Collaborative Learning: A Critical Learning Process for Medical Students

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共同学習：医大生にとって重要な意味を持つ学習過程

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English

Abstract

Purpose: This research study examines the issue of collaborative learning in medical education in Japan and provides some insights into how medical students' view of collaborative learning changes after entering university and how it is impacting their studies.

Methods: A survey questionnaire was distributed to first year medical students, a sample of senior (third and fourth year) students at Hamamatsu University School of Medicine (Japan) as well as to a sample of general university freshmen students in the middle of the second semester of 2010.

Results: 182 questionnaires were returned (140 medical and 42 general students). More similarities than differences were noted between the freshmen student groups whereas the senior medical students had developed a better grasp of collaborative learning and group study.

Conclusions: The main findings of this study are that (1) freshmen medical students may be more conservative than other freshmen university students in study habits and preferences, and (2) senior medical students' study habits were mostly positively influenced by their experience with group learning and there was a strong indication of improved social communication skills.

Key words: collaborative learning, medical education, Japanese universities, PBL

Introduction

Although learning is ultimately an individual endeavor based on the implementation of learning skills, effort and motivation, the degree of success can be positively influenced by broadening students learning experiences to include methodologies that better prepare them for their future careers. Collaborative learning has become a core educational requirement for medical students[1], primarily through the implementation of Problem-Based Learning (PBL), in most modern medical curricula (Davis and Harden 1999, O'Dowd 2005). This recognizes the need for doctors to be able to work together in teams and with other health-care professionals to facilitate interdisciplinary cooperation and more successful medical outcomes. At the medical student level, the desired outcomes of participation in collaborative learning include a significant increase in their understanding and application of medical knowledge, enhanced critical thinking skills, acquiring better interpersonal skills, more satisfaction in learning outcomes, and greater self-confidence when in clinical settings (O'Dowd, 2009). Regrettably, collaborative learning is not something that comes naturally to most freshmen medical students as their previous learning experiences have been usually based on rote memorization and individual study of set textbooks in preparation for university entrance examinations. Compounding the problem is the concurrent exponential increase in medical knowledge, which means that just covering the basics is inadequate; students need to learn the basic concepts of medicine as well as how to apply what they have learnt where to find and how to incorporate new information, and have the cognitive and interpersonal skills to solve diagnostic problems. In an attempt to address these needs, medical schools have made major efforts over the past decade to reform their curricula with the inclusion of PBL where the focus of learning is redirected to the learners themselves working together in collaboration with a tutor. The verdict on whether or not this has been successful in medical schools around the globe is still somewhat mixed[2] and further study is needed to develop a more accurate picture of the scheme as a whole as it has developed in each academic setting.

This paper will briefly examine how medical students' view collaborative learning after entering university and how it is impacting their current studies as well as the issue of collaborative learning as it is applied in a typical Japanese medical university.

Collaborative learning

The *Collins COBUILD English Dictionary for Advanced Learners* defines the term "collaborative" as "a piece of work done by two or more people or groups working together." The term "collaborative learning", however, is open to a wider range of interpretations and distinctions; indeed, it has become an umbrella term covering a variety of educational approaches centered on two or more students, or students

with teachers, coming together for a combined learning activity to create understanding or solutions. For the purposes of this paper, I lean towards UNESCO's definition of it, which is, "*when learners work in groups on the same task simultaneously, thinking together over demands and tackling complexities. Collaboration here is seen as the act of shared creation and/or discovery.*"[3] This definition best describes the process of collaboration that medical students need to engage in to develop the knowledge and skills needed for their future careers.

