

A Study of the Applicability of Kolb's Learning Cycle to the Improvement of Independent Enquiry Study in Liberal Studies

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Abstract

This is a theoretical study of the possibility of applying Kolb's Learning Cycle (KLC) to enhance the conduct of Independent Enquiry Study (IES) in Liberal Studies (LS) in Hong Kong. By going through the KLC repeatedly, with a strengthened Reflective Observation phase, students will be able to review their work in various phases of the cycle and make improvement in the conduct of IES. Besides, based on the principles of learning put forth by Hein (1991), students' motivation to conduct the KLC for IES can be raised by providing more choices, greater autonomy, tasks of appropriate levels of difficulty and more opportunities for collaboration.

Keywords

Kolb's Learning Cycle, principles of learning, Independent Enquiry Study, enquiry skills, motivation

1. Introduction

Kolb put forth a model of learning process, underpinned by the belief that ‘knowledge is created through the transformation of experience’ (as cited in Konak et al., 2014, p.13 and Tomkins & Ulus, 2016). This study will evaluate whether Kolb’s Learning Cycle (KLC) could be applied to improve students’ learning process, in terms of students’ motivation and enquiry skills, via the conduct of Independent Enquiry Study (IES), the School-based Assessment (SBA) task of Liberal Studies (LS) in the Hong Kong Diploma of Secondary Education (HKDSE) Examination. The possibility of introducing enhancement measures will be investigated with regard to the capacity of the HKEAA and that of school teachers. The limitations of applying the KLC in the conduct of IES will also be discussed.

2. IES as an SBA task

As part of the assessment requirement of the HKDSE, each student has to conduct an enquiry study on a contemporary issue ‘with social bearing either in the local, national and/or global scale’ (HKEAA, 2017 (will be referred to hereafter as the Handbook), p.4). Students can formulate an enquiry question of their interest, then design the enquiry plan and tools to gather relevant data to make judgement in response to the enquiry question.

IES is expected to be conducted by phases, with opportunities for revision and further improvement. To facilitate assessment for learning, according to the Handbook, IES Reports comprise four parts: (A) Problem Definition (an explanation of the focus and scope of the IES); (B) Relevant Concepts and Knowledge/Facts/Data; (C) In-depth Explanation of the Issue; (D) Judgement and Justification (justifications of arguments in response to the enquiry questions).

School teachers assess the performance of students in their final reports on the enquiry study and the initiative of students in the learning process through IES (10%), which may comprise their performance on the proposal for IES, interim worksheets or other forms of assignments facilitating students to conduct IES, time management or motivation of students. Marks awarded by the school teachers, subject to moderation by the Hong Kong Examinations and Assessment Authority (HKEAA), constitute 20% of the total subject mark of the LS Examination.

IES, as a learning activity, is characterised firstly by the freedom of choice. Besides the autonomy in formulating enquiry questions and designing enquiry plans, students may also present the enquiry results in writing or in other forms, such as videos or PowerPoint presentations.

Secondly, it is a learning-oriented assessment, termed by Carless et al. (2006), as a learning process in which the ‘learning elements are emphasised more than measurement

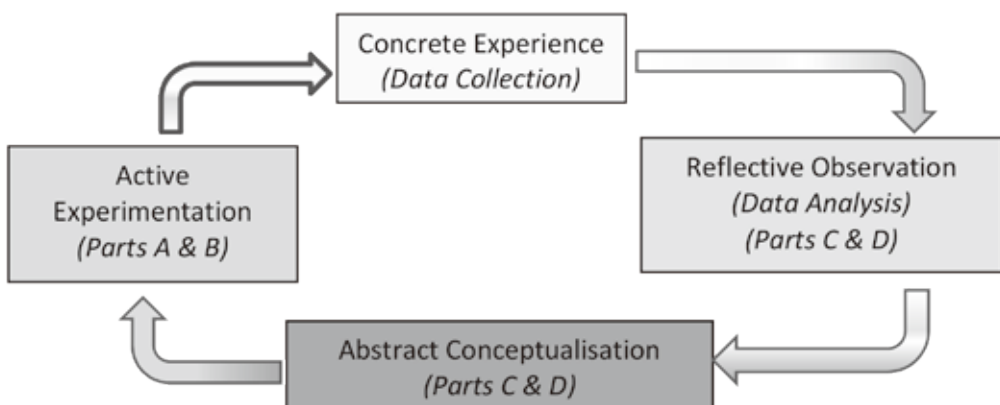
ones' (as cited in Carless, 2007, p.5). The major objective of IES is to build up students' enquiry skills. With reference to Black's (2004) notion on assessment for learning, feedback should be one of the key elements to promote students' learning in the conduct of IES, which is also an assessment-for-learning task.

