Building life-long learning capacity in undergraduate nursing freshmen within an integrative and small group learning context

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Abstract

Background: Life-long learning involves the development of skills in critical thinking (CT), effective group process (GP), and self-directedness (SDL). Recent studies have shown that small group learning with active interactions is effective in enabling students to develop themselves as independent learners beyond graduation. With a view to integrative learning, the purpose of this study was to evaluate life-long learning outcomes through the work of small group teaching and learning for a class of undergraduate nursing freshmen during one academic year.

Methods: A mixed-methods approach was used to evaluate the CT, GP and SDL of 99 freshmen with a self-assessment questionnaire before and after their learning activities in three nursing courses, and to identify themes from a total of six focus group interviews with the students and teachers.

Results: The CT, GP and SDL results obtained from self-assessment did not indicate significant differences. Four themes emerged from the qualitative analysis.

Discussion: Many factors contributed to the results on life-long learning skill development of students in this study. The qualitative analysis provided good insights for future teaching and learning development.

Conclusions: With a developmental perspective, life-long learning may be better developed and evaluated over a longer period of time in the nursing program.

Introduction

With the high separation rate of nurses and the aging population in Hong Kong, there have been increasing demands for registered nurses. More student places are being allocated to baccalaureate pre-registration nursing programs. Student intakes for such programs have increased rapidly to a maximum of 200 per class in recent years. Tertiary education institutions have developed strategic plans to introduce student-centered and more group learning opportunities to enable students to actively utilize their own learning opportunities, and to strengthen their life-long learning abilities. Student-centered learning and better student development of life-long learning capacity are the keys to educational reform in Hong Kong, which is aiming to increase the three-year university study to four-year programs with more liberal education and life-long learning development (Poon and Wong, 2008). All these

contextual factors formed the basis of this study's attempt to re-structure and align three undergraduate nursing courses that target the acquisition of life-long learning skills and a broader knowledge base for nursing freshmen. These learning goals match the education reform for a new four-year university structure in Hong Kong, with the objectives of strengthening life-long learning skills and liberal education, and advancing opportunities in continuing professional education.

Life-Long, Self-Directed and Small Group Learning

Life-long learning is an active process in which students search for knowledge, understand it, and apply it to meet their personal and professional goals throughout the life span (Aggarwal and Bates, 2000; Nayda and Rankin, 2008). Life-long learning skills are broad and involve problem-solving and critical thinking, effective teamwork and self-directedness. A meta-analysis of 39 studies showed that small groups were an effective setting for learning (Springer et al., 1999). In addition, life-long learning skills can be achieved through small group interactions (Baptiste, 2003; Neo, 2003; Prince, 2004). Knowledge exchange and discussion are enhanced in small groups through sharing, active listening, and providing and receiving constructive feedback to and from each other in the groups. University students, as adult learners, prefer to take charge of their own learning through self-direction (Merriam et al., 2007). In small groups, these active learners are further developed with the approach of problem-based learning (PBL) (Kemp et al., 2002; Wilkie and Burns, 2003; Prince, 2004); the taking of such an active role within the PBL context prepares them for life-long learning (Bengtsson and Ohlsson, 2010). Problem-based learning is the process of students' learning through active work towards the understanding and resolution of a problem; operationally it is done through the small group setting (Barrett, 2005).

In summary, self-directed learning can be achieved through small group interactions as students take responsibility for their own learning (Miflin, 2004). In small groups, students are motivated and able to play an active role in exploring and learning new knowledge collaboratively and cooperatively with the developing broad learning skills, rather than being taught didactically (Baptiste, 2003; Neo, 2003).

The purpose of this study was to evaluate broad life-long learning outcomes through the work of small group teaching and learning in three aligned Year 1 courses of an undergraduate nursing program. These courses were re-structured to improve the course design with an integrative approach, in order to meet the increasing need of education for life-long learning skills in the forthcoming new academic nursing structure under the current university education reform. The re-structuring was expected to align with the vision of the needucation structure in Hong Kong, which aims to prepare students with a broader knowledge and skill base, a more solid foundation for future study in their particular disciplines, and a continuous whole-person development throughout the life span.

