

What Should Be Altered in the Newly Introduced Integrated Preclinical Curriculum? : A Qualitative Study of Curriculum Reformation

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Purposes

The purpose of this study is to analyze the pros and cons of the integrated curriculum which has been introduced in 2011 to the 4th-year preclinical education at Tohoku University School of Medicine (TUSOM). Our goal is to provide valuable information for further improvement of the new curriculum.

Problems

Fourth-year curriculum of TUSOM is comprised of two major components, lecture courses of clinical medicine and training courses of basic clinical skills. The lecture part, which accounted for approximately 85% of total hours of 4th-year curriculum, was divided into 30 discipline-based courses, all of which were compulsory, until the academic year of 2010. This departmentalized curriculum had been developed during the late 1990s through the early 2000s when major departments (internal medicine, general surgery, etc.) had been divided into many subspecialties. Two major problems with this curriculum have been indicated both by faculty and students. The first one was the frequent examinations by each of the 30 disciplines that each had its own course and exam. Complaints by 4th-year students about the hectic schedule of lectures and

tests were frequently seen in their year-end curriculum evaluation sheets. For instance, one 4th-year student wrote in 2010, "When I reflect back on the past year, I feel I have acquired almost nothing because the curriculum was really tight and I've been always hurried into preparing for tests." Similar opinions on 4th-year curriculum were expressed even by 6th-year students in their final evaluation of six-year education they had taken at TUSOM. In addition, doctors who gave lectures to 4th-year students commonly witnessed and reported that students sat in the lecture hall working hard to prepare for the next test but not listening to his/her lecture itself. This vicious circle may have encouraged students to memorize factual knowledge, but prevented them from fostering higher cognitive abilities, i.e. interpretation, application and problem solving. The second problem was the lack of collaboration among related disciplines. For instance, the departments of cardiovascular medicine and cardiovascular surgery provided lectures and conducted exams with no communication about their course contents until 2010. It is likely that there has been redundancy and significant gaps in the curriculum due to the lack of communication among departments.

To overcome this problematic situation, TUSOM

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created a working group in 2009 with a few core faculty responsible for preclinical and clinical education. The working group drafted a preliminary plan for the reformation of 4th-year curriculum, after repeated deliberations, and disclosed the plan in 2010 to all the departments involved in 4th-year education. The purpose of the plan was to integrate the preclinical curriculum, based on organ systems and three domains of educational taxonomy, knowledge, skills and attitudes.¹⁾ As the first step in implementing this plan, four major blocks - Circulatory System, Respiratory System, Digestive System, and Neural System - were created in 2011. Of the 30 disciplines, 9 were involved in the four blocks, and 21 disciplines were to be consolidated into a total of 9 blocks in 2012.

Analysis of the quality of the four blocks that have been phased in in 2011 would provide precious information for the improvement of the four blocks as well as for the other nine blocks which will be created in 2012.

Research design

Three blocks - Circulatory System, Respiratory System, and Digestive System - started during April and were completed by the end of July 2011. The Neural System block was conducted during September through October 2011.

A survey was conducted to collect opinions from students and course directors during late October in 2011 after completion of all the four blocks that had been newly introduced to 4th-year curriculum. In the survey, five Likert 5-point scale questions about the block system were asked to see the perceptions of students and the directors of clinical education: questions 1 to 5 asked about understandability, course materials, collaboration among lecturers, preparation for tests and overall success of the block system, respectively (Figure 1). In addition to the rating-scale questions, three open-ended questions

were added to ask students and course directors about good points, *NOT* good points, and proposals for improvement, of the block system (Tables 1 and 2). Students answered the questionnaire using a paper form in an anonymous way while course directors did using an electronic form via email and hence not anonymously.

We also used two major methods of qualitative research, document analysis and interviewing with purposive sampling,²⁻⁴⁾ in this study. A semi-structured focus-group interview was conducted on November 8, 2011 with a group of four 4th-year students who volunteered to participate in it. One of the authors (SI) served as the interviewer and facilitated the students to talk freely about the block courses. The interview lasted for 38 minutes, and was audio-recorded with an agreement of the interviewees. The audio-record was transcribed verbatim by a company specific for transcription. A focus-group interview with course directors was also planned but was not conducted because of their time constraints.