3. IES as a Manifestation of KLC

Students learn actively by going through four cyclical stages, consisting of Active Experimentation, Concrete Experience, Reflective Observation and Abstract Conceptualisation. According to Kolb, all the four stages are necessary for a complete learning experience.

The process of conducting IES enables students to go through the various stages of the KLC (Figure 1). In Parts A and B, students go through the Active Experimentation stage. They start off the enquiry study by exploring the concepts or information related to a topic of their interest and then they formulate titles, devise the enquiry tools and plan their active learning activities. The data collection is a process in which they 'experience' with their enquiry plans. Subsequently, they analyse the data and reflect on the findings and draw conclusions in response to the enquiry questions in Parts C and D, undergoing the Reflective Observation and Abstract Conceptualisation stages.

Figure 1. Stages in KLC (modified from the model by Konak et al. (2014) (p.13))



As mentioned by Konak et al. (2014), constructivism is the theoretical basis for KLC. In other words, students construct meanings while going through KLC, fulfilling the principles of learning postulated by Hein (1991) (Table 2). Even though Hein’s major concern was museum learning, reference can still be made to his discussion of the general principles of learning. For the sake of comprehensive and deeper learning by conducting IES, these principles set the directions for enhancing the learning process. In the following sections, the ways to facilitate the achievement of these principles in the learning cycle of IES will be discussed.

Table 2. Principles of learning (Hein, 1991)

1. <i>Learning is an active process.</i> 2. <i>Learning consists both of constructing meaning and constructing systems of meaning.</i> 3. <i>The crucial action of constructing meaning is mental.</i> 4. <i>Learning involves language.</i> 5. <i>Learning is a social activity.</i> 6. <i>Learning is contextual.</i> 7. <i>One needs knowledge to learn.</i> 8. <i>It takes time to learn.</i> 9. <i>Motivation is a key component in learning.</i>
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4. Areas of concern with the implementation of IES

To gauge the views of the major stakeholders (teachers and students) on the implementation of IES, the HKEAA conducted a longitudinal study from 2011 to 2014 (HKEAA, 2014). The findings show that there is still much room for improvement with regard to the process of learning via IES and students’ attitude towards it.

Even though in these three years, both teachers and students became more positive on the impact of IES on the learning of skills, such as enquiry skills, as well as helping ‘students become more independent learners’, the ratings¹ in these areas were just slightly over the positive side on a six-point scale in 2014, ranging from 3.5 to 3.8 (p.11, p.15). Respondents’ views on the learning process also displayed a similar pattern. For the question about whether students ‘have received appropriate feedback ... from the teacher and other schoolmates’ and opportunities for collaboration with fellow students, the ratings

¹ From the longitudinal study in 2014, the ratings on the statements: ‘IES helps improve students’ enquiry skills.’ and ‘IES helps students become more independent learners.’ were 3.8 and 3.5 respectively among teachers, and 3.5 and 3.6 respectively among students on a six-point scale (HKEAA, 2014, p.11, p.15).

were 3.8 and 3.4 respectively in 2014 (p.12, p.14). There is a long way to the maximum rating of six.

A more worrying sign was about whether IES 'motivates students and gives them a valuable assessment experience'. The rating by teachers was 3.4, while that of students was even lower, standing at 3.2 (p.11 and 16), reflecting that respondents had reservations about students' motivation to conduct IES.

5. Applying KLC for Enhancing Learning via IES

The longitudinal study provided insights into the areas deserving enhancement, namely the learning process of enquiry skills and motivation of students. In this section, ways to improve these two areas via the KLC will be discussed.