Theoretical Framework

As stated by the Association of American Colleges and Universities (2004), our study aim was based on the need for tertiary educators to foster students' abilities through integrative

learning across courses and over time, so that they are better prepared for the real-world practice of nursing. Defining integrative learning has been a topic of discussion since the turn of the 20th century with a focus on its approaches of multi-, inter-, and intra-disciplinary work (Drake and Burns, 2004). Schneider (2003) argued that integrative learning leads students to unite their learning with the world beyond the tertiary education institute, and above all to continuously translate their education to new contexts, new problems and new responsibilities, which is a life-long process. Our integrative learning approach means using a set of teaching and learning methods (Schneider, 2003) within the small group context, which is constructed in alignment with the common life-long learning goals across three nursing courses in the freshman year of study. This enables students to put their knowledge to effective use. The integrative learning is thus done through their reflective practice and active linking of their learnt knowledge and skills; exposure to multiple sources across the integrating courses; application of theories to practice in various settings; utilization of diverse and even contradictory points of viewwithin a teamwork environment; and enhancing the understanding of issues and positions contextually (Association of American Colleges and Universities, 2004; Huber et al., 2007). We hypothesized in this study that with the integrative learning approach and the small group teaching and learning focus across the relevant courses, students would develop and demonstrate the essential capacities of life-long learners, for instance, the skills of self-directedness in study, critical thinking and teamwork. Lai and Tang (2000) found that high school graduates entering universities in Hong Kong typically did not possess these skills. With the emphasis on integrative learning, students could put these skills together and develop habits of mind. The integrative approach with a focus on small group teaching and learning would prepare them to make informed judgments in the conduct of their professional and civic lives (Association of American Colleges and Universities, 2004; Huber et al., 2005).

Methods

This study used a mixed-method design with a quantitative pre-post evaluation and an exploratory qualitative approach of the naturalistic inquiry (Lincoln and Guba, 1985; Sandelowski, 2000). According to Morse and Niehaus (2009), the mixed methods used were sequentially quantitative and qualitative (Quan → qual), with the former a core component and the latter supplementary to it. With the qualitative data set, the quantitative analysis can be invoked to explore more in-depth relationships among variables. The quantitative data were collected with a set of self-administered questionnaires containing three sub-scales, and the qualitative data were obtained later from focus group interviews. Outcomes were collected from multiple informants, both teachers and students, since different types of data collected from different sources can be triangulated to produce a more comprehensive picture of the topic being studied (Hammersley and Atkinson, 1983; Sands and Roer-Strier, 2006). The central premise of the mixed-methods approach is that the combination can provide a better understanding of the research topic than either the qualitative or quantitative approach alone (Creswell and Plano Clark, 2007). These two approaches complement each other so that the evidence base of the required knowledge can be broadened (Flemming, 2007).

The New Integrative Courses

Three foundational nursing courses in Year I were aligned for their contents: Nursing Foundations (NF) in semester one, and Introduction to Nursing Theory (INT) and Health Promotion and Education (HPE) in semester two (Box 1). After re-structuring the contents, these courses incorporated the teaching and learning of students through small group activities for their basic and broad skills of lifelong learning as professional nurses in 1) identifying the learning needs, 2) searching for and applying information, 3) thinking critically and solving problems, 4) being self-directed, and 5) functioning well in a group/team setting with good communication skills. Small group learning is a common teaching and learning strategy in all

Box 1
Learning plans of the Nursing Foundations, Introduction to Nursing Theory, and Health Promotion and Education courses.

Nursing Foundations (NF)
This is a course offered in semester one. The learning and acquisition of fundamental concepts and knowledge about a professional healthcare discipline (nursing) from this course form the foundation for graduates' effective and appropriate professional practice in the future. At this level, the fundamental concepts and knowledge to be learnt by the freshmen are actually broad and generic, e.g. life-long/self-directed learning skills, problemsolving and critical thinking skills, and communication skills, which are the foundations that make a professional an effective life-long learner. This course cultivates students' attitudes to and skills in life-long learning for their effective nursing practice in the future.