The comments written by students and course directors in the survey and the transcribed record of the interview were analyzed according to the content analysis method.^{3,4)} Three members of this study (SI, FT, YA) read the comments first, and each of them analyzed the data independently to decide themes. Then the three researchers met and compared their thematic analyses to find approximately 70% agreements among their results. Then the researchers reread the documents iteratively and discussed the themes again, and finally the themes were decided by their agreement. Member-checking of the themes was done by the four students participated in the focus group interview, which resulted in no alterations to the themes. The member-checking of the themes identified from course directors' comments were not performed in this study.

Results

1. Survey of the perceptions of students and course directors about the block system (Figure 1).

Of the 93 4th-year students, 47 (51%) participated in the survey, and 10 (71%) directors of clinical education out of 14 directors involved in the four blocks participated. More than 70% of both students and course directors answered positively to the questions regarding the understandability (Q1) and overall success (Q5) of the block system. To the question about the easiness of preparation for tests in block courses (Q4), more than 50% of students and course directors responded positively while

approximately 20% responded negatively. There was a discrepancy between the perceptions of students and course directors about the course materials (Q2) and collaboration among lecturers (Q3). While 56% of students answered that course materials were useful, only 40% of course directors who had provided the materials for students did so. In contrast, only 43% of students agreed and 30% of them disagreed that collaboration among lectures was satisfactory while 70% of course directors agreed that it was satisfactory.

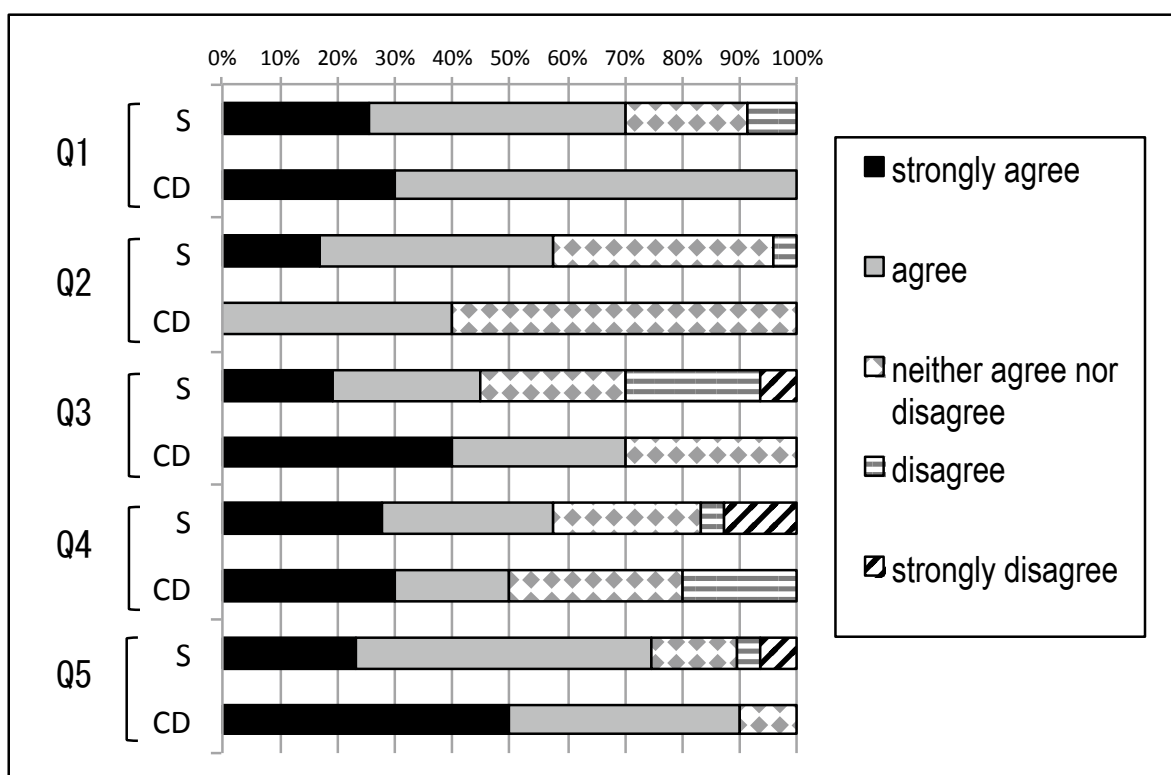


Figure 1. Survey results of students' and course directors' perceptions of block courses.

Q1 to Q5: Question 1 to Question 5

S: responses from students (of the 93 4th-year students, 47 answered).

CD: responses from course directors (of the 14 course directors, 10 answered).

Question 1: Block courses were more understandable than department-based courses.

Question 2: Learning materials provided by block courses were useful.

Question 3: Collaboration among lecturers in block courses was satisfactory.

