An Integrated Humanities–Social Sciences Course in Health Sciences Education: Its Proposed Design, Effectiveness and Associated Factors

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Abstract

Background

Previous research has not provided enough direction regarding effective content design of courses integrating humanities and social sciences in medical and dental education. This study aims at exploring how an Integrated Medical/Dental Humanities–Social Medicine/Dentistry course can be designed; how effective it can be in terms of students' growth in knowledge, attitudes, skills, and aspirations; and what can be associated factors.

Methods

The course was designed by distilling commonalities in the international standards for medical/dental education proposed by seven major health organizations. This analysis resulted in a curriculum covering eight major topics (history; professionalism; communication; ethics; management; policy; insurance; law; and research methodology). During the 2017 calendar year, data was collected and statistically analyzed from 68 third-year pre-doctoral students enrolled in the resulting MDHS 13-week course.

Results

Participants showed growth in skills, aspirations, knowledge, and attitudes, with the greatest change occurring in skills, then aspirations, knowledge, and attitude. However, knowledge growth was the only variable significantly related to student achievement of course objectives ($\beta = 0.635$, $t(63) = 3.394$, $p = 0.001$). The topics that students perceived as most critical were insurance, policy, management, and law. Perceived importance of research was the most common and was significantly related to all types of learning outcomes (For knowledge, $\beta = 0.213$, $t(63) = 2.203$, $p = 0.031$; for attitudes, $\beta = 0.784$, $t(63) = 10.257$, $p = 0.000$; for skills, $\beta = 0.769$, $t(63) = 9.772$, $p = 0.000$; and aspirations $\beta = 0.639$, $t(63) = 7.595$, $p = 0.000$).

Conclusions

This study proposed a framework for a humanities-social sciences education for health sciences education, and analyzed its implementation. The empirical evaluation of its effectiveness and factors related to successful outcomes found that students perceived gains in their knowledge, attitudes, skills, and aspirations for humanistic and social aspects of dentistry/medicine, and that recognized importance of research was associated with the greatest growth in all four areas of learning outcomes. This study hopes to contribute to the improved design of integrated humanities–social sciences courses.

Background

Over the last few decades, the field of health sciences education has aimed at producing doctors with scientific knowledge of disease and treatment as well as insight into the personal and societal contexts in which patients' problems arise. In spite of the long-standing debates and difficulties inherent in such a task, medical and dental education institutions have introduced humanities and social sciences courses to their curricula. Instead of offering separate courses, however, many institutions have established an integrated approach under the rubric of Medical/Dental Humanities-Social medicine/dentistry (MDHS) education. MDHS is an interdisciplinary approach to medical/dental education that seeks to incorporate relevant learning experiences in the humanities and social sciences into medicine and dentistry.^{1–4} The backdrop to this change is the rising global demand for health care and welfare, and the belief that future medical practitioners with a solid understanding of the humanistic and social aspects of medicine will make greater contributions to human health and life.^{5,6}

By integrating the humanities and social sciences, MDHS may achieve more persuasive rationale and broader contextualization.⁵ Studies on medical education have proposed future roles of doctors in the changes of healthcare and society. Tomorrow's Doctors by the General Medical Council (GMC)⁷, the Role of the Doctor by the World Federation for Medical Education (WFME)⁸, and the Five Star Doctor by the World Health Organization (WHO),⁹ all suggested that medical education integrate content addressed by the humanities and social sciences, and argued that educators should improve educational practices accordingly. Increasingly, major health organizations argue for dental and medical education that prepares students to become ethical and humane doctors with professional integrity, a sense of social responsibility, leadership capacities, critical thinking and research competencies, and an orientation towards lifelong learning. Medical and dental curricula must therefore develop students' understanding of the causes of diseases, the distribution of healthcare benefits, the outcomes of healthcare practices, changes in medicine and dentistry, and socioeconomic, demographic, cultural, and individual factors in health.^{10–12}

To this end, MDHS courses have become a core part of the curriculum in many medical and dental schools, though the actual implementation of such courses comes with some difficulties. Foremost among these is the design of the MDHS courses. Despite the efforts of educators to insert and improve MDHS courses in their curriculum, no broad consensus exists about exactly what to teach future practitioners.^{13,14} The recent move to integrated courses covering the patient-doctor-society include content related to professionalism, policy, history, and research.^{15–17} Nevertheless, little research has provided guidance for those seeking to increase the effectiveness of the content design of MDHS courses.

