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Predictors of medical student satisfaction with pre-clinical courses

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ABSTRACT

Objective: Although student course evaluations are widely used as important measures of teaching quality, little attention has been paid to understanding what influences student satisfaction with courses. This study aimed to identify predictors of medical students' overall satisfaction with pre-clinical courses.

Methods: Data were collected from course evaluations conducted from 2014 to 2016 on all 38 pre-clinical courses offered in Years 1 and 2 of a 4-year medical curriculum at a private medical school in South Korea. The course evaluation questionnaire consisted of 10 items, which addressed three aspects of course design and implementation, that is, effective course implementation, course contents and teaching methods, and appropriateness of learning outcomes, which were rated using a 5-point Likert-type scale. Along with these three domains, teaching ratings and five variables related to the course characteristics were included in a multivariate stepwise regression analysis performed to identify factors predicting overall course satisfaction.

Results: A total of 5,347 evaluation surveys were collected from 278 students (response rate of 92.3%). The regression analysis revealed six variables that predicted overall course satisfaction (adjusted $r^2 = 0.71$, $p < 0.001$). The best predictor was the appropriateness of learning outcomes and this was followed by course contents and teaching methods, effective course design and implementation, teaching ratings, and the year in the program and the semester of the year in which the course was offered.

Conclusion: Effective course design and implementation, individual teacher performances, and course characteristics likely predict medical student satisfaction with pre-clinical courses. Our findings highlight the importance of the design and implementation of the course in alignment with the learning outcomes and of clearly communicating them to enhance student satisfaction with the quality of the course.

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Introduction

Student course evaluations provide important measures of teaching quality in medical education. Course evaluations provide a structured way of collecting student feedback about teaching effectiveness and course qualities and can be utilized for formative and summative purposes [1–3]. The main goals of course evaluations are "to obtain student feedback regarding courses and teaching for improvement purposes and to provide a defined, practical process to ensure actions are taken to improve courses and teaching" [4]. Accordingly, the Liaison Committee on Medical Education [5] requires medical schools to assess the quality of their courses.

Course evaluations are widely used to measure course quality in higher education, and a wide body of literature supports student evaluation as a useful instrument to measure it [1,3,6]. Of the items on course evaluation forms, student overall satisfaction is a key indicator of course quality [1,4]. Moreover, student satisfaction with course quality is an important aspect of program evaluation as it is an integral part of student experience [7]. However,

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little attention has been paid to understanding what influences student satisfaction with courses in medical education [8,9], and research on the predictors of student overall satisfaction with course quality is scant [4].

The literature offers frameworks for course evaluation constructs and influencing factors in student course ratings. Gibson et al. [7] posit that there are four domains of course evaluation constructs, namely, learning outcomes, individual teacher performances, and structural and procedural aspects of teaching. In a study of different course types spanning several years, Sadoski and Sanders [10] identified common themes regarding medical student perceptions of course qualities, such as (a) administrative aspects including course organization, (b) clearly communicated goals and objectives, and (c) instructional staff responsiveness. A systemic review of research in medical education [9] found that course evaluation results are influenced by several factors, which include course subjects and individual student characteristics, that is, gender, student's initial interest in the course subject, and performance level.

The literature suggests that student evaluations of teaching ratings are a key component of course evaluation and an important determinant of student satisfaction [4,11]. A qualitative study of medical student course ratings [12] showed that overall course ratings in undergraduate medical education were mainly influenced by student satisfaction with teaching and exam difficulty. A review of research in higher education indicates student ratings of teaching are not affected by the teacher's individual characteristics, such as age, gender, and personal characteristics [2]. However, the literature does not provide clear evidence as to students' course ratings actually reflect teaching effectiveness. Some studies show student course ratings are affected by factors not related to teaching effectiveness, such as effort or caring by teachers [13] and student assessment [4]. Furthermore, a meta-analysis of research of student evaluations of teaching in higher education settings indicated student evaluations of teaching were not associated with learning [14]. Therefore, Elzubeir and Rizk [15] posited that course evaluations were limited in terms of their abilities to assess teaching effectiveness for either formative or summative purposes.

It is critical to consider the contextual information about the course, that is, course characteristics, when interpreting student course ratings [1]. Studies have been conducted on course characteristics that relate to student course ratings. Research in higher education indicates student ratings are affected by the level of the course, class size, and academic discipline [2]. Furthermore, it can be argued medical courses differ from college courses in that teaching is often delivered by a number of instructors and medical students have less choice regarding their courses and teachers than college students [9,13,16]. Therefore, such characteristics need to be taken into account when studying factors related to course satisfaction of medical students.

