).

On school level, the implementation of this innovative practice cannot be successful without school support. School vision of an open and vigorous learning environment, leadership, infrastructure, support for professional development, administrative procedures and school networking, pedagogical support for teachers should be taken into consideration (Pelgrum, 2008).

On policy level, political environment and government policy are the cornerstones of rapid development of the innovative and energetic practices. In Hong Kong, schools are equipped with favourable ICT infrastructure. It can be comparable with a lot of OECD countries. However, a clear and insightful vision of education and a comprehensive strategic plan are necessary.

Conclusion

Web 2.0 technologies with international collaboration create a classroom with autonomy, active participation and connectedness. Learning motivation, in this dynamic, challenging, fun and learner-centred environment, can be raised. It is because learners’ basic needs of relatedness, autonomy and optimal challenges can be fulfilled in this learning environment. The success of this pedagogical innovation lies on the rapport of teachers, school and government policy.

More research should be conducted in other school contexts where schools may vary in terms of school culture, student characteristics, teachers’ competence with reference to TCPK, infrastructure and administrative procedures. They may also vary among different countries. Studies over a wide range of context may help us understand how and to what extent Web 2.0 technologies with international collaboration raise students’ motivation. In addition, there exist a lot of Web 2.0 applications and they may serve different educational objectives. They can be cognitive tools, meta-cognitive tools, social networking platforms, threaded discussion tools, communication tools, collaborative creation tools and survey tools. In the process of pedagogical design, teachers should understand when, where, how they are used properly in order to develop their full potentials. As some other new Web 2.0 technologies are being invented, more research should be done to explore the potential of these new learning and teaching opportunities.

Although this study has its delimitation as being an one-off programme, *World Healer*, in order to fully understand the impact of blended learning of Web 2.0 technologies, international collaboration and normal classroom on student learning motivation, longitudinal studies should be conducted.
Acknowledgements

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References


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<tr>
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<th>Experimental Group (N = 18) Mean (SD)</th>
<th>Control Group (N = 20) Mean (SD)</th>
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<tbody>
<tr>
<td>Overall (Questions 1-20)</td>
<td>5.20 (0.377)</td>
<td>4.675 (0.568)</td>
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<td>Top three items</td>
<td></td>
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<td>3. I can analyze both sides of the argument</td>
<td>6 (0.984)</td>
<td>5 (0.745)</td>
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<td>6. I can understand teachers’ explanation</td>
<td>6 (1.085)</td>
<td>6 (0.923)</td>
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<td>18. I am open-minded when our classmates opposed my viewpoints</td>
<td>6 (0.840)</td>
<td>5 (0.933)</td>
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<tr>
<td>Experiment Group’s scores are higher than Control Group’s</td>
<td></td>
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<tr>
<td>1. I have a good attainment in this subject/course.</td>
<td>5 (1.127)</td>
<td>4.5 (1.231)</td>
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<tr>
<td>3. I can analyze both sides of the argument.</td>
<td>6 (0.984)</td>
<td>5 (0.745)</td>
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<td>4. I can understand the subject content.</td>
<td>5.5 (1.166)</td>
<td>5 (0.826)</td>
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<td>*10. I can reflect on my learning and master my learning direction.</td>
<td>5 (0.998)</td>
<td>4 (0.967)</td>
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<td>12. I can apply the subject knowledge in my daily life.</td>
<td>5 (1.530)</td>
<td>4 (1.174)</td>
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<tr>
<td>14. I can search useful information from various sources.</td>
<td>5 (1.098)</td>
<td>4 (1.137)</td>
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<td>*15. I can learn on a new topic on my own.</td>
<td>5 (1.491)</td>
<td>4 (1.461)</td>
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<tr>
<td>16. I can skillfully point out others’ mistakes without creating negative feelings.</td>
<td>5 (0.900)</td>
<td>4 (0.988)</td>
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<tr>
<td>17. I can handle frustrating and annoying situations in learning.</td>
<td>5 (0.963)</td>
<td>4 (0.889)</td>
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<td>18. I am open-minded when our classmates opposed my viewpoints</td>
<td>6 (0.840)</td>
<td>5 (0.933)</td>
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<tr>
<td>19. I can firmly reject unreasonable requests from others.</td>
<td>5 (1.392)</td>
<td>4 (1.432)</td>
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<td>*20. I can clearly express my opinion.</td>
<td>5.5 (0.850)</td>
<td>5 (0.973)</td>
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<td>Both group obtained the same scores.</td>
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<td>Questions 2, 5, 7, 8, 9, 11, 13 (raw score mean=5); Question 6 (raw score mean=6)</td>
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<td>Remarks:</td>
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<td>Scores in a 7-point scale, from 1 (not confident at all) to 7 (very confident)</td>
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<td>* The items with significant difference in ANOVA test, where p&lt;0.05.</td>
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About the Author

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