Introduction to Nursing Theory (INT)
This is a course offered in semester two. Professions exist to serve society. When society changes with rapid technological advances, information explosion, increased consumer expectations and constrained financial resources, professionals must also change, and this is a life-long developmental process. Basic knowledge and skills must be possessed by nursing professionals for information management, critical and creative thinking, and collaboration in a multidisciplinary context. Using nursing theory and evidence-based practice as examples, this course enables freshmen to learn about the necessary skills for life-long professional practice, in particular the search and critical use of information. Students are encouraged to be reflective and critical in their developing role as life-long learners for professional development through the effective search and application of information.

Health Promotion and Education (HPE)
This is a course offered in semester two. "Health for all" is advocated by the World Health Organization (1986), highlighting health as "a resource for everyday life, not the objective of living". Everyone must be nurtured and assisted at different stages to achieve and maintain health as an ongoing developmental process. Thus, this course on promoting "health for all" aims to instill a desirable living mentality and resources that fuel the freshmen with appropriate holistic health concepts and knowledge, and more importantly to initiate and sustain their correct attitude and health practice in everyday living, first at the individual level, naturally extending to their peers and families, and eventually to the community after they graduate and expect to be life-long learners for ongoing health promotion and education.
During the teaching and learning of this course in conjunction with the other two (NF and INT), students learn to appreciate the importance of acquiring and maintaining health across the life span, which is an ongoing process requiring good critical skills, self-directedness and team work. In this way, these future owners of society can sustain their competitiveness and vitality to cope with ever-escalating demands and their duty to the rapidly-changing society.

these courses. The small group learning activities were led by eight facilitators (tutors) among the three courses. Prior to the group teaching and learning, a discussion session was conducted

by the researchers with these facilitators to share experiences and consolidate their perspectives on small group teaching and the PBL approach. The aim of this exercise was to align the approach of these facilitators in such learning contexts.

Good communication skills are believed to be an integral factor for effective multi-disciplinary teamwork among healthcare professionals (Deering et al., 2011; Lingard et al., 2004). The literature has demonstrated that the use of simulated exercises and role plays in the curriculum provides promising results for effective student learning (Calhoun and Chambers, 2004; Festa et al., 2000; McCaughey and Traynor, 2010; Vessey and Huss, 2002). Hence, group activities through a series of communication workshops in which students role-played, peer reviewed and reflected on their competence of communication skills in interviewing and interacting with patients and their relatives were added in NF in particular. After the mass lectures regarding communication skills had been delivered by the NF lecturer to all students, they designed their communication scenarios, wrote their scripts and videotaped their role plays. During the small group sessions, with the help of group facilitators, the student peers reviewed and reflected on their performance captured on videos in order to achieve the best learning outcomes.

Expected Outcomes and the Instruments

After completing the three courses, students were expected to have developed the motivation to play an active role in their own life-long learning. They were equipped with basic and broad skills for obtaining appropriate resources to meet their own learning needs (self-directed learning/SDL). Students had started to acquire knowledge about the concept of health and appreciate the importance of health maintenance with their active and self-directing role. They were also equipped with experience and skills in teamwork and communication through the small group process of learning (group process/GP). These skills are important for their future work and further learning within the multidisciplinary healthcare context. Last but not least, students developed a critical thinking attitude for their ongoing learning throughout the life span (critical thinking/CT). Primarily, the development of this broad learning skill-mix through group learning could be measured and evaluated in terms of SDL, GP and CT (Benson et al., 2001). Therefore, an instrument which could reflect the status of their life-long learning capacity by measuring these three features was used to collect the quantitative data.