Collaborative learning is much more than just doing "group work". As the delivery of education has shifted away from the simple teacher-centered lecture-style model towards more flexible student-centered models, more emphasis has been placed on developing learner skills and styles, learner autonomy and cognitive skills to facilitate "deep learning" as opposed to "surface learning". In his book on groupwork, Reynolds (1994) described the role of the teacher as also shifting from "custodian of knowledge" to "manager and facilitator of learning". Students working in groups are now a common practice, based on the belief "*that students will learn more easily because they are more involved, or that they can and should learn from each other and from the experience which can be generated in groupwork, or that learning in groups is preferable on social or political grounds – it is how people should work together*"(Reynolds, 1994, p.24). Within the framework of working together in a group, students have the opportunity to develop the dynamics of individuals working together to produce a synergy that can facilitate the learning of every student in that group. At its best, the process of collaborative learning will amalgamate the students' own work and knowledge, new information each has collected, their varying perspectives and insights on what is being studied, cooperation to get all the study done, and highlight the strengths and weaknesses of their interpersonal skills. Indeed, the success of each group may depend on their willingness to leave their individual comfort zone and embark on a new path requiring new skills and perspectives. The processes of collaborative learning have their roots well grounded in learning theory; primarily, that it embodies the idea that learning is an active and constructive process. In collaborative learning, students must work together actively and with a common purpose to integrate new information to create new learning for all members. This requires the students to activate three areas of indirect learning strategies outlined by Oxford (1990, p.17);

(1) Metacognitive strategies: (a) students centering their own learning
(b) planning and arranging their own learning
(c) evaluating their own learning

(2) Affective strategies: (a) lowering their anxiety about group work
(b) encouraging themselves as they progress
(c) taking their emotional temperature

(3) Social strategies: (a) asking questions
(b) cooperating with others
(c) empathizing with others

These are the very skills that medical students need to develop to be successful in the problem-based learning tutorials in their third and fourth year programs (O'Dowd, 2005).

A learning process critical for medical students

Why is it necessary to require medical students to change their traditional individualistic learning styles and participate in collaborative learning? Quite simply, medical students now need to learn how to learn (to become life-long learners) and how to locate and manage new information rather than just memorizing basic facts. Traditional education stressed the mere learning of facts that are then tested through written examinations; this approach does not evaluate the students' development of higher-order thinking skills that enable them to understand information presented to them and then be able to analyze, synthesize, evaluate and apply it in different medical situations. Collaborative learning is now considered by many medical university educators to be a far better approach for developing the critical thinking skills and interpersonal skills needed by doctors in their future practice. Indeed, one of the basic elements of collaborative learning is the development of teamwork skills necessary for members to successfully achieve group goals. Teamwork skills do not come naturally to many medical students and so must be taught and developed over time; skills such as leadership, communicating, sharing, negotiating, building trust, decision making, supporting and even conflict management. Students working together will have to learn how to cooperate and help each other in positive ways to increase their combined learning. This means learning how to share information with others and being able to explain what they understand so that others can learn and benefit. However, this is easier said than done; I believe the reality of the situation for our medical students is much more difficult and complex as they struggle to cope with their new learning environment and try to pass their program courses with increasing workloads and study burdens. Therefore, I undertook this study to uncover how medical students' view collaborative learning after entering university and how it is impacting on their study habits and approach to their current studies.

Classroom research

Subjects and methodology

The initial research step for this study was to conduct a survey of first year medical students at Hamamatsu University School of Medicine (HUSM), senior medical students (third and fourth years) who have participated in problem-based learning tutorials at HUSM and some general university students

at Nihon University Mishima campus. A total of 182 survey forms in the second semester of 2010: 104 from HUSM freshmen, 36 from senior HUSM students, and 42 from freshmen students at the Mishima campus. The student survey instrument (Appendix 1) for this study was based on earlier instruments I had independently developed for other studies and was written in Japanese, as all the students surveyed were not English majors. This instrument was distributed to students after class time and completed forms were collected during the class break. It asked students to think about seven questions and either check or write their replies in Japanese or English; most of the students replied in Japanese.

Results

Here are the summarized results of the survey responses. All data is shown as percentages of each survey sample; raw data is shown in Appendix 2.