5A. Enhancements on the Learning Process of IES

As an assessment-for-learning task, the implementation of IES takes place in schools, falling back on the administration of teachers. As such, the role of the HKEAA is mainly on the design of the task and assessment framework.

Starting from 2019, students will be given the freedom to choose between the four-part structure of the IES and a streamlined structure by integrating Parts C and D in the Abstract Conceptualisation stage of the KLC, thus aligning closer with the school of thoughts of constructivists, which underpins the KLC. Under constructivism, as explained by Hein (1991), knowledge must be constructed by individual learners and there are 'different entry points for different learners'. To facilitate the learning process, learning situations should be provided 'for learners to carry out their own mental actions' (Hein, 1991) freely. This freedom in the learning process goes in line with the nature of IES, which allows students to formulate enquiry questions to explore topics of their own interests. Only a freer structure in the presentation of enquiry results can accommodate the multitudinous enquiry questions and learning processes of individual students.

With reference to the comments of IES Examiners² on the samples of IES Reports from students in 2017, it was evident that students had difficulties in making good use of Parts C and D. Instead of analysing the issues in Part C to pave the way for the arguments in Part D, redundancies and disjunction of the evidence in Part C and arguments in Part D were common weaknesses of IES Reports. Take a concrete example of a popular enquiry question: 'Should Country Parks be Used for Housing Developments in Hong Kong?' Disappointingly, a common problem with the IES on this topic, as identified

² In the mark moderation process of IES, six samples of IES are taken from each school for external examiners to mark. These examiners have to report on the performance of candidates after marking.

by examiners, was the redundancy in Parts C and D. Students merely explained the positive and negative impacts of developing country parks in Part C, followed by an explanation of his/her standpoint towards this enquiry question in Part D, repeating some of the impacts mentioned previously. This phenomenon might stem from the uniqueness of the enquiry question, making it difficult to separate the analysis of the impacts and the justification of his/her stance in Parts C and D respectively. Besides, the knowledge construction of some students may not be in two distinctive stages as suggested by Posner et al. (1982), i.e., assimilation and accommodation. Students might assimilate their prior knowledge of the impacts the development of country parks while evaluating these impacts one by one. In this manner, any efforts in differentiating the mental output of assimilation and accommodation may result in a report lacking in coherence. In fact, the KLC makes no attempt to distinguish between these two stages. Students may go through the Abstract Conceptualisation phase when working on both Parts C and D (Figure 1).

As a school-based activity, the processes in the KLC of IES are mainly in the hands of school teachers. Though the structure of the report of the enquiry results is stipulated by the HKEAA, there is still much room for teachers to design learning activities in each stage of the KLC to facilitate students to conduct an IES.

Enhancement in which stage of the KLC will be more effective? Although there has been inadequate empirical evidence of the relative impact of various stages of the KLC on learning (Konak et al., 2014), research pointed to the benefits of reflection. The study by Konak et al. (2014), for instance, provided evidence for the enhancement of learning outcomes by a KLC task with group discussions and self-reflective questions in the Reflective Observation stage.