Self-Assessment of CT, GP and SDL

A modified self-administered questionnaire, originally designed by nursing researchers at McMaster University (Ladouceur et al., 2004), was used to assess the changes in students' self-evaluation of their skills in CT, GP and SDL (n=99). The Cronbach's alphas of the GP, SDL and CT sub-scales were acceptable at the levels of 0.83, 0.88 and 0.90 respectively. Items 3 and 4 of the SDL scale carried the similar meaning of 'using appropriate resources to meet own learning needs'. Hence, one of these items was removed. A revision of the wording in a total of two items of the CT and GP sub-scales was performed for better clarity. As pointed out by Ladouceur et al. (2004), two items about 'attends every class' and 'is punctual' in the GP sub-scale were not strongly correlated with other items on the scale. These two items were therefore removed. Finally, there were nine items in the CT sub-scale, ten for GP, and nine for

SDL included in the scale for this study. The number of response options for each item was changed from six to four, and the Likert scale was consequently composed of the levels '0 = never', '1 = almost never','2 = sometimes' and '3 = often'. The original scale with level 4 as 'almost always' and level 5 as 'always' were removed, because in this study 'often' was considered to be sufficient by definition to suggest a good level of the learning skills. The rationale for using an evennumbered scale was to avoid regression toward the easy option of the neutral point (Allen and Seaman, 2007). The score of each sub-scale was the total score of all items in that scale. It ranged from 0 to 27 for CT and SDL, and 0 to 30 for GP. A higher score represents a better outcome. For the 'global impression scale' of each sub-scale of the learning skills, the word 'average' in the original scale was replaced by 'expectations' for clearer meaning, i.e., from '0 = much below average' to '0 = far below my expectations', and subsequently to '1 = below my expectations', '2 = meets my expectations', '3 = above my expectations', '4 = far above my expectations', and '5 = outstanding'. Cronbach's alphas and test–retest intra-class correlation coefficients (ICC) were performed for each sub-scale by comparing the results obtained from the baseline with those obtained a week later after commencement of the students' first course (NF). Information on gender, previous work experience, monthly household income, etc., was collected from the recruited nursing freshmen to detect whether demographic factors were associated with the outcome measures.

Focus Group Interviews

Qualitative feedback from the small group facilitators and students was obtained by focus group interviews at the end of each semester. Facilitators and students were interviewed separately, and the interview questions were designed to elicit their perceptions on the following aspects:

– experience of skill development in critical thinking, learning (questioning, information searching, and communication), self-directedness to learn, and group interactions,
– strengths of the courses in enhancing student learning,
– weaknesses/limitations of the courses that hindered students' learning,
– major difficulties encountered in teaching (for facilitators) and learning (for students),
– experiences students enjoyed most in the course, and
– suggestions for improving the courses in the future.

Procedures

All Year 1 nursing freshmen (n=167) and small group facilitators (n=8) who were enrolled in or taught the three courses were invited to join the study. Since it was deemed ethically inappropriate to set up a control group with no integrative learning for the three courses in the study, a pre- and post-test quasi-experimental design was used. Evaluations were performed, 1) at baseline before the first course (NF) commenced in the first week of semester one; 2) a week later and before the small group learning activities for ICC of the modified questionnaire (T1); 3) when the NF course was completed at the end of semester one (T2); and 4) at T3, when the other two courses (INT and HPE) were completed in semester two. The quantitative data analyses were performed using the computer software SPSS for Windows Version 14.0.

Descriptive statistics were used to examine the participants' characteristics. Ethical approval was obtained from the relevant institution for the study.

Results

Demographics

 A total of 99 students were able to be paired for the learning skills questionnaire at baseline, T2 and T3, and their demographics are shown in Table 1. The proportion of female to male students was high (77.8% female), as usually expected in the nursing discipline, while the majority of the students was 21 years old or below (86.9%). Many of them had work experience (72.7%), with a mean of 8.7 months, and their monthly household income mainly ranged from HK$10,000–30,000 (56.6%) (approximately US$1280–3850).

Table 1   Demographics of students

Characteristics of students (n = 99)	n	%
Gender		
Male	22	22.2
Female	77	77.8
Age		
21 or under	86	86.9
22 or over	13	13.1
Monthly household income		
< HK$10,000 (< ~ US$1,280)	28	28.3
HK$10,000 - 30,000 (US$1,280 - 3,850)	56	56.6
> HK$30,000 (> ~ US$3,850)	15	15.2
Admission type		
Direct entry from high school	45	45.5
Entry with qualifications other than high school	54	54.5
For Non-JUPAS students, the highest level of academic achievement *		
Matriculation	2	3.8
Certificate	2	3.8
Higher diploma	4	7.5
Post-graduate diploma	1	1.9
Associate degree	40	75.5
Bachelor's degree	4	7.5
Work experience		
No	27	27.3
Yes	72	72.7
Duration of work experience (months) **		

