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Small group activities within academic communities improve the connectedness of students and faculty

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Abstract

Background: The University of California, San Diego, School of Medicine implemented a curriculum change that included reduction of lectures, incorporation of problem-based learning and other small group activities.

Six academic communities were introduced for teaching longitudinal curricular content and organizing extracurricular activities.

Methods: Surveys were collected from 904 first- and second-year medical students over six years. Student satisfaction data with their sense of connectedness and community support were collected before and after the implementation of the new curriculum. In a follow-up survey, medical students rated factors that contributed to their sense of connectedness with faculty and students (n=134).

Results: Students' perception of connectedness to faculty significantly increased following implementation of a curriculum change that included academic communities. Students ranked small group clinical skills activities within academic communities significantly higher than other activities concerning their sense of connectedness with faculty. Students' perception of connectedness among each other was high at baseline and did not significantly change. Small group activities scored

higher than extracurricular activities regarding students' connectedness among themselves.

Conclusions: The implementation of a new curriculum with more small group educational activities including academic communities enhanced connectedness between students and faculty and resulted in an increased sense of community.

Introduction

Curricular renewal is a continuous process for medical schools and is required to meet society's changing needs and to educate the next generation of physicians (Boysen et al. 2016). In the last two decades, medical schools have been adopting learner-centered curricula to encourage students to teach themselves and develop life-long learning skills under faculty supervision (Hemmer et al. 2011). To better model the team-based approach to healthcare, more small group learning activities are replacing traditional lectures (Pershing & Fuchs 2013). Clinical skills training has been increasing in what have traditionally been considered the pre-clinical years, to allow the students to connect basic science knowledge with patient care (Irby et al. 2010). Also, the introduction of learning communities has played an important role in

enhancing students' medical school experience and to maximize learning (Smith et al. 2014, Smith et al. 2016).

To date, several studies have focused on USMLE performance as the major academic outcome following curricular changes described above (Christianson et al. 2007, Wilkerson et al. 2007, Williams et al. 2011). The few studies that investigated the influence of curriculum change on social and psychological wellbeing reported increased faculty engagement (Venance et al. 2014), lower depressive symptoms in medical students (AlFaris et al. 2014), an increase in confidence related to professionalism (Christianson, et al. 2007) and a positive (AlFaris, et al. 2014, Wilkerson, et al. 2007) or stable (Edgren et al. 2010, Moore-West et al. 1989) perception of the learning environment.

One often overlooked outcome of curricular change is its effect on students' connectedness to each other and to faculty, and the resulting sense of community within the school. Sense of community is defined by McMillan as a "feeling that members have of belonging, a feeling that matters to one another and to a group, and a shared faith that members needs will be met through their commitment to be together" (McMillan & Chavis 1986). Although sense of community has been defined in many different ways (Etzioni & Etzioni 1999, Rovai 2002a, Wighting et al. 2008), the majority of the definitions share the key

element of “feeling connected among community members”. Few studies have assessed the impact of students’ level of connectedness and sense of community (Liu et al. 2007, Rovai 2002b, Vora & Kinney 2014). Students perceived increased learning (Liu, et al. 2007, Rovai 2002b), engagement and satisfaction (Liu, et al. 2007) when a sense of community was present. It has also been suggested that connections within the community is a key element of resilience in medical education (McKenna et al. 2016).

In this study, we investigated the impact of a curriculum change on the sense of community. The University of California San Diego (UCSD) School of Medicine (SOM) implemented a new integrated organ-based curriculum in the academic year 2010/2011 (Savoia 2010). The curriculum change reduced lecture time and increased small group activities in a new format (Appendix 1). Six academic communities were introduced and clinical activity in the pre-clerkship years was enhanced. In the new curriculum PBL (problem-based learning) groups and longitudinal small groups that meet with the same facilitator for two years predominate. The academic communities span both academic and extracurricular activities. The academic activities include the longitudinal small groups within the Practice of Medicine (POM) course. A combination of teaching clinical skills within the POM course and increased clinical preceptorship hours enhance clinical activities.

We determined students' perceptions on their connectedness with faculty and peers before and after the implementation of the new curriculum. We next analyzed which elements of the new curriculum most contributed to their connectedness.

Methods

Survey administration and instruments:

- *Students' perceptions on the sense of community resulting from connectedness with faculty and among themselves:*

First and second year medical students (MS1s and MS2s) were surveyed regarding their perception on the connectedness with faculty and among themselves. Survey data were collected over six years (2010-2015) and deidentified responses from a total of 904 MS1s and MS2s were analyzed. Data obtained from MS1s and MS2s were aggregated. The survey administration occurred during the last weeks of each academic year and was part of a larger UCSD SOM annual survey. The questions analyzed are listed below:

- *How satisfied are you with your overall sense of community (connectedness to and support from others) with students?*
- *How satisfied are you with your overall sense of community (connectedness to and support from others) with faculty?*

Students were asked to rank these statements on a 5-point Likert scale ranging from very dissatisfied to very satisfied.