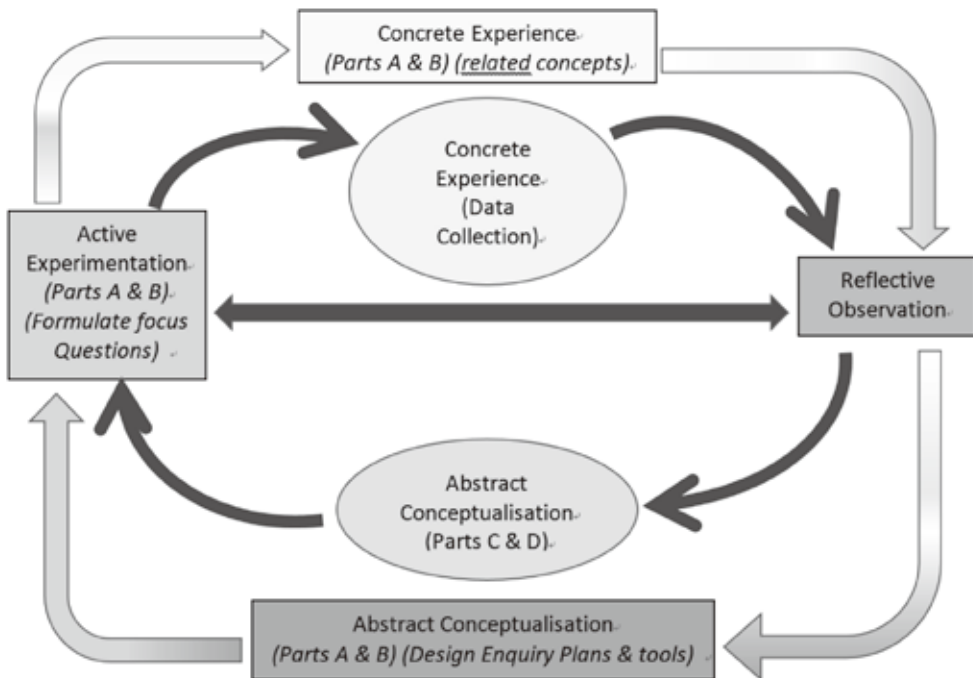
From Carless's (2007) practices of learning-oriented assessments in tertiary institutions in Hong Kong, 'timely and forward-looking' (p.8) feedback is the key to promoting current learning. Along a similar vein, Black et al. (2004) believed that marks only encourage students to compare among themselves, but comments help them to improve on their work. Wakefield et al. (2014) quoted Nicol's (2010) view that providing feedback to peers 'involves a higher level of reflection' (p.260), which may help them to improve on their own work. Even though Carless, Black et al. and Nicol did not aim at applying the whole KLC, they have provided insights for the positive impact of feedback (as a form of reflection) not only on future learning activities, but also on current learning/tasks. From these studies, various forms of feedback, such as group discussions, peer feedback and self-reflection, could constitute the Reflective Observation phase in the KLC for IES.

On the premises that reflection plays a significant role in the KLC, the stages of KLC could be rearranged to incorporate more phases of Reflective Observation to promote IES learning. This is theoretically sound as Forrest (2004) put forth that the phases in KLC

may be overlapped (as cited in Konak et al., 2014). The KLC could be a continuously spiraling process by which knowledge is constructed and thinking skills are enhanced. Along this line of thought, if students can go through the KLC repeatedly, improvement could be brought about by reviewing the previous stages in the phases of Reflective Observation and Abstract Conceptualisation.

Figure 3 shows a suggestion for the design of a continuous KLC for IES, allowing self-review and improvement after reflection.

Figure 3. A continuous KLC (modified from KLC in Konak et al., 2014, p.13)



Students may embark on an IES by Active Experimentation and then go through the outer cycle, followed by the inner cycle in Figure 3 (along the purple arrows). They may revisit the previous stages of work after Reflective Observation. In the Active Experimentation stage, students identified enquiry topics of their interests and formulate the enquiry/ focus questions. They may conduct desk research for concepts related to their enquiry (Concrete Experience). With Reflective Observation, some students may deem it necessary to amend the enquiry focus (Active Experimentation), while some of them may go on to the Abstract Conceptualisation phase to design the enquiry plan and the data collection tools. They may then revise their focus questions based on their assessment

of the practicability of the enquiry (Active Experimentation) or deploy the tools for data collection (Concrete Experience).

In the inner cycle, students may analyse the data collected and make judgements in response to the enquiry questions (Reflective Observation and Abstract Conceptualisation). All the stages could be reviewed as shown in the arrows in Figure 3. By going through a continuous KLC with Reflective Observation as the hub determining the pathway of the learning process, a more thorough learning process in relation to the enquiry question formulated by the student could be experienced and continuous improvement could be made. Undergoing the Reflective Observation phase repeatedly will help build up metacognitive skills, which are conducive to active learning (Bransford et al., 2000). Students ‘take control of’ and plan their enquiry studies by ‘defining learning goals and monitoring their process in achieving them’ (p.18). Besides, the continuous learning cycle offers ample opportunities for students to reflect on their previous stages of work, which is one of the key strategies of metacognition.