Characteristics of students (n = 99)		n	%
1-12 months		50	82
13-24 months		6	9.8
>24 months		5	8.2
	Range	1 – 60	
	Mean	8.7	
	Standard Deviation	12.1	

 Percentage may not add up to 100 due to missing data (* n = 53   ** n = 61)

The median monthly household income in Hong Kong for 2010 was US$2300 (Information Services Department, 2012).

     The number of students in the class was 167. At baseline, 150 students completed the self-assessment questionnaire on CT, GP and SDL. The Cronbach's alphas of the three modified sub-scales indicated acceptable levels of reliability (CT: 0.71, n=144; GP: 0.80, n=149; and SDL: 0.81; n=137). Intra-class correlation coefficients (single measures) obtained from the test and re-test of the modified questionnaire at baseline and after one week (before commencement of the small group activities) were 0.6 for CT (0.531–0.734, 95% CI, n=131), 0.569 for GP (0.445–0.672, 95% CI, n=138), and 0.52 for SDL (0.380–0.636, 95% CI, n=127), which were also within the acceptable ranges.

CT, GP and SDL Before and After the Small Group Activities
     Distributions of pre- and post-test scores were examined using the Kolmogorov–Smirnov test of normality. As the data was normally distributed, paired t-tests were performed to examine the pre and post scores in CT, GP and SDL. At baseline, the mean scores of subscales CT, GP and SDL were 18.48, 19.42, and 18.21 respectively. Paired t-tests were performed using data from the participants who completed both the pre- and post-test questionnaires at baseline and T3 (n=99). However, there was no significant difference between the pre and post scores for CT, GP and SDL (Table 2).

     A paired t-test was also performed for the scores obtained at baseline and T2 (when students completed the first course of NF). No significant difference was found in the means of CT, GP and SDL. Logistic regression and ANOVA of the scores were performed with the demographic characteristics of the students. No significant association of any particular demographics was identified with the change of scores in CT, GP and SDL.

Table 2   Paired t-test of pre and post scores on critical thinking, group process and self-directed learning (n = 99)

	Mean (*SD*)	t	p
Critical Thinking *			
Pre-test	18.48 (*3.06*)	0.072	0.94
Post-test	18.45 (*2.60*)		
Group Process #			
Pre-test	19.42 (*2.68*)	0.047	0.96

	Mean (*SD*)	*t*	*p*
Post-test	19.40 (*3.08*)		
Self-directed Learning [+]			
Pre-test	18.21 (*3.13*)	0.102	0.536
Post-test	18.49 (*2.75*)		

* Critical thinking scores ranged from 0 – 27
\# Group process scores ranged from 0 – 30
\+ Self-directed learning scores ranged from 0 – 27

Feedback on CT, GP and SDL

The digital records of six focus group interviews (three student groups at T2 with n=5, 6 and 7 respectively; two student groups at T3 with n=5 and 7 respectively, and a teacher group with eight facilitators at T3) were transcribed verbatim. The data were analyzed line by line with the latent content analysis (Mayan, 2001) through coding and categorization for theme development (Mayan, 2009). Three investigators (VC, CC and LS) formed a group and discussed the codes and categories that were being developed individually in order to reach common consensus. NVivo 2.0 was used to aid management of the data with better efficiency during the analysis process. Finally, four themes emerged from the latent content analysis: 1) contrasting views in critical thinking, 2) continuing the development of more effective group work, 3) self-directed learning through PBL, and 4) continuing to acquire communication skills.

Contrasting Views in Critical Thinking

Critical thinking was believed to be cultivated through the group activities with a PBL approach. For instance, when students were asked about their experience of PBL group work regarding health promotion in the HPE course, they responded,

The more I think about it, I think it stimulated us to think independently. In another words, not to just do or follow just what other people do or tell us to do. It also enabled us to express our opinions and share with other people (Student 2, first interview at T3).