1. How do you see yourself as a learner?

Responses	1st yr Med	Senior Medical	General university
I study best by myself	56.7	19.4	64.3
My concentration is disturbed by others	14.4	50.0	23.8
I try to solve my problems alone	26.9	8.3	14.3
I study better when I am with others	24.0	16.7	16.7
I like to help others study	50.0	47.2	45.2

2. Have your study habits changed since entering this university?

Responses	1st yr Med	Senior Medical	General university
Yes	72.1	77.8	61.9
No	27.9	22.2	38.1

3. Do you study better or worse when others are involved?

Responses	1st yr Med	Senior Medical	General university
Better	26.0	61.1	28.6
Worse	30.8	13.9	21.4
Same	43.2	25.0	50.0

4. What do you think of when you see the word "collaboration"?

1st yr Med	Senior Medical	General university
other's opinions are helpful = 31.7	more effective learning = 27.8	get others ideas / opinions / information = 28.6
not for all study = 25.0	teach each other = 19.4	help each other = 23.8
helpful = 9.6	group members are important = 19.4	better than study alone = 19.0
depends on group members = 7.7	get new knowledge = 11.1	distracting = 16.7
competition/stimulating = 5.8	better understanding = 8.3	only on projects/ tough subjects = 7.1
help each other = 5.8	doesn't always work = 8.3	
good for communication skills = 2.9		
can do what an individual can't = 2.9		

5. When you must work with others, how do you learn with others?

Responses	1st yr Med	Senior Medical	General university
discussing my problems	13.5	5.5	19.0
reading the text	23.1	11.1	40.5
check my understanding	26.0	25.0	38.1
exchange class notes	26.9	2.8	21.4
asking others questions	15.4	41.7	76.2
communicating by discussion to get knowledge	22.1	11.1	21.4
doing assigned homework together	41.3	2.8	42.9
comparing class problems	25.0	13.9	42.9
copying homework	3.8	0.0	4.8
cooperate on projects	15.4	5.6	21.4
listening to others explanations	69.2	27.8	21.4

6. When do you study with others?

Responses	1st yr Med	Senior Medical	General university
Class time only	19.2	2.7	40.5
Lunch time	3.8	16.7	26.2
After class at school	65.4	86.1	26.2
Weekends	17.3	36.1	2.4
Library	34.6	11.1	33.3
Someone's home	27.9	5.6	16.7
Study area / tutorial room	0.0	66.7	14.2
Restaurant / coffee shop	5.8	5.5	0.0

7. How long do you study with others each week now?

Responses	1st yr Med	Senior Medical	General university
Less than 1 hour	63.5	2.7	57.1
1 to 2 hours	16.3	5.6	19.0
3 to 4 hours	4.8	33.3	16.6
About 10 hours or more	0.0	27.8	0.0
Only for tests	5.8	11.1	2.4
Don't study	3.8	0.0	7.1

Discussion

Question one asked students to reveal how they see themselves as learners in a group context. Although freshmen medical students had, by the time of the survey, already had some expose to collaborative learning processes through my English classes (English IA and English Conversation I), 56.7% responded that they still preferred to study by themselves while 50.0% didn't mind helping other students when the occasion arose, possibly reflecting their need to develop social contacts in their new learning environment. General university freshmen showed a stronger preference for individual study (64.3%) as most have had little exposure to group work to that point. Senior medical students, with a greater exposure to group learning through PBL, showed the greatest affinity for collaborative learning by their response that only 19.4% studied best by themselves. Nevertheless, their response to whether they studied better with others was no better than general university students and below that of freshmen. Indeed, 50.0% of seniors responded their concentration was disturbed by others, perhaps reflecting the difficulties they have with collaborative group work.

As to whether or not their study habits have changed since entering university, it is natural for senior medical students to have responded as the most changed (77.8%) due to the demands of PBL in their medical curriculum, however, it is the 22.2% of seniors who responded they have not changed that may be the cause of "*disturbances*" (Question 1) to others. Medical students in both groups mentioned group study in their responses while none in the general university group mentioned it as a factor.

Question three asked if students studied better or worse if others were involved. As could be expected, senior medical students responded more positively that they studied better in collaborative study (61.1%) whereas medical freshmen were more similar to general university students (26.0% and 28.6% respectively). More medical freshmen responded that group study was worse for them (30.8%), compared with just 13.9% of senior medical students, perhaps reflecting the difficulty some students have in adjusting to their new learning environment and the new demands on them from their university teachers.