5B. Enhancements on Students’ Motivation

The second concern on the conduct of IES as found from the longitudinal study (HKEAA, 2014) was the lack of motivation of students. In Hein’s (1991) terms, ‘motivation is a key component in learning’. He also posited that learners should ‘know the reasons why’ they have to learn. This section will focus on suggestions to motivate students to carry out the KLC of IES.

To raise students’ motivation, as discussed earlier, what the HKEAA can do is limited since the KLC is solely conducted in schools. There have been suggestions for providing more incentives for students to conduct IES by increasing the proportion of Initiative in the marking guidelines. However, the existing weighting of Initiative, which is 10%³ of IES, is deemed appropriate by the majority of teachers in consultations.

What can be done to promote motivation? Paris (1997) identified five factors contributing to motivation towards learning in museums: *choices*, *challenge*, *context*, *control* and *collaboration*. Although Paris (1997) made reference to learning in museums, the factors put forth are applicable to ‘constructive and active learning’ (p.22) and thus the KLC of IES. In the following, ways to enhance motivation will be discussed with reference to these factors. However, as IES is a task for students to learn in context by nature, *context* will not be the targets for enhancement.

³ The IES constitutes 20% of the whole subject mark of LS. Therefore, Initiative accounts for 2% of the subject mark.

Choices and Control

First of all, students should be given *choices* and *control* of the enquiry questions and methodology. Evidence of the importance of this factor can be drawn from the research of Ryan and Grolnick (1986), which showed that students were more interested in their schoolwork if they enjoyed greater autonomy in the classroom (as cited in Paris, 1997).

The greater the freedom, the higher the motivation. IES is designed to allow autonomy for students. As stipulated in the *Handbook* for LS (HKEAA, 2017), one of the assessment objectives is 'setting goals and plans' (p.3) for enquiry studies 'of interest to them' (p.4). Students should also be given the freedom to choose pathways in the KLC. For instance, they may go back to the Active Experimentation phase subsequent to Reflective Observation, instead of going on to the Abstract Conceptualisation phase (Figure 3).

As a matter of fact, the *Handbook* is only a set of guidelines. The HKEAA is not in the capacity to oversee the details of teaching and learning of IES in schools. If teachers provide students with some topics for IES for the sake of administrative convenience, students' freedom to choose topics of their own interests will be limited. The downside of this practice is that students lose motivation for completing the IES, not to mention going through the KLC in a circular manner.

Challenges

Paris (1997) quoted Clifford (1991), Schunk (1989) and Zimmerman (1989) that tasks given to students should be 'moderately difficult' 'to enhance perceptions of their competence and self-efficacy' (p.24). This was concurred by Carless (2007), who believed that appropriate tasks are one of the key elements of learning-oriented assessments, which resemble the nature of IES. Though the assessment task is stipulated by the HKEAA as IES, teachers have the autonomy to make the difficulty level of IES more appropriate to keep students engaged. Examples are providing specific feedback by teachers or the peers, targeting the potential problems in the Reflective Observation phase. As suggested by Carless (2007), feedback is more effective in promoting learning if the criteria are made known to students and the feedback helps students to envisage their progress in terms of the achievements of the criteria. Along this line of thought, students' self-perception of competency in conducting IES could be enhanced by making clear of the requirements of IES and providing feedback on the strengths and weaknesses in conjunction with the requirements.

Besides, the compartmentation of the whole IES task into Parts A, B, C and D (or the integrated Parts C and D) and the various phases in the KLC will help to make the task more manageable to students. Going through the KLC continuously for the revision of the

previous parts or phases will allow room for improvements. However, the number of times reverting to the previous stages should also be appropriate so that students will not be made frustrated, undermining self-efficacy.