Evaluating the quality of the course is integral to program evaluations, and thus, it is essential that we gain deeper insight into what influences student course ratings. In the present study, we sought to identify factors that predict medical students' overall satisfaction with pre-clinical courses by analyzing course evaluation data collected over a period of 3 years.

Methods

Study setting and instrument

Data were collected from course evaluations of all pre-clinical courses offered in Years 1 and 2 of a 4-year medical curriculum at a mid-sized private medical school in South Korea during the 3-year period from 2014 to 2016. All first- and second-year students were invited to participate anonymously in course evaluations of all 38 pre-clinical courses offered in their curriculum. Eighteen courses were offered in Year 1 and 20 courses in Year 2 of the 4-year program. Year 1 courses placed emphasis on basic sciences, Year 2 courses focused on clinical sciences, and courses in social medicine and medical humanities were integrated throughout the curriculum. These courses were offered in six blocks during each academic year, and course evaluations were conducted at the end of each block.

Course evaluation questionnaires were composed of two sections. Table 1 details the items in the course evaluation questionnaire. The first section consists of 10 statements regarding three facets of course evaluation: (1) the effectiveness of course implementation (two items), (2) course contents and teaching methods (three items), and (3) appropriateness of learning outcomes (three items). In addition, Item 9 asked students to rate overall course satisfaction using a global rating method, which is typically used to measure the quality of the course [17]. Item 10 was a question on laboratory sessions. The second section of the questionnaire concerned teaching ratings, in which

students were asked to rate the teaching quality of each and every instructor who had taught in the course. Students responded to the statements using a 5-point Likert-type scale, where 1 = *strongly disagree* and 5 = *strongly agree*. The teaching rating scores in a course was calculated by an average of the scores of all instructors involved in teaching in the course.

Data analysis

Reliability analysis was conducted on the three domains of course evaluation in the questionnaire in order to test its internal consistency by calculating Cronbach's alpha coefficient. In addition, a multivariate stepwise regression analysis was conducted using student responses to the item on overall course satisfaction (Item 9) as the dependent variable and on eight independent variables, that is, the three constructs of course evaluation in the questionnaire, teaching rating scores, and five factors related to course characteristics, namely, (1) the academic year in which the course was offered (i.e., 2014, 2015, or 2016), (2) the year in the program in which the course was offered (i.e., Year 1 or 2), (3) semester of the year the offered was offered (i.e., first or second semester), (4) the course's subject domain (i.e., basic, clinical sciences, or social medicine / medical humanities), and (5) the number of instructors involved in the course.

Independent *t*-test and one-way analysis of variance were performed to compare student responses to different course characteristics. The statistical analysis was conducted using IBM-SPSS version 23 for Windows, and statistical significance was accepted for p values < 0.05. Pearson's r coefficients were used to analyze relationships between two continuous variables.

Ethical considerations

An ethical review of the study protocol was conducted and approved by the Institutional Review Board (IRB) of Dongguk University, Gyeongju (DGU IRB 20180018-05), which waived the requirement for informed consent because the data used had been acquired prior to the study and data collection did not require direct contact with participants.

Results

A total of 287 students completed 5,347 course evaluations over the 3-year period (a response rate of 92.3%). Of these students, 101 participated in 2014, 97 in 2015, and 89 in 2016. All sub-scales in the questionnaire demonstrated high internal consistency, that is, Cronbach's alpha coefficients for the three domains were ≥ 0.82. Furthermore, these three domains were highly associated with student overall course satisfaction, where Pearson's r coefficients ranged from 0.79 to 0.81 ($p < 0.001$).

Table 2 shows the results of multiple regression analysis, which showed six variables predicted student overall satisfaction with pre-clinical courses and those variables accounted for 71% of variance (adjusted $r^2 = 0.71$, $p < 0.001$). All three constructs of course evaluation in the questionnaire were found to significantly predict overall course satisfaction. The strongest predictor was the appropriateness of learning outcomes, which was followed by course contents and teaching methods, and course implementation. The fourth strongest predictor was teaching ratings.

Two variables related to course characteristics also predicted student course satisfaction: the year in the program and the semester of the year in which the course was offered. Students' ratings

Table 1. Items in the course evaluation questionnaire and Cronbach's alpha values.

Domains	Items	Cronbach's alpha
Effective course implementation	1. Classes ran on schedule.	0.82
	2. Classes ran in accordance with the course syllabus.	
Contents and teaching methods	3. The workload was appropriate.	0.86
	4. The lectures were well organized.	
	5. Activities and assignments in the course were helpful.	
Appropriateness of learning outcomes	6. Learning outcomes were clearly communicated.	0.90
	7. Learning outcomes were at the right level for me.	
	8. Lectures were well aligned with learning outcomes.	
Overall satisfaction	9. Overall, I am satisfied with the quality of the course.	-
Laboratories	10. The laboratory sessions were effective. (Optional question for courses with lab sessions)	-

Table 2. Variables that predicted student overall satisfaction with pre-clinical courses (n = 5,347).