One difficulty concerns how to appropriately quantify the achievement of the educational objectives and program effectiveness.^{18–22} The most widely-used approach for measuring the effectiveness of MDHS courses has been to survey student satisfaction, which corresponds to Kirkpatrick's most basic level of educational program evaluation.²³ The educational standards of every curriculum should center on the graduates' occupational competency in practice, however. According to Kirkpatrick, the effectiveness of education is best measured by the extent to which students transfer knowledge, skills, and attitudes from the classroom to the job, and further, adopt long-lasting aspirations to change their lives and professional environments.²³

Another difficulty is associated with the recognized status of the field. Many students regard courses that connect the humanities-social sciences with health sciences to be clinically irrelevant, impractical, and pointless.^{17,24} As a result, such courses occupy a lower status in the academic hierarchy than biomedical and clinical courses.¹³ Furthermore, some students feel burdened by or dissatisfied with the writing assignments such courses may require. This sentiment may be due to their weaker grasp of fundamental concepts and methodologies in the humanities and social sciences compared to their proficiency in the biomedical and clinical sciences.

This study addresses the difficulties faced by medical and dental schools seeking to incorporate MDHS education into their curriculum. We investigated the design and implementation of an MDHS course by measuring the relationship between students' participation in the course and growth in knowledge, attitudes, skills, and aspirations tied to the course outcomes, as well as understandings about the significance of the course content. In order to generate knowledge that may assist in the effective design and implementation of MDHS curricula, we posed the following research questions:

1. To what extent did students exhibit gains in knowledge (K), attitudes (A), skills (S), and aspirations (A) following their participation in the integrated MDHS course? Are there growth differences among the four?
2. How does their KASA growth associate with students' achievement?
3. Which component of the MDHS course did the students recognize as significant for their future careers? Are there differences among the components?
4. How does students' recognition of the course component significance associate with their KASA growth?

Methods

Integrated MDHS Course Design

Since there is no standard for best practices for an integrated MDHS course design, the course for this study, Critical Understanding of Changing Dental Health Care, was designed by classifying and synthesizing the standards and goals of medical and dental education proposed by the following seven international associations:

- ACGME - Accreditation Council for Graduate Medical Education, Outcome Project
- EC - European Commission, Tuning Project
- GMC - General Medical Council, Tomorrow's Doctors
- ADEA - American Dental Education Association, Dentist' Core Competency
- ADEE - The Association for Dental Education in Europe, Dentist' Core Competency
- WHO - World Health Organization, Five Star Doctor
- WFME - World Federation for Medical Education, Role of the Doctor Project

[Table 1 near here]

Table 1
Competency Standards or Goals of Medical/Dental education and Related MDHS Content Components

ACGME	EC	GMC	ADEA	ADEE	WHO	WFME	Course Objectives - Content Areas	MDHS Content Areas
- Professionalism - Interpersonal & Communication Skills	- Apply ethical & legal principles in the medical practice - Communicate effectively in a medical context	Apply psychological principles, methods, & knowledge to the medical practice	- Professionalism - Communication & Interpersonal Skills	- Professionalism - Interpersonal, Communication, & Social Skills	Communicators	The doctor as the communicator	- A complex comprehension of & insights into: - medical profession (history, mission, & qualification) - patient as a human (personhood, illness, & suffering) - Prepared to be ethical and humane doctors with professional integrity Medical/Dental Humanities	- History of Medicine - Dentistry - Medical Profession - Communication - Ethics
Systems-based Practice	Promote health, engage with population health issues, & work effectively in a health care system	- Apply to medical practice the principles, methods, & knowledge of the population health & the improvement of health & healthcare - Apply social science principles, methods, & knowledge to the medical practice.	- Health Promotion - Practice Management & Informatics	Prevention & Health Promotion	- Community Leaders - Managers	- The doctor as the educator - The doctor as a community health leader - The doctor as a manager of healthcare within society - The social accountability of medicine & the doctor - Demographic changes, migration, & the future of medicine	- A complex comprehension of & insights into: - social, economic, or contextual determinants & changes that impact health and healthcare - social or community solutions for health promotion - Prepared to be socially responsible doctors with leadership Social Medicine/ Dentistry	- Policy - Insurance - Law - Management
Practice-based Learning & Improvement		Apply scientific methods & approaches to medical research	Critical Thinking	Knowledge Based Information & Information Literacy		The doctor as the researcher	Prepared to be lifelong learners and critical thinkers with research competence Research	Research Methodology