Collaboration

Paris (1997) identified social supports as one of the factors promoting motivation, in turn facilitating learning, converging with the principles of learning posited by Hein (1991): ‘learning is a social activity’. Students learn through interactions with the peers, teachers or people in the learning contexts. The impact of collaboration on learning was evident in the research by Konak et al. (2014) and Hrastinski and Stenbom (2013). The factor analysis by Konak et al. (2014) on KLC showed that more student-to-student interactions through group work raised students’ perceived competency. Furthermore, the research of Hrastinski & Stenbom (2013) on peer coaching, which is termed by Vygotsky (1978) as a form of ‘collaboration between a learner and a more capable person’, found more positive attitudes towards the subject with peer coaching.

Collaboration can be incorporated in various phases of the KLC of IES. For instance, brainstorming exercises in groups may help students to formulate enquiry questions in the Active Experimentation phase. Literature search and data collection in the Concrete Experience phase can be done in collaboration with students of similar enquiry topics. The Reflective Observation phase has the greatest potential to be collaborative, such as peer feedback and peer coaching.

By increasing the autonomy of students, adjusting the level of difficulties of IES and providing collaborative activities in the KLC, students’ motivation in conducting IES and the learning process could be enhanced.

6. The Limitations of Applying KLC

In this section, the limitations of the KLC in promoting learning via IES will be discussed in terms of the theoretical underpinning and the validity of KLC, the practical issues in classrooms and cultural characteristics in Hong Kong.

From a theoretical viewpoint

The views of critics on the theoretical underpinning of the typology of the KLC model and experiential learning will be examined.

Firstly, academics like Reynolds (2009) critiqued that experiential learning, from which the KLC was developed, lacked a theoretical foundation (as cited in Tomkins &

Ulus, 2016). Bergsteiner et al. (2010) also quoted the comment of Coffield et al. (2004) on the weak association between Kolb's learning styles (action, reflection, feeling and thinking when moving through the KLC) and Jung's types. Price's research (2004) (as cited by Bergsteiner et al. (2010)) also suggested discrepancies between the self-reported learning styles and the actual learning processes adopted by students when going through the various phases of the KLC. Critics argued that doing, reflecting, feeling and thinking are by no means stable personality traits as learners need to shift among these when performing various activities in the KLC. Instead of being learning styles, these are believed to be learning processes, which may not be unique in each stage of the KLC. They might be found concurrently in a stage. For instance, learners may be 'thinking' about the concepts while writing up ('doing') Part B of the IES in the Concrete Experience stage. In view of the contentions, learning processes are not specified in my suggested model of continuous KLC in Figure 3. The adaptation of the KLC in this manner was also concurred by Tomkins & Ulus (2016), who concluded their research by denoting that it was unnecessary to make the distinction 'between thinking and action, detachment and engagement, mind and body' (p.171, 172).

Another epicentre of contention was the epistemology of KLC, which is based on constructivism. To Kolb, learners create knowledge by transforming experiences in the KLC (Tomkins & Ulus, 2016 and Bergsteiner et al., 2010). Radical constructivists, for instance, Glaserfeld (1993) postulated that 'truth is replaced by the notion of viability' and 'all knowledge is only subjective, provisional and uncertain' (as cited in Osborne, 1996, p.56, p.57). Knowledge can only be constructed and there is no truth that can be transferred to learners.

In contrast to the beliefs of radical constructivists, the research findings of Tomkins & Ulus (2016) demonstrated the significance of prior knowledge in learning. In their study, a series of content-rich lectures prepared students for the role play exercise and discussions in the KLC. They concluded that the lectures played an important part in reducing anxiety in the subsequent tasks in the KLC. In fact, their findings were in line with the principle of learning by Hein (1991), which delineated prior knowledge as a pre-requisite for learning.

To align better with the nature of LS, social constructivism, as opposed to the radical branch, is a more appropriate theoretical perspective to be adopted in applying the KLC. Lave (1988) and Brown et al. (1989) believed that knowledge is constructed in social contexts (as cited in Osborne, 1996). Social constructivism also underpins Hein's (1991) principles of learning: 'learning is a social activity' and 'one needs knowledge to learn'. The implication on the KLC for IES is that prior knowledge plays a role in various phases of the learning cycle. Equipping students with knowledge of enquiry skills and the requirements of IES is essential to learning through the KLC.