Variables	Unstandardized coefficients		Standardized coefficients	t	p
	B	Standard error	β		
Appropriateness of learning outcomes	0.489	0.017	0.424	28.121	<0.001
Course contents and teaching methods	0.344	0.016	0.319	21.052	<0.001
Effective course implementation	0.109	0.014	0.096	7.795	<0.001
Teaching ratings	0.069	0.010	0.073	7.229	<0.001
Year in the program*	0.036	0.011	0.025	3.331	0.001
Semester of the course offering**	−0.025	0.011	−0.018	−2.387	0.017

*1 = Year 1, 2 = Year 2.
**1 = first semester, 2 = second semester.

of overall course satisfaction were higher for Year 2 courses than that in Year 1 courses (t = 3.04, p < 0.01), and courses offered in the first semester received higher ratings of overall course satisfaction than those offered in the second semester (t = 2.08, p = 0.04).

Discussion

Our findings indicate that factors, such as effective course implementation, incorporating appropriate contents and teaching methods, developing appropriate learning outcomes, and communicating them, clearly need to be taken into account to enhance student satisfaction with course quality in pre-clinical courses. Our findings are consistent with those of previous studies in medical education settings, which found that course design and implementation and teaching quality are significantly associated with students' course ratings [9] and, with the study from higher education settings, the quality of course design and implementation are more important than student or course characteristics [4].

In particular, we found the best predictor of medical students' overall satisfaction with course quality was related to learning outcomes. There has been an emphasis on effective course design and assessment of student learning in outcome-based curricula, and the learning outcomes offer a framework for student assessment and course evaluations [18,19]. Our findings highlight the importance of the design and implementation of the course in alignment with the learning outcomes and of clearly communicating them with the students as suggested by Sadoski and Sanders [20] to enhance student satisfaction with the quality of the course. For medical teachers to develop such skills in developing appropriate learning outcomes, faculty development is instrumental. Students' course evaluations should provide medical schools and teachers with formative feedback that facilitates improvements in course quality. However, the literature indicates that educators usually do not improve their courses based on such feedback without systematic institutional support [21]. Therefore, a variety of educational and administrative supports are warranted to help faculty to improve their skills for developing and implementing learning outcomes effectively.

Of the variables related to course characteristics in this study, two factors significantly predicted overall course satisfaction: the year in the program and the semester of the year in which the course was offered. These findings are not consistent with those of previous studies in higher education settings in the previous studies in higher education settings that time of the day the course was offered did not affect student course ratings [2]. We suggest this reflects changes in student perceptions of course workload over time as they advance through the program; Year 2 students get more used to the coursework than in Year 1 and they likely feel more fatigued from the coursework in the second semester than in the first semester as time lapses during the academic year. However, the present study does not provide direct evidence as to which factors influenced observed differences in course satisfaction across time periods in the program. Moreover, these course characteristics appear to be administrative variables pertinent to the school's curriculum structure, which differs across medical schools. In our study, the year in which the course was offered was also a variable related to course characteristics,

and we found this did not predict student course satisfaction. This finding indicates that our course ratings were stable across years, which is in line with the findings from previous studies in higher education settings showing the stability of student course evaluations [2]. Nevertheless, the findings highlight that course satisfaction ratings are multidimensional, which is in line with findings in higher education [4].

Limitations of the study should be acknowledged. First, this was a single institutional study, and therefore some findings might not be applicable to other settings. For instance, we did not factor in the variable in class size because this was a single-institution study. As previous studies indicate student course satisfaction is associated with class size [2], some of our findings may not apply to the institutions with large class sizes. Second, this study evaluated student satisfaction with pre-clinical courses, and therefore the findings are not generalizable to clinical settings in which the teaching and learning context is quite different from those in pre-clinical courses [16]. Third, this study did not involve data on some of the individual student characteristics, such as student age and gender, as the data were collected anonymously. Future study is warranted to include individual student characteristics for a more comprehensive understanding of factors that predict medical student course satisfaction in pre-clinical courses.

Conclusions

This study found that six variables significantly predicted medical students' overall satisfaction with pre-clinical courses. Our findings indicate how courses are designed and implemented predict student course satisfaction more strongly than individual teacher performances or course characteristics. In particular, our findings highlight the importance of the design and implementation of the course in alignment with the learning outcomes and of clearly communicating them to enhance student satisfaction with the quality of the course. We suggest medical educators to focus on effective course design and implementation to improve student satisfaction with course quality.

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