- *Students' perceptions on the different elements of the medical school training that contribute to their connectedness among themselves and to faculty:*

At the end of the academic year 2015/2016, MS1s and MS2s were anonymously surveyed on their perception of different elements contributing to connectedness of students with faculty and to rank them on a 5-point Likert scale ranging from strongly disagree to strongly agree. The different elements focused on characteristics of the new curriculum including PBL groups, longitudinal small groups (the POM course) and the building in which academic communities and small group activities are housed. All small group activities moved into the newly constructed Medical Education and Telemedicine (MET) building in the beginning of the academic year 2011/2012. For the various extracurricular tasks, activities from the academic communities, student organizations and service learning activities were listed. For students' connectedness among themselves, housing related activities and athletic activities were named in addition to the other elements listed above. Students also had the opportunity to list other elements that contributed to their connectedness in an open-

ended question. The top three comments were incorporated in the results section.

Assessment and categorization of curricular hours:

Curricular hours were assessed from administrative records for the two pre-clerkship years of the “old” curriculum (academic year 2008-2009) and were compared to the “new” curriculum (academic year 2015-2016). Although the curriculum was introduced in Fall 2010, no major changes were made within the following years. Hours accounting for exams and any optional sessions (e.g. optional review or lab sessions) were excluded from analysis. One instructional unit was counted as 50 minutes.

Instructional hours were categorized by teaching modality and counted towards lecture, laboratory, small group activities, large group problem solving, clinical preceptorship or video/ computer-assisted learning (CAL). Small group activity was defined as any teaching in a small group setting involving 5-8 students and one facilitator. Small group activities were further divided into categories: “Ad hoc” groups were defined as randomly assigned small groups that met once or a small number of times during a specific course. In contrast, “longitudinal small groups” met in the same formation with the same facilitator for the entire pre-clerkship curriculum (i.e. small groups within the academic communities; the POM course). Another small group category is PBL, an instructional method in which medical students

explore a problem with a facilitator. However, the role of the facilitator is different from other small groups settings and has been described of a “custodian of the group process and guide for discovery” (Maudsley 1999). The dynamics within PBL groups are described and reviewed elsewhere (Albanese 2010). In the PBL groups neither the small group members nor the facilitator stayed the same throughout the academic year. A PBL facilitator or small group may stay together as little as two weeks or as many as 15 weeks. The category “problem solving in large group” includes any activity that is provided by one instructor in a large classroom actively engaging the students in problem solving. Teaching sessions in this category included team-based learning (TBL) and case-based instructions. Clinical preceptorship is defined as teaching in the community setting. Students work with community-based physician preceptors and practice history and physical examination skills in a real-world setting. Any mandatory videos and CAL were categorized as “video/CAL”.

This study was exempted from full review by the institutional review board of the University of California, San Diego.

Statistical analysis:

Descriptive statistics (means, standard error of the mean) were calculated using GraphPad PRISM (version 5.0b). Students’ perceptions

of connectedness were compared between the old and new curriculum using an unpaired Student's t- test. For the comparison of different elements of the medical school experience, Kruskal-Wallis test with Dunn's post test was used. $p < 0.05$ was considered significant.

Results

Connectedness and sense of community

To determine the impact of the curriculum change on students' perception of their connectedness among each other and with faculty, quantitative data were collected over six years. The overall survey response rate was 60% (n=904/1503). Students were asked to rate their perception on the connectedness to faculty on a 1-5 Likert scale ranging from very dissatisfied to very satisfied (Fig. 1A). Students were also asked about their perception of the connectedness among themselves (Fig. 1B). The curriculum change was initiated for MS1s in the beginning of the academic year 2010/2011 and for MS2s in the beginning of the academic year 2011/2012. Student ratings within the old curriculum (n= 267; 189 MS1/MS2s in 2010, 78 MS2s in 2011) were analyzed together and compared to student ratings in the new curriculum (n=637; 99 MS1s in 2011, 538 MS1/MS2s in 2012-2015). Students' perception of their connectedness to faculty was significantly higher in the new curriculum compared to the old curriculum (unpaired

t-test, $p < 0.001$; Fig. 1A). Students' perception of their connectedness among each other, however, did not significantly change (Fig. 1B).

Variable factors affecting connectedness

In order to understand which aspects of the curriculum most contributed to their connectedness, MS1s and MS2s were surveyed at the end of the academic year 2015/2016 with 153 students participating (62%, 153/248 MS1s and MS2s). Students were asked to rank different elements of the medical school training (including extracurricular activities) on a 1-5 Likert scale ranging from strongly disagree to strongly agree. Students reported that POM groups (small group activities within academic communities) and the PBL groups were the most important activities contributing to their connectedness to faculty (Fig. 2A). These elements scored significantly higher than all other activities including service learning activities, activities through student organizations and extracurricular activities through the academic communities (Kruskall-Wallis test with Dunn's post test; $p < 0.05$). The POM groups scored significantly higher than the PBL groups suggesting a regular and longitudinal small group atmosphere as the most important contributor to connectedness with faculty. Students had also the opportunity to list any additional activities that might have contributed to their connectedness to faculty in an open-ended question. Thirty-nine students left various comments including office

hours with faculty (n=11), research opportunities (n=7) and the UCSD Student-Run Free Clinic (n=5) as the top three statements.