From the perspective of validity

Some academics have been skeptical about the impact of KLC on learning. For instance, Kirschner et al. (2006) contended that experiential learning might bring about student satisfaction rather than learning (as cited in Tomkins & Ulus, 2016). Nevertheless, research findings, such as that of Tomkins & Ulus (2016), displayed a reduction of anxiety in experiential learning tasks. Even though their research did not provide any direct measurement on the learning outcomes of KLC, the reduction in anxiety was a positive impact that might pave the way for better learning outcomes. Therefore, the benefits of KLC on the performance of students cannot be dismissed.

IES, being a School-based Assessment task, is designed with marking criteria for assessing the learning outcomes. Therefore, self-reflection or self-reports on learning processes and attitudes may be the activities in the Reflective Observation phase and an indicator for implementation evaluation (such as the longitudinal study), rather than a tool for measuring students' performance as adopted by Price (2004) in his research (as cited by Bergsteiner et al. (2010)). The validity of the continuous KLC suggested in Figure 3 for promoting enquiry learning is yet to be verified by research on the performance of the IES in terms of the stipulated marking criteria.

Cultural influences

Students from different socio-demographic backgrounds may show different learning outcomes in the KLC. Konak et al. (2014) also pointed out in their research on KLC that the lack of consideration of the socio-demographic background of students could be one of the limitations. More direct evidence for the effect of cultural differences on learning was provided by a research on the teaching styles in several Asian cities conducted by Hallinger (2010). He concluded that Asian teachers were more used to rote learning and teacher-directed instruction and 'student-centred learning as "foreign" in origin and in nature' (p.412). One of the Taiwanese respondents in his research pointed out the traditional Chinese culture 'values uniformity' (p.412). Carless (2007) also perceived that the majority of people in Hong Kong 'equate assessment with grading' (p.13) and thus focussing on the learning outcomes in the form of marks. Inferring from these cultural characteristics, the implementation of the KLC for IES, which is student-centred and process-, rather than outcome-oriented, may face resistance from teachers and students. The concerns about marks may also hinder the collaboration work among students in the KLC.

Practical Issues in Classrooms

The resistance to IES may also stem from the workload on teachers. Since the class size in Hong Kong can be relatively big (about 30 to 40 students in a class) and

some teachers may need to take up more than one class of LS in a form, it may involve much work in providing feedback to students with a large variety of enquiry topics and a diversity of ability, thus undermining the effectiveness of learning through the KLC of IES, especially with the continuous KLC.

7. Conclusion

IES is a learning process through experiencing a KLC of an enquiry study on a contemporary issue. To promote the learning of enquiry skills and motivation of students, the design of the KLC of IES could be enhanced by allowing students the freedom in the report structure (choosing between a four-part structure or a three-part structure with the integrated Parts C and D) and in the enquiry process, incorporating more reflective experiences by going through the KLC repeatedly, strengthening the experiences by collaboration and facilitating students to tackle the challenges on the way. However, the effectiveness of learning via KLC of IES hinges on the possibility to raise the acceptance of this new mode of learning in the Chinese culture and to alleviate the workload of teachers.

In 2019, the HKEAA will allow more flexibility in the IES report structure - candidates may integrate Parts C and D in the reports. Whether greater freedom in the Abstract Conceptualisation phase of the KLC will bring about positive impacts as suggested in this theoretical study is yet to be verified by empirical studies on the authentic performance of the IES Reports which will be available in 2019. Furthermore, an investigation on the views of teachers and students will shed light on the learning processes of the KLC of IES and the motivation of students.

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以庫伯學習圈改善通識教育獨立專題探究的應用研究

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摘要

本文為理論研究，探討庫伯學習圈(KLC)可否改善香港的通識教育獨立專題探究(IES)。若學生能反複經驗有強化的「體驗反思」階段的KLC，他們可檢視自己在學習圈較前階段的工作，並改善其IES。另外，根據海因(1991)的學習原理，可從以下的方向提升學生在進行IES的KLC時的動機：提供更多選擇、更大自主性、難度合適的工作及更多協作機會。

關鍵詞

庫伯學習圈，學習原理，獨立專題探究，探究能力，動機