Question 4: Preparation for tests was easy in block courses.

Question 5: In general, introduction of block system was successful.

2. Themes identified from students' and course directors' survey comments (Tables 1 and 2).

From students' survey comments about good points and *NOT* good points of block courses, four themes each were identified (Table 1). The themes identified in students' comments as good points were 1) improved understandability, 2) reduced redundancy, 3) combined course tests and 4) unified learning materials, while those as *NOT* good points were 1) heavy burden of each test, 2) inadequate learning materials, 3) insufficient collaboration among faculty/departments and 4) redundancy remained. From course directors' survey comments

about good points and *NOT* good points of block courses, four themes each were also identified (Tables 2). The themes identified in course directors' comments as good points were 1) improved collaboration among faculty/departments, 2) reduced redundancy, 3) improved understandability and 4) combined course tests, while those as *NOT* good points were 1) insufficient collaboration among faculty/departments, 2) difficulty in scheduling among faculty, 3) difficulty in preparing tests and 4) redundancy remained. In the proposals for block courses from students and course directors, four themes each were identified (Tables

Table 1. Themes identified from survey comments of 47 4th-year students.

What were the good points of block courses?		
Themes	Number of comments	Typical comments
1. Improved understandability.	13	"I could learn a disease from multiple aspects." "It was easy to memorize important points."
2. Reduced redundancy.	12	"Did not have to study similar subjects repeatedly."
3. Combined course tests.	4	"Several tests were combined into one test."
4. Unified learning materials.	3	"Just one textbook covered one block."
What were the <i>NOT</i> good points of block courses?		
Themes	Number of comments	Typical comments
1. Heavy burden of each test.	13	"It was hard to prepare for tests because of the wide range covered by one block."
2. Inadequate learning materials.	9	"Each department prepared learning materials by its own way."
3. Insufficient collaboration among faculty/departments.	3	"Sometimes teachers did not appear on time due to poor communication among them."
4. Redundancy remained.	2	"There was considerable overlap among lecture contents in a block."
What would you propose to improve block courses?		
Themes	Number of comments	Typical comments
1. Further collaboration among faculty/departments.	4	"I think lectures could be arranged more effectively, for instance, lectures on lung cancer by medical oncology and thoracic surgery departments could be combined."
2. Distribution of course materials.	2	"I want the course materials distributed by Internet."
3. Preparation of guide for essential learning issues.	1	"I want the guide for essential learning points in each course."
4. Preparation of mini-tests.	1	"Mini-tests after a lecture (provided by some lectures) helped me to understand the important points."

Table 2. Themes identified from survey comments of 10 course directors.

What were the good points of block courses?		
Themes	Number of comments	Typical comments
1. Improved collaboration among faculty/departments.	9	"It was of great help to know the contents and framing of other courses."
2. Reduced redundancy.	7	"Reduction of redundancy allowed time for detailed teaching."
3. Improved understandability.	2	"(Block system) helped students to understand diseases effectively."
4. Combined course tests.	2	"It was good that tests of relevant courses were combined into one."
What were the <i>NOT</i> good points of block courses?		
Themes	Number of comments	Typical comments
1. Insufficient collaboration among faculty/departments.	2	"I was not sure what other lecturers had spoken prior to my lecture."
2. Difficulty in scheduling among faculty.	2	"It was hard to arrange faculty's time to meet the lecture schedule."
3. Difficulty in preparing tests.	2	"There was a minor confusion in preparation of the test."
4. Redundancy remained.	1	"Because of the shortage of time for preparation, there still remained redundancy of lectures."
What would you propose to improve block courses?		
Themes	Number of comments	Typical comments
1. Further collaboration among faculty/departments.	5	"Further refinement of course contents is necessary to enhance students' comprehension." "Horizontal collaboration involving multiple blocks will be required to teach students the holistic approach to patients."
2. Support cost of teaching materials.	1	"Support for the cost of preparing course materials should be considered."
3. Appropriate size of tests.	1	"Test size should be appropriate and not too extensive."
4. Secure time for preparation of teaching.	1	"Sufficient time for preparation of the block-based teaching should be secured."

1 and 2). Students proposed 1) further collaboration among faculty/departments, 2) distribution of course materials, 3) preparation of guide for essential learning issues and 4) preparation of mini-tests, while course directors proposed 1) further collaboration among faculty/departments, 2) support cost of teaching materials, 3) appropriate size of tests and 4) secure time for preparation of teaching.