[Figure 1 near here]

The course was designed to incorporate, in an interrelated manner, content on medical/dental humanities, social medicine/dentistry, and integrated research. In 13 weeklong units, classes covered nine topics in the context of dentistry: history, professionalism, communication, ethics, management, policy, insurance, law, and research methodology (See Appendix 1). The aim of the course was to promote a complex and critical understanding of (1) the medical profession (history, identity/mission, and qualifications of good doctors), (2) patients as humans (personhood, illness, and suffering), (3) social, economic, and contextual determinants that impact health and healthcare, and the related changes, (4) social and community solutions for health promotion, and (5) research methodologies. In a broader sense, the aim of the course was to ready students to become ethical and humane doctors with professional integrity, a sense of social responsibility, leadership capacities, critical thinking and research competencies, and an orientation towards lifelong learning.

Participants And Data Collection

Sixty-eight of seventy-five pre-doctoral students at a South Korean dental school agreed to participate in this study with the written informed consent. Of the participants, 26.5% were female (n = 18) and 73.5% were male (n = 50); 70.6% were admitted under the 2 + 4 dental education system (n = 48) and 29.4% under the 4 + 4 system (n = 20). The average age of the participants was 25.2 (SD = 1.55). All participants were in the third year of their program and enrolled in the course Critical Understanding of Changing Dental Health Care. The students had not been exposed to any integrated MDHS course prior to this course, but had

participated in a course on medical communication in the second year of their program. Student achievement was defined in terms of performance on several in-class assessments: (1) three rounds of research paper development (40% of grade, weeks 4, 6, and 12); (2) two presentations (20% of grade, weeks 8 and 12), a final examination (30% of grade, following last class); and attendance and participation (10% of grade). Survey data was collected via the second author (JYL) from all 68 participants after the course final exam in December 2017. The response rate was 90.7% (68 out of 75). Approval for the study (#2-2017-0053) was granted by the Institutional Review Board of the participating school

Measure

Both student achievement data and survey data were collected for the study. The survey was composed of three-parts and used a 5-point Likert scale. Part 1 of the survey asked for respondents' background data. Part 2 was comprised of 20 items designed to measure participant perceptions of their own growth in four domains—knowledge, attitudes, skills, and aspirations (KASA)—following their participation in the course. These domains reflect Rockwell and Bennett's (2004) well-established KASA framework for measuring educational outcomes. For each of the four domains, five questions were posed (See Appendix 2).²⁵ Cronbach's alphas were calculated for the internal consistency of the scales for each domain, resulting in 0.907 for knowledge, 0.896 for attitudes, 0.915 for skills, and 0.897 for aspirations. The internal consistency for the entire survey was 0.966. Finally, Part 3 of the survey asked students to rate the importance of each of nine course components—history, professionalism, communication, ethics, management, policy, insurance, law, and research methodology. Students were asked to rate the extent to which each of the components was of general importance ("I find it an important component of the course"), of importance to their future career ("I think that it is important to learn for my future career"), and importance to provide more instruction on ("I think that I need to learn more about it in the curriculum"). (See Appendix 3)

Data Analyses

The data were analyzed using three types of statistical analysis. Descriptive statistics and within-subject one-way ANOVA were used with paired-samples t-tests as post-hoc comparisons in order to examine student perceptions about the effectiveness and significance of the integrated MDHS course. We conducted two sets of stepwise multiple regressions while conducting a preliminary test of the data to verify the assumptions of normality (histograms – symmetric bell-shaped, P-P plots), multi-collinearity ($VIF < 10$, $Tolerance > 0.2$) (Q3: VIF ranged 2.6 ~ 4.9, and $Tolerance$ ranged 0.20 ~ 0.38 for knowledge, attitudes, skills and aspirations scales; Q4: VIF ranged 0.82 ~ 1.67, and $Tolerance$ ranged 0.60 ~ 1.22), independence of error (Dubin-Watson value = 2.00 for Q3, 1.64 ~ 2.13 for Q4), and homoscedasticity (scatter plot-random pattern).