In the same interview, Student 4 also expressed a similar view of the simulation for them to think more. She said,

Because we all wanted to do the project well, we thought that if we could express our ideas then it might be possible to stimulate a "chain reaction" to encourage other group members to think more and more.

However, a strong negative perception was identified from the third interview at T2, namely that critical thinking development was not enhanced in the NF course.

I think that whether it's PBL or else, this course was delivered in one direction (theoretical), without critical elements in it. Because there was no critique or thinking incorporated from different perspectives, what you learnt and saw were the existing ways of thinking, and you used these ways to evaluate the content and questions from the course. It was not that you

learnt something and tried to use that to determine whether the topics were real or unreal, true or false, or whether they could be applied. I think this was not considered (Student 3).

From the teachers' point of view, one group facilitator viewed that INT was a really good platform for students to develop critical thinking.

I actually didn't realize that INT introduced the concept of evidence-based practice … I think the most important thing was that through this course, students learnt systematic methods to identify evidence and cultivate their critical thinking. That is to say, the current practice is such and such, but they learnt the ways to search for useful information, perhaps challenging some existing practice. That's what I mean (Facilitator 4 interviewed at T3).

These views demonstrated the contrasting views among students and teachers about the effectiveness of critical thinking development in the three courses.

Continuing the Development of More Effective Group Work

Many issues were raised by the interviewees regarding the group process, e.g. leadership and participation, number of groups, and the physical environment. The most frequently raised concern was relating to the number of groups and the physical environment of the group activities. For instance, Facilitator 2 in interview at T3 commented that,

The course delivery mainly required group discussion, which was facilitated by the teachers. If possible, the student-to-teacher ratio for group activities should be reduced, for instance I had seven smaller groups to facilitate in my room.

Regarding the number of smaller groups that needs to be facilitated at one time, another facilitator in the same interview also commented that, "It's too many". Student 1 in the third interview at T2 expressed a similar view:

And I think the number of tutors was insufficient. One tutor assisted 40 students and wandered around in the seminar room to see all of them. It was difficult for him/her to become fully involved in every smaller group, to see what exactly what the students were doing, or to advise whether their discussion was taking them in the right direction.

Another student commented on the physical environment:

Because there were two groups of students discussing in the lecture theatre, it was disturbing when the other group was discussing more loudly (Student 5, first interview at T3).

On the other hand, for a better group learning process, it appeared that the presence of a good leader was important.

And I think in the groups we need to identify a good leader. This is very important because ultimately if the leader is ineffective, the group will get into the wrong flow and ideas. If the

whole group of people is smart, they'll discover what is wrong altogether. But not every group is effective and clever enough to discover the problem (Student 7, second interview at T3).

However, not all students can be a good leader the first few times.

My group had only one member who was quiet; the other nine were all very active, unlike your group. We changed leaders every time so that nobody could dominate, but the one who was quiet stayed quiet (Student 6, third interview at T2).

Apart from the larger number of groups to be facilitated by individual facilitators at one time and students' leadership issues regarding their self-directed learning, group work was found to be useful for students' learning about open-mindedness.

I think that during the discussion process I could see how other people viewed the topic. Mine was not the only way of looking at the problem. One may think about it in other ways. It's about not only my view, but looking at different perspectives to understand an issue. Actually there can be many ways to do a thing. I think this is good. It (group work) enriches my own thinking process, or my thinking capability. Ultimately it's better to be in a group for learning. More ideas generated from more people are better than one-way reception (Student 2, first interview at T2).

With the issues of large group to teacher ratio, the noisy environment, and developing group leadership to enhance the self-directed group learning, teaching and learning feedback of students and facilitators in the context of group work suggested the need to continue the development of more effective group work.

Self-Directed Learning Through PBL

Students in the first interview at T2 found PBL, although difficult at times, a good experience in training themselves to be self-directed in their learning. For instance,

I think for PBL, we have to find information for some learning materials ourselves. I think this is ok and quite good because you learn how to do it yourself. That means being self-motivated, which pushes you to search for information. This skill can be used in the future (Student 1).