3. Themes identified from focus group interview with four students (Table 3).

From the focus group interview with four students, four themes were identified: 1) improved

understandability, 2) careful reformation of curriculum, 3) decreased frequency versus increased burden of tests and 4) preparation of learning materials.

4. Comparison of the themes identified from students' and course directors' survey comments and students' focus group (Table 4).

The themes identified in various data sources about the block courses were compared in a table, and they were categorized into eight major themes. Four of the eight themes, 1) improved understandability, 2) reduced redundancy, 3) departmental collaboration

and 4) combined tests, were identified in the survey comments from both students and course directors. One other theme, unified learning materials, was identified in students' comments, and another two themes, secure time for preparation of teaching and need for financial support, were identified in course directors' comments. In addition, careful curriculum reformation was identified as a theme from the focus group interview with students.

Discussion

Curriculum of TUSOM has been extensively altered since the beginning of 21st century in parallel with the global and national trends in curricular reformation of healthcare professions' education.⁵⁾ It is important to analyze the outcome of a new curriculum to further improve the curriculum, and there have been a number of reports on major curriculum reformation in medical education.^{6~11)} However, most of them are descriptive work which presents the processes of curriculum change experienced by a single or a few institutions.^{6~10)} An extensive literature search using the PubMed¹¹⁾ and EBSCO Health Source¹²⁾ yielded only one article in which qualitative methods were applied to the analysis of a major curricular transformation that had been introduced to a medical school in the US in 2001.¹³⁾

Qualitative methods have been widely used in the social sciences including educational research.⁴⁾ The methods have been accepted in the area of medicine as a means to understand patients' and healthcare providers' beliefs and behaviors.^{14, 15)} Researchers of medical education have also applied the methods to the analysis of doctors' and students' attitudes and perceptions.^{2, 3, 16)} Qualitative research analyzes the quality of a particular activity/situation or attitudes/behaviors of people in the natural setting.^{3, 4, 16)} Three major methods are utilized in qualitative research, namely, document analysis, interviewing

and observation.^{3, 4)} In this study, we used document analysis and interviewing to evaluate the newly introduced curriculum at TUSOM.

In the survey we conducted, a good agreement was seen between the perceptions of students and faculty about the introduction of a block system to 4th-year preclinical education (Figure 1). Both of the two stakeholder groups were mostly positive about the new curriculum. Qualitative analysis revealed that they shared four themes in common, improved understandability, reduced redundancy, departmental collaboration and combined tests, about the block courses (Table 4). Rooms for improvement were identified regarding the redundancy and collaboration. There were ambivalent responses from both students and faculty to the tests in block courses (Tables 1-4). Though both of them regarded combined tests as a good point of block system, students thought that burden of each test had increased (Tables 1 and 3) while faculty felt that it was hard to prepare a test (Table 2). Because one of the purposes of our curriculum reformation was to reduce the load of tests on students, appropriate size and timing of tests should be considered as proposed by students and faculty (Table 4). In addition to the four themes shared by students and faculty, two other themes, improved learning materials and careful reformation of curriculum were identified from students' comments, and two another themes, secure time for preparation of teaching and need for financial support were identified from faculty's comments (Table 4). It is natural that different themes were identified from the two stakeholder groups because students and faculty see the curriculum from different viewpoints.

Discrepancies between students' and faculty's perceptions were also observed in the survey results: fewer students than faculty responded that collaboration among lecturers was satisfactory, while fewer faculty than students responded that course

Table 3. Themes identified from the semi-structured focus group interview with four students.

Themes	Number of students who commented	Typical comments
1. Improved understandability.	4	“Organ-based lectures are easy to understand.” “The multidisciplinary approach provided by the block system really helped me to enlarge my perspective of diseases.”
2. Careful reformation of curriculum.	4	“I hope the combination of departments in the new blocks will be carefully decided.”
3. Decreased frequency versus Increased burden of tests.	3	“It is good that the frequency of tests has decreased in the block system.” “The burden of one test is quite heavy in the block system.”
4. Preparation of learning materials.	1	“I cannot concentrate on lectures when course materials are not dished out.”

Table 4. Comparison of the themes identified from students’ and course directors’ survey comments and students’ focus group.