Results

Q1. Growth in Student KASA

First, we compiled the descriptive statistics and conducted a bivariate correlational analysis of the outcome variables. Overall, a high percentage of students reported growth in knowledge (83.8%), attitudes (77.6%), skills (82.6%), and aspirations (81.51%) following completion of the course. One-sample t-tests indicated that students' responses were above neutral with large effect sizes (Cohen, 1988) (knowledge: $M = 3.23$, $SD = 0.86$, $t(67) = 7.03$, $d = 0.85$; attitudes: $M = 3.14$, $SD = 0.83$, $t(67) = 6.41$, $d = 0.78$; skills: $M = 3.34$, $SD = 0.92$, $t(67) = 7.54$, $d = 0.91$; aspirations: $M = 3.24$, $SD = 0.87$, $t(67) = 7.02$, $d = 0.85$). Students reported the greatest improvement in their skills followed by their aspirations, knowledge and attitudes. Four outcome variables and final achievement were significantly and positively related to each other (knowledge-final achievement: $r = 0.724$, $p = 0.000$; attitudes-final achievement: $r = 0.629$, $p = 0.000$; skills-final achievement: $r = 0.575$, $p = 0.000$; aspirations-final achievement: $r = 0.632$, $p = 0.000$). A within-subject one-way ANOVA was conducted to investigate differences between each of the four KASA outcomes. Degrees of freedom was corrected using Huynh-Feldt estimates of sphericity ($\epsilon = 0.90$) based on the result of Manly's test ($\chi^2(5) = 15.15$, $p = 0.01$). The result indicates a significant difference between the outcomes ($F(2.69, 180.24) = 2.88$, $p = 0.045$). Post-hoc analysis indicated no statistically significant difference in the growth of skills, aspirations, and knowledge, but a significant difference was observed in attitudes and skills ($t(67) = -2.604$, $p = 0.011$, $d = 0.23$). Attitude growth showed the smallest change ($M = 15.71$, $SD = 4.13$) while skill growth showed the largest ($M = 16.71$, $SD = 4.60$).

Q2. The relationship between KASA growth and the course achievement

We conducted multiple regressions to investigate the relationships between student growth in knowledge, attitudes, skills, and aspirations and course achievement. We found a significant regression equation ($F(4, 63) = 17.700$, $p < 0.000$), with an R^2 of 0.529 (Adj. $R^2 = 0.499$). We found knowledge growth to be the only significant explanatory variable ($\beta = 0.635$, $t(63) = 3.394$, $p = 0.001$). According to Cohen's guidelines, the relationship perceived objective attainment and knowledge growth has a large effect size ($f^2 = 1.123$).

Q3. Perceived Importance Of Course Components For Future Career

A within-subject one way ANOVA was conducted to investigate differences between student satisfaction with the components of the course content. Degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\epsilon = 0.63$) based on Manly's test ($\chi^2(20) = 92.14$, $p = 0.00$). The results show a significant difference between student satisfactions with different course components ($F(3.76, 251.64) = 19.31$, $p = 0.00$). Students perceived the importance of insurance to be the most critical content component, followed by policy, management, and law. Students rated the importance of professionalism as least important for their future career. We found no significant differences between aspects of the humanistic content (history, professionalism, ethics, and communication), nor between aspects of the social sciences content (insurance, policy, management, and law). Significant differences were found in the

perceived importance of various aspects of the humanistic content and social sciences content, with effect sizes d ranging from 0.594 to 0.868, indicating large effects. In general, students tended to regard the social sciences content as more important than the humanistic content.