Student 2 agreed, saying,

I agree. Because when I was in high school, my teachers gave us information and we just studied it. And that was ok. But for Nursing Foundations, we need independence to search for information. Therefore, we are trained to have skills that we didn't have before.

Although student 4 experienced the challenge that, "*It's good to have our own motivation and self-directed learning, but searching for the right information was difficult*", self-directedness was considered by students as something that is learnt through PBL activities in groups.

Continuing to Acquire Communication Skills

Further analysis of the transcripts from the focus group interviews with the students indicated that their perceptions of the learning effectiveness of communication exercises aiming at better teamwork and patient care were inconclusive, due to the very contrasting views. For instance, when students in the first focus group interview at T2 were asked what their most impressive experience was, they said,

I think the assessment for video production was quite interesting and fun. And when you shared your production with other students you learnt from seeing each other's deficits. This will help us to communicate with patients better when we are out for clinical attachment later (Student 2).

Student 3 added that, "Actually I think this was a good way. Yeah, I mean production of the communication video. Because all the skills introduced in the lecture could actually be practiced to produce the video". Another student also answered that, "The role play and video production were the most impressive. This was the most interactive part of the whole course and the most interesting experience". However, in the third focus group interview at T2 with another group of students, there were very contradicting comments. For instance, Student 1 commented that, "I don't think I learnt anything from the communication video production at all; it was just for fun!" "Actually I think the communication video production was useless", said Student 2. In addition,

If we have to learn communication, it's not going to be done in one course. In the future we'll see a real patient. For example, if the patient has a very serious illness, like cancer, he/she would be in deep despair. And how can you as a nursing student really cheer him/her up, and show that you are concerned about him/her? I think the real practice is much more important than learning it through role plays (Student 6).

Students preferred actual practice for their communication skills development, rather than addressing hypothetical situations through role plays and video production for peer review and reflection in the groups. The learning of communication skills needs to be further developed.

Discussion

This study had the merits of using multiple informants and mixed methods by collecting data from both students and group facilitators with a set of self-administered questionnaires and focus group interviews.

Comparing the Quantitative and Qualitative Data

Most of the qualitative findings discovered from the focus group interviews were diverse regarding students' learning experiences in the three courses. For instance, both prominently favorable and unfavorable views were expressed by students with regard to group learning for critical thinking. Conflicting views were also found about their experiences of communication skills learning. On the other hand, they were concerned about the setting of group work, where many groups needed to work in one venue with the help of only one facilitator. The exception

for a clear positive trend of learning experience among these students was the development of self-directed learning. One of the identified themes from this study, 'contrasting view in critical thinking', and a still more positive view towards 'self-directed learning through PBL', were comparable with the results of a developmental action inquiry (DAI) on constructing a PBL curriculum for pre-registration nursing education in Hong Kong (Pang et al., 2002). The themes suggest that there is a need to continue the work of developing critical thinking, better group facilitation, and communication skills. These results appeared to be consistent with the insignificant statistical outcomes of CT, GP and SDL before and after the group learning, as measured by the McMaster self-assessment scale in this study. Kuhn (1999) argued a developmental model of critical thinking across the life span from the age of three through three broad categories of meta-knowing: meta-strategic, meta-cognitive and epistemological knowing. The essence of Kuhn's position was that the development of critical thinking was associated with the time available, and it would be benefited by practice in the real context. Furthermore, Fopma-Loy (1999) argued that the use and practice of critical thinking had to be made explicit to students in order to generate better learning outcomes.