When asked what they think of when they see the word "collaboration", freshmen medical students responded with a range of ideas. On the positive side, "*other's opinions are helpful*" (31.7%), "*help each other*" (5.8%), "*competition/stimulating*" (5.8%), "*can do what an individual can't do*" (2.9%), and "*good for communication skills*" (2.9%). On the negative side, "*not for all study*" (25.0%), "*uncomfortable*" and "*needs rules*". Most senior medical students commented primarily on the technical aspects, such as "*more effective learning*", "*teach each other*", "*get new knowledge*", and "*better understanding*". Several also commented that the composition of the study group is very important in determining how much each can achieve and learn, and as such "*doesn't always work*". Finally, the responses of general university students were overall closer to the definition of collaborative learning, but also included comments such as "*distracting*" (16.7%) and "*only on projects or tough subjects*" (7.1%).

Question five asked students about how they learn and study in collaborative groups. Freshmen medical students responded with "*listening to others explanations*" (69.2%), "*doing assigned homework together*" (41.3%), "*exchange class notes*" (26.9%), "*check my understanding*" (25.0%) and "*comparing class problems*" (25.0%); these responses reflect their practical approach to study and their elementary understanding of the processes involved in collaborative work. Senior medical students responded with "*asking others questions*" (41.7%), "*listening to others explanations*" (27.8%), and "*check my understanding*" (25.0%); their responses reflect a greater use of social and communication skills involved in working together. Finally, the responses of general university students reflect their utilitarian approach to study: "*asking others questions*" (76.2%), "*doing assigned homework together*"(42.9%), "*comparing class problems*" (42.9%), "*reading the text*" (40.5%), "*check my understanding*" (38.1%).

Question six not only asked when students studied but also where they dedicated time for collaborative learning. Medical students showed a strong preference for after school (65.4% and 86.1% respectively), whereas general university students were equally disposed to studying at lunchtime (26.2%). Both freshmen groups chose the library for group study (medical students 34.6%, general university students 33.3%), whereas senior medical students preferred the more cloistered tutorial rooms. Freshmen medical students preferred to study at a group member's home (27.9%) compared to 5.6% of senior students and 16.7% of general university students. Interestingly, 5.8% of freshmen medical students and 5.5% of their seniors replied that restaurants and coffee shops were used to meet with other students for study purposes.

Question seven asked how long students studied with others each week. Most freshmen medical students and general university students responded that they studied less than one hour per week with others, 63.5% and 57.1% respectively, indicating that they were still continuing with their previous individualistic study mode. Senior medical students spent far more time in collaborative study, with 33.3% spending three to four hours per week and 27.8% spending ten hours or more each week.

The responses to the survey indicate that freshmen medical students may be more conservative in their views on study habits than other freshmen university students, hanging onto their familiar study styles. However, the responses of senior medical students' indicate their study habits have mostly been positively influenced by their experience with group learning and there is a strong indication of the development of improved social communication skills. Based on these findings, the challenge for medical educators is how to introduce group learning practices in the most efficient way while supporting freshmen as they adjust to the new and unfamiliar learning environment.

Formative steps to collaborative learning

After all the strenuous study to successfully enter the medical university, many freshmen complain of "study fatigue" and so begin their first year program without the strong focus they previously had (O'Dowd, 2006). I strongly believe that medical educators should at the earliest opportunity introduce freshmen to collaborative learning in their first year program as it presents both a novel framework for them to adapt to their new learning environment as well as encouraging more social interaction and social skill building and laying a strong foundation for their future collaborative studies in PBL.

In my English program classes, collaborative learning is achieved through my class group system of having students participate in small groups for class work. The groups are formed in the first class of the semester and from that day forth play an important role in each and every class. Students work together,

checking homework, sharing research and ideas, completing exercises and activities and keep a record maintained by the group members themselves, with a different member assigned the task of being the record-keeper/manager for each class. Intellectual integrity is an important trait of the physicians mind, but it also needs other traits to complete it, such as intellectual courage, and intellectual perseverance; these traits need to be introduced and practiced from the very beginning of their studies Without an educational framework to help students develop these traits, collaborative learning is more likely to become collaborative inertia (O'Dowd, 2007).