Q4. The relationship between student perceptions of the significance of course components and KASA growth

We conducted stepwise multiple regressions to explore the relationships between student perceptions of the significance of the course content components and the outcome variables (Table 2). The perceived significance of research was the common significant explanatory variable for all growth in KASA and the total outcome. The perceived importance of research ($\beta = .644$, $t(63) = 6.659$, $p = 0.000$) and professionalism ($\beta = 0.213$, $t(63) = 2.203$, $p = 0.031$) were significantly related to knowledge growth; in the final model these two variables explained 63.4% of the variances in knowledge growth. Regarding growth in attitudes and skills, the perceived importance of research was the only significant explanatory variable for growth in attitudes ($\beta = 0.784$, $t(63) = 10.257$, $p = 0.000$) and in skills ($\beta = 0.769$, $t(63) = 9.772$, $p = 0.000$); it explained 61.4% of the variances in attitude growth and 59.1% in skill growth. Growth in aspirations was significantly related to the perceived importance of research ($\beta = 0.639$, $t(63) = 7.595$, $p = 0.000$) and law ($\beta = 0.265$, $t(63) = 3.145$, $p = 0.003$); the final model suggested that these two variables explained 62.3% of the variances in aspirational growth. The composite variable of all the outcome variables was explained by the perceived importance of research ($\beta = 0.792$, $t(63) = 11.391$, $p = 0.000$) and policy ($\beta = 0.140$, $t(63) = 2.017$, $p = 0.048$), with an explanatory power of 72.2%.

[Table 2 near here]

Table 2
Regressions for Outcome Variables

Dependent Variables	Explanatory Variables	<i>b</i>	<i>SE b</i>	<i>B</i>	<i>T</i>	<i>p</i>	<i>R</i> ² (adj. <i>R</i> ²)	<i>F</i>
Knowledge	Research	3.008	.452	.644	6.659	.000	.634	56.273***
	Professionalism	.987	.448	.213	2.203	.031	(.623)	
Attitudes	Research	3.531	.344	.784	10.257	.000	.614 (.609)	105.203***
Skills	Research	3.860	.395	.769	9.772	.000	.591 (.585)	95.483***
Aspirations	Research	3.039	.400	.639	7.598	.000	.623	53.784***
	Law	1.518	.483	.265	3.145	.003	(.612)	
Final Achievement	Research	2.756	.242	.792	11.391	.000	.722	84.225***
	Policy	.557	.276	.140	2.017	.048	(.713)	
*** <i>p</i> < .001								

Discussion

Our aim in this study was to explore the potential effects of an integrated MDHS course on students' course achievement and growth in knowledge, attitudes, skills, and aspirations. We also investigated student perceptions of the importance of the course content and the relationship of these perceptions to course achievement and growth in KASA.

A high ratio of students (77.6%~83.8%) reported positive growth following their participation in the MDHS course. Students reported the greatest growth in skills, followed by aspirations, knowledge, and attitudes, in that order. Skill growth referred mainly to how familiar students had become with methods for conducting research. Compared with their biomedical or clinical science courses, students in the MDHS course spent more time collecting and summarizing the materials needed to answer their research question, constructing a suitable theory, and deriving conclusions. The experience of writing up their research findings may account for their strong sense that they had gained important skills.²⁶ The substantial growth in aspirations that students reported also was very encouraging. Even after completing the course, students aspired to participate in more training in related areas and engage in efforts to further their development.

Professional competency is composed of practical wisdom acquired through extensive experience together with ongoing professional development and evolving knowledge and skills.²⁷ The third greatest gains reported by the participants were in knowledge, and only students who perceived growth in knowledge remarked that the course was organized suitably and had achieved its stated goals. Since most medical and dental courses are composed of lectures and written examinations, there is a danger that students may believe that skills acquired through project activities or the growth of aspirations are not directly relevant to accomplishing the course objectives.

Student perceptions about the importance of course content may correspond to their perceived future professional needs as well. Students recognized the importance of core aspects of the public healthcare system, such as insurance, policy, management, and law. They valued content within the social sciences

higher than content in the medical humanities. Although students are aware that they need to be humanistic doctors in the long run,¹⁷ they seemed to feel that the practical issues doctors may face as future practitioners are more relevant to the content found in the social sciences. They expressed the need for coursework that covers practical knowledge and action guidelines for specific subjects. Also, from the perspective of methodology and scholarly analysis, medicine shares more with social science because it follows deductive reasoning using hypotheses and evidence, a process with which students may be more familiar.