Evaluation of Small Group Activities

As planned, at the end of the semester after all the group learning activities were completed, feedback from all facilitators of the three courses was gathered from a focus group interview. However, before the commencement of the first course, there was an unforeseeable decision of the school's workload committee for a new structure of small group learning activities, which differed from the original plan. The new structure was that, instead of having one facilitator for each group of around 10 students out of a class of 167, every facilitator was assigned to facilitate around 40 students in each group. For this group size, four or more smaller groups were formed within groups of students, and their group PBL activities were facilitated by the single facilitator moving about in the same seminar room or lecture theatre. Nevertheless, as represented by the theme 'continue the development of more effective group work', both students and facilitators preferred a higher facilitator-to-student ratio, i.e. a smaller group size, for the group learning activities. Willett et al. (2011) conducted a trial of large-versus small-group learning for second-year medical students, and compared their learning outcomes. No significant difference was detected between the two groups' examination scores (p=0.56), but student satisfaction was lower in the larger group (p<0.001). A randomized controlled study performed by Roberts et al. (2005) compared the outcomes of a PBL module delivered in a large class setting within a lecture theatre (n=194 in 22 groups) against another module conducted in a smaller group PBL setting (n=52 in five groups). Students in the larger group did not score as high on educational effectiveness and perceived academic value as students in the smaller groups. The results indicated that there was no significant difference in basic science knowledge learning outcomes between students in the two different groups. However, similar to Willett et al.'s and our studies, it was discovered that students preferred the smaller group teaching format. The preference of small-group learning, as discovered in this study, was comparable with that in both Willett et al.'s (2011) and Roberts et al. (2005) studies. Whether the new structure of a larger group with sub-groups contributed to the insignificant difference in pre- and post-test levels of CT, GP and SDL in this study remains unknown. The issue of group size for the best learning outcomes remains a topic for further empirical studies

or systematic review, either in the local or international context. More studies are also needed to obtain more evidence and a deeper understanding of the cognitive and emotional effects of small group learning in PBL (Dolmans and Schmidt, 2006).

McMaster Self-Assessment of CT, GP and SDL

When compared with the Cronbach's alphas of the original CT, GP and SDL sub-scales developed by Ladouceur et al. (2004) (0.90, 0.83 and 0.88 respectively), the modified sub-scales for this study were 0.71, 0.80 and 0.81. While the values were similar for GP and SDL, the reliability of the revised version of CT (alpha 0.71) was a relatively more desirable level from the sample of this study than the extremely high level of 0.9 (Ladouceur et al., 2004). The inter-class correlation coefficients (single measures) of each sub-scale were also acceptable in the revised version. The modified McMaster self-assessment questionnaire may be used to act as a better guide to individual students' performance in CT, GP and SDL within a group learning setting. It will also be more meaningful in assessing the development of students' learning skills in these areas across their years of undergraduate study (Kuhn, 1999).

Limitations

Although supplemented by a qualitative approach, this study was limited by the quasi-experimental design of the core quantitative component. A better design would be to have a randomized controlled trial, but ethical concerns about randomizing students to control and experimental groups in a real teaching and learning context remain a challenge. The results of this study suggest good internal reliability and ICC of the McMaster self-assessment questionnaire. Nevertheless, as pointed out by Ladouceur et al. (2004), the CT sub-scale, in particular, may be further developed for better differentiation between the stronger and weaker CT of students.

Conclusions

Revision and evaluation of the three Year 1 nursing courses focusing on small group learning activities in this study for life-long learning skills and capacity generated some useful themes for reflection on future developments and changes to the curriculum. The quantitative results did not indicate any significant change in the broad learning skills of CT, GP and SDL. Many factors might have contributed to this outcome. The impact of change regarding the increased student-to-facilitator ratio for small group learning during the academic year when the study was conducted remains unclear. Within the framework of integrative learning, studies with a more longitudinal design are required to better understand the possible trajectory of changes and development of broad learning skills among students in terms of CT, GP and SDL. The revised McMaster self-administered questionnaire used to evaluate these skills is reasonably reliable and may, subject to further refinement, be used to evaluate students' learning and development over time in the undergraduate nursing program.

More studies on the size and structure of group activities are necessary to confirm the most effective and efficient way of group learning with or without a PBL perspective. Although no significant change was observed in the nursing freshmen in terms of their CT, GP and SDL in this study, it was clear that they had been exposed to the integrative learning environment as

beginning learners on the three foundational courses involved. Although some negative feedback was obtained from the qualitative data, positive feedback was not absent. From the perspective of a developmental model of learning (Kuhn, 1999), the first step was taken in enabling these students to pave the way for the next several years of nursing study, aiming at their development as individuals and as professional practitioners capable of independent life-long learning and critical thinking.

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