Conclusion

Collaborative learning in medical universities cannot be considered an optional learning style; rather, it is an integral part of medical students' education and professional development. This study found that (1) freshmen medical students may be more conservative than other freshmen university students in study habits and preferences and so may need more exposure to collaborative learning situations to develop needed traits and skills, and (2) senior medical students' study habits were mostly positively influenced by their experience with group learning with a strong indication of improved social communication skills. The limitations of this study were the sample sizes, the subjective nature of the survey instrument, and the lack of general applicability of its findings to other medical institutions; future research needs to be carried out on larger samples of students in a more prospective and systematic way. Indeed, learning across medical curriculums will experience evolution and change over time and future studies should take this into consideration. At present, medical students who participate actively in collaborative learning and feel the experience is positive should be able to significantly increase their understanding and application of medical knowledge, enhance their critical thinking skills, acquire better interpersonal skills, achieve more satisfaction in their learning outcomes, and feel greater self-confidence when in clinical settings when their begin their fifth and sixth year programs.

Notes

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Appendix 1

Survey 2010　(Japanese)

1.　学習者としての自分をどのように考えますか。

（　）私は単独学習がもっとも効率があがる。　　（　）人がそばにいると勉強に集中できない。

（　）私は学習中疑問が生じても自分ひとりで解決しようとする。

（　）私は単独学習よりも共同学習のほうが勉強がはかどる。　　（　）私は勉強仲間が困っていれば、積極的に力を貸したいと思う。

2. 入学後あなたの学習習慣は変化していますか。（　）はい　　（　）いいえ

どう変化したのか説明してください。.....

3. 人がそばにいたり、共同学習している場合、あなたの学習ははかどりますか。

（　）はかどる　　（　）じゃまされると感じる　　（　）まったく影響をうけない

4.「共同学習」という学習法についてあなたはどう評価しますか？ 漠然とした印象でもいいですからあなたの考えを簡単に述べてください。

.....

5. やむをえず共同学習形式を選ばなければならない場合、あなたはどのように学習しますか。

（　）自分が取り組んでいる問題について議論
（　）テキストを使い一緒に問題に取り組む
（　）自分の理解力の確認
（　）書き漏らしがないかノートを交換して確認
（　）分からない時には共同学習者に質問する
（　）他者と議論することによりコミュニケーション能力を高める
（　）宿題を一緒にする
（　）問題点を比較しあう
（　）共同学習者の宿題を丸写し
（　）プロジェクトについて協力しあう
（　）共同学習者の説明を聞く

6 あなたがグループ学習するのはどういう時間帯ですか。また場所はどこですか。

授業中のみ　　学校の昼休み　　放課後　　週末　　その他の時間＿＿＿＿＿＿＿＿

図書館で　　グループのだれかの自宅　　その他の場所＿＿＿＿＿＿＿＿＿＿

7. 現在、毎週何時間くらいグループ学習を実行していますか。

（　）1時間未満　（　）1～2時間　（　）3～4時間　（　）その他＿＿＿＿＿＿＿

Appendix 1

Survey 2010　(English)

1.　How do you see yourself as a learner?

(　) I study best by myself　　(　) My concentration on study is disturbed by others

(　) I try to solve my problems alone

(　) I study better when I am with others　　(　) I like to help others study

2. Have your study habits changed since entering this university?　(　) Yes　(　) No

Explain how……..……..

……..……..

3. Do you study better or worse when others are involved?

(　) better　　(　) worse　　(　) it is the same.

4. What do you think of when you see the word "collaboration"?

……..

……..

5.　**When you must work with others, how do you learn with others?**

(　) discussing my problems　　(　) doing assigned homework together

(　) reading the text　　(　) comparing class problems

(　) check my understanding　　(　) copying homework

(　) exchange class notes　　(　) cooperate on projects

(　) asking others questions　　(　) listening to others explanations

(　) communicating by discussion to get knowledge

6.　When do you study with others?

(　) only in class time　(　) at the library　(　) lunch-time at school　(　) after class at school

(　) on weekends　(　) someone's home　(　) .....

7. How long do you study with others each week now?

(　) less than 1 hour　(　) 1 to 2 hours　(　) 3 to 4 hours　(　) .....