We may consider why the perceived importance of professionalism was significantly related to knowledge growth. First, as students learned about the history of the medical professions, it led them to consider their own professional identity. Such self-conceptions may play an important role in their relationships with patients and colleagues, as well as in their own well-being. Second, as the students more seriously considered their roles as professionals, they began to want to acquire more knowledge about current health management systems. Finally, as they conducted their research projects, students employed the core values of professionalism as grounds for critically understanding changes in the healthcare system and envisioning concrete courses of action.

One of the most noteworthy findings was that students who more strongly perceived the integrated research activity as important exhibited the most marked growth in all KASA aspects. Student perceptions about the importance of the research component of the course may be an indicator of how well the MDHS course integrated the humanities and social sciences in the students' minds, and persuaded them of the need for such an MDHS course. By conducting research activities, students practiced activities that engaged their critical thinking skills as they sought to resolve complex real-life issues related to dental care.²⁸⁻³⁰ Engagement in critical thinking can provoke students' multi-disciplinary contemplation and reflection when facing complex issues in medicine and dentistry under ambiguity and uncertainty.^{13,31,32}

Conclusions

The proposed MDHS course that served as the focus of this study covered three major areas: medical humanities (history and professional identity of medical professionals, communication, and ethics), social medicine (policy, insurance, legal dispute, and management); and integrated research. The topics of humanities and social sciences need to be related to each other and designed to be assimilated when students engaged in integrated research. Students need to be convinced of the importance of both humanities and social sciences, engaged in more learning activities for attitudinal growth, and assessed their growth in balanced perspectives.

This study has a number of limitations. First, this study was conducted under the cross-sectional design. More long-term and dynamic tracking of the learning outcomes as students grow to be medical professionals would be desirable, suggesting a need for well-designed longitudinal investigations. Although student self-assessment (SSA) has been known as valid for the particular participants and research contexts³³⁻³⁵, which this study conformed to, and KASA instrument have been used widely, SSA still entail limitation. Future studies are recommended to adopt a pre- and post-scale to assess actual changes in KASA. Additionally, more research is required to determine whether research activities actually do yield improvement in critical thinking in humanities and social sciences or whether the perceived learning outcomes persist in the long term³⁶. Also, the male dominant target population in this study may not be generalizable to all medical and dental programs. Further research needs to be conducted to confirm these results in a gender balanced population. Lastly, although the regression models in this study showed fairly strong associations between dependent variables and explanatory variables, the totality of evidence supplied in this study is insufficient to generalize their causal relationships. Further validation would be required using new datasets and ideally using a large scale RCT. Nevertheless, we hope that this study will contribute to better designed MDHS courses that strengthen medical practitioners' professional competencies and thereby improve the public health.

Abbreviations

ACGME
Accreditation Council for Graduate Medical Education
ADEA
American Dental Education Association
ADEE
The Association for Dental Education in Europe
ANOVA
Analysis of Variance
EC
European Commission
GMC
General Medical Council
KASA
Attitudes, Attitudes, Skills, and Aspirations
MDHS
Medical/Dental Humanities-Social medicine/dentistry
WFME
World Federation for Medical Education,
WHO
World Health Organization

Declarations

Ethics approval and consent to participate

The Institutional Review Board of the participating school approved this study (#2-2017-0053). Sixty-eight third-year pre-doctoral students at a South Korean dental school participated in this study with the written informed consent of their participation and publication of this study.

Consent for publication

All of the sixty-eight students participated in this study with the informed consent of the publication of this study.

Availability of data and material

Related data of this study can be available upon request to the second author.

Competing interests

There are no conflicts of interest to declare.

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Authors' contributions

JHL: research design, data analysis/interpretation, draft and revision writing

JYL: course implementation, data collection, critical discussion, and draft writing

IYJ: course implementation, data collection, critical comments

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Figures

- History of Medicine/Dentistry & Medical Profession
- Communication
- Ethics

- Policy
- Insurance
- Law
- Management

Figure 1

Integrated MDHS Course Components