Major themes	Positive/Negative aspects, Proposals	Themes from students’ survey comments	Themes from course directors’ survey comments	Themes from students’ focus group
1. (improved) Understandability	Positive:	Improved	Improved	Improved
	Negative:	-	-	-
	Proposal:	Preparation of essential learning issues.	-	-
2. (reduced) Redundancy	Positive:	Reduced	Reduced	-
	Negative:	Remained	Remained	-
	Proposal:	-	-	-
3. Departmental collaboration	Positive:	-	Improved	-
	Negative:	Insufficient	Insufficient	-
	Proposal:	Further collaboration	Further collaboration	
4. (combined) Tests.	Positive:	Combined	Combined	Frequency decreased
	Negative:	Burden per a test increased	Difficult to prepare	Burden per a test increased
	Proposal:	Mini-tests	Appropriate size	-
5. (unified) Learning materials.	Positive:	Unified	-	-
	Negative:	Inadequate	-	Inadequate
	Proposal:	Distribute by Internet	-	-
6. Secure time for preparation of teaching.	Proposal:	-	Secure time for preparation of teaching	-
7. Need for financial support.	Proposal:	-	Support cost of teaching materials	-
8. Careful curriculum reformation.	Proposal:	-	-	Careful curriculum reformation

materials were useful (Figure 1). Course directors of relevant departments had exchanged information on their course contents to create a new block in which 15 to 30 clinical doctors were to be involved as lecturers, which let them realize for the first time the importance and effectiveness of collaboration in terms of curriculum development (Table 2). Students also appreciated collaboration among lecturers (Table 1), but at the same time they pointed that lack of communication among teachers still remained (Table 1). Because students attended all the classes of 4th-year and hence could review them, probably they were more sensible than course directors of the extent of collaboration among faculty as well as of redundancy and gaps in course content. These situations may explain why students gave a lower score for collaboration among faculty than course directors did. In contrast, it does not seem simple to answer the question of why course directors rated teaching materials lower than students did (Figure 1). Course directors might have taken that materials they had prepared for students were incomplete because it was extremely hard for them to spare time for education during March through April 2011 when eastern Japan was in a serious condition due to the Great Japan Earthquake and Tsunami. However, this remains conjecture at present since there were no descriptions suggesting the influence of the disaster on education in faculty's comments. Further analysis is needed to understand what had really existed behind faculty's evaluation of course materials.

Muller, et al. conducted analysis of the integrated curriculum that had been newly introduced to their medical school in 2001, and they reported similar results to ours.¹³⁾ They identified four themes, interdisciplinary teaching, interdisciplinary collaboration, building curricular links, and curricular sequencing and frameworks, based on focus group interviews of three stakeholder groups, students,

course directors and curriculum leaders. One significant difference between their results and ours is that practical issues, related to tests, financial support, etc., were included in the themes identified by our analysis. This difference may be due to the different concerns the two research groups held: Muller's group asked their stakeholders about their perceptions on curriculum integration at the end of the completion of new curriculum, while we asked our students and faculty about the pros and cons of new curriculum when it was still in the process of implementation.

In conclusion, both students and faculty of TUSOM evaluated the integration of preclinical lecture courses positively. More practical than abstract issues were identified through the qualitative analysis of students' and faculty's survey comments as well as by the focus group interview with students. To apply the results obtained by this study to curriculum reformation, we held a meeting on March 1, 2012, in which 30 faculty members from 27 clinical departments participated and discussed the new curriculum. The data of this study were presented to the participants at the meeting. We believe that our first attempt to evaluate the curriculum with the use of qualitative methods was successful because the results provide precious information that can be applied to the next step of curriculum reformation.

Limitations and future plan

Although this study used multiple methods with different data sources to enhance its trustworthiness, referred to as triangulation in qualitative research,^{2~4)} it still has several limitations in terms of trustworthiness. First, the themes that were identified in the focus group interview with students have not reached saturation^{2~4)} since the focus group was conducted only once with four students who held favorable opinions about the block system.

Different student groups may respond differently to the curriculum reformation. Second, although the themes identified in students' survey comments and the focus group interview with four students were confirmed by a few representatives of them, the themes identified by faculty's comments were not checked by the members who participated in the survey.²⁻⁴⁾ Third, the focus group interview with directors of clinical education, which had been planned, was not implemented due to their time constraints. Despite these limitations, the current study provides rich information for the curriculum reformation next year in which the 30 clinical subspecialties in 4th-year education will be consolidated into a total of 13 block courses.

The psychomotor and interpersonal skills part of the education¹⁾ should be blended in with the knowledge part of the new curriculum in the near future. Qualitative research should be conducted again to analyze how the new curriculum works when integration is completed.

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owing to the great endeavor by them. We are deeply grateful to and proud of our faculty for their efforts and accomplishments in implementing the new curriculum despite this adversity.

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