Appendix 2

Survey responses 1st year medical students (N = 104)

1. How do you see yourself as a learner?

I study best by myself = 59
My concentration on study is disturbed by others = 15
I try to solve my problems alone = 28
I study better when I am with others = 25
I like to help others study = 52

2. Have your study habits changed since entering this university? Yes = 75 No = 29

less study = 24
study with group = 12
only before tests = 6
don't study = 7
too busy to study = 3
concentrate on new subjects = 2
can't study regularly = 6
no good study place = 6
only study at school = 3

3. Do you study better or worse when others are involved? better = 27 worse = 32 same = 45

4. What do you think of when you see the word "collaboration"?

other's opinions are helpful = 33
help each other = 6
uncomfortable = 1
good for communication skills = 3
helpful = 10
needs rules = 1
not for all study = 26
competition/stimulating = 6
can do what an individual can't do = 3
depends on group members = 8

5. When you must work with others, how do you learn with others?

14 discussing my problems
43 doing assigned homework together
24 reading the text
26 comparing class problems
27 check my understanding
4 copying homework
28 exchange class notes
16 cooperate on projects
16 asking others questions
72 listening to others explanations
23 communicating by discussion to get knowledge

6. When do you study with others?

class time only = 20
lunch-time at school = 4
after class at school = 68
weekends = 18
library = 36
someone's home = 29
restaurant/coffee shop = 6

7. How long do you study with others each week now?

less than 1 hour = 66
1 to 2 hours = 17
3 to 4 hours = 5
only for tests = 6
don't study = 4

Appendix 2

Survey responses　Senior medical students　(N = 36)

1. How do you see yourself as a learner?

I study best by myself = 7　　My concentration on study is disturbed by others = 18

I try to solve my problems alone = 3

I study better when I am with others = 6　　I like to help others study = 17

2. Have your study habits changed since entering this university?　Yes = 28　No = 8

More study = 4　　group study needed = 4

3. Do you study better or worse when others are involved?　better = 22　worse = 5　same = 9

4. What do you think of when you see the word "collaboration"?

more effective learning = 10　　teach each other = 7　　group members are important = 7

get new knowledge = 4　　better understanding = 3　　doesn't always work = 3

5. When you must work with others, how do you learn with others?

2	discussing my problems	1	doing assigned homework together
4	reading the text	5	comparing class problems
9	check my understanding	0	copying homework
1	exchange class notes	2	cooperate on projects
15	asking others questions	10	listening to others explanations
4	communicating by discussion to get knowledge		

6. When do you study with others?

class time only = 1　　lunch-time at school = 6　　after class at school = 31　　weekends = 13

library = 4　　someone's home = 2　　restaurant/coffee shop = 2　　tutorial room = 24

7. How long do you study with others each week now?

less than 1 hour = 1　　1 to 2 hours = 2　　3 to 4 hours = 12

only for tests = 4　　don't study = 0　　about 10 hours or more = 10

Appendix 2

Survey responses General university students (N = 42)

1. How do you see yourself as a learner?

I study best by myself = 27 My concentration on study is disturbed by others = 10

I try to solve my problems alone = 6

I study better when I am with others = 7 I like to help others study = 19

2. Have your study habits changed since entering this university? Yes = 26 No = 16

less study = 15 study alone/ no change = 4 study my favorite subjects more = 3

3. Do you study better or worse when others are involved? better = 12 worse = 9 same = 21

4. What do you think of when you see the word "collaboration"?

help each other = 10 get others ideas/opinions/information = 12

better than study alone = 8 distracting = 7 only on projects or tough subjects = 3

5. When you must work with others, how do you learn with others?

8	discussing my problems	18	doing assigned homework together
17	reading the text	18	comparing class problems
16	check my understanding	2	copying homework
9	exchange class notes	9	cooperate on projects
32	asking others questions	9	listening to others explanations
9	communicating by discussion to get knowledge		

6. When do you study with others?

class time only = 17 lunch-time at school = 11 after class at school = 11 weekends = 1

library = 14 someone's home = 7 free time = 1 study area = 6

7. How long do you study with others each week now?

less than 1 hour = 24 1 to 2 hours = 8 3 to 4 hours = 7 only for tests = 1 don't study = 3