With respect to the connectedness of students among each other, students ranked again the PBL and POM groups the highest, followed by the MET building, activities through student organization, extracurricular activities through academic communities, service learning activities, athletic activities and housing related activities (Fig. 2B). PBL and POM groups did not differ significantly but both small groups scored significantly higher than all other extracurricular activities. In an open-ended question that allowed students to add any additional activities that they found important for their connectedness among themselves, 18 students provided comments. The various different small group settings (n=4), study groups (n=3) and other social activities (n=2) were mentioned as the top three statements.

Discussion

In this study we provide evidence that students' connectedness to faculty can be enhanced through curricular change. Our study demonstrates that regular, longitudinal small group curricular activities within academic communities have the greatest impact on students' connectedness and sense of community with faculty. Students'

connectedness with each other was high at baseline and did not significantly change.

Medical school is unquestionably stressful, and psychological distress, rates of depression, burnout and suicide are higher among medical students than other students (AlFaris, et al. 2014, Dyrbye et al. 2008, Rosal et al. 1997, Rosenthal & Okie 2005, Saipanish 2003). Academically robust curricula leave little time for students personal development and engagement with each other and faculty (Bicket et al. 2010). Caring peer and faculty interactions within a perceived community, however, facilitates students' acceptance, respect and inclusion within the university (Wilson & Gore 2013). A sense of community also helps to avoid isolation and promotes satisfaction (Vora & Kinney 2014), contributing to a culture of wellness and well-being. In addition, students' personal and professional growth can be promoted by longitudinal interactions with faculty (Levine et al. 2011).

Much of the literature on students' well-being has focused on specific activities outside of the classroom. Yoga classes (Bansal et al. 2013, Bond et al. 2013), counseling services (Thompson et al. 2010) and mindfulness meditation programs (Rosenzweig et al. 2003, Shapiro et al. 1998) have been introduced to decrease students' distress. Our study, however, shows that students' connectedness is most supported

by curricular activities, particularly small group learning. According to our survey results, small group activities rated significantly higher than any extracurricular activities, including service learning activities, housing related activities, athletic activities and extracurricular activities offered by the academic communities.

Small group learning offers many benefits to the learner, including active learning and involvement, problem-solving abilities and communication skills (Crosby 1996), and a variety of theories provide rationales for implementing small groups in medical education (Dennick & Exley 1998). Small group learning is often called collaborative learning as it is based on the interaction between students and faculty, which improves cognitive development and learning (Hogan & Tudge 1999). Small group learning builds on learners' existing knowledge in an active learning environment, emphasizing a constructivist approach (Piaget 1952). Learning is also facilitated through observing and reflecting on thoughts and actions of others (McKendree et al. 1998), and the experience of teamwork within the small group environment allows students to acquire the team skills crucial for the medical profession.

Interestingly, in our study, any type of small group setting fostered students' connectedness towards each other. In contrast, longitudinal

regular small groups within the academic communities rated significantly higher than PBL groups in their contribution to the connectedness of students with faculty. This implies that students feel most connected to faculty when they meet in the same group with the same facilitator for the entire academic year. This is in line with Festinger's theory of group cohesiveness proposing membership continuity as the key phenomenon of group cohesiveness (Festinger 1950).

Academic communities are a recent development in medical education, and more than half of all US medical schools have implemented learning communities (Smith, et al. 2014). It has been demonstrated that these communities address multiple needs, including students' well-being, clinical skills instruction and mentoring. They also create an environment in which medical students form continuous and meaningful relationships with faculty and peers (Smith, et al. 2014, Smith, et al. 2016). However, it is unclear which element of the learning communities is responsible for these benefits.

Social events are an important part of learning communities and nearly all schools indicate "student well-being" as a major emphasis (Smith, et al. 2014). Our study indicates that the extracurricular activities offered by the academic communities only play a minor role in students' connectedness to faculty. In fact, the extracurricular activities from the academic communities were ranked lowest when

compared with all other curricular and extracurricular activities within the new curriculum. This is in contrast to earlier studies in higher education that propose that informal relationships between students and faculty increase the social integration in an institution (Pascarella 1980). One possible explanation might be the low numbers of students' contact hours with faculty in extracurricular activities compared to the rather intense interaction with faculty within the small group setting learning physical examination skills.

The question of what is a realistic, optimal level of student-student and student-faculty connectedness still remains. It is very unlikely that all the various personalities in such stressful conditions would find themselves "very satisfied" with their connectedness, making a "5" very unlikely. A recent study focused on the learning environment in 28 North American medical schools supports this concept. In this study, most medical students "often" (3.8 rating on 1-5 Likert Scale) felt that faculty were "reserved and distant" (Skochelak et al. 2016). Although this study's question cannot be directly compared to our results, we believe the study suggests that a "5" rating is not a realistic level of connectedness. Further increasing small groups or introducing more extracurricular activities in which faculty and students can bond might increase our students' rating of their sense of community with faculty.

Limitations

This study has several limitations. First, our study was done at a single medical school, therefore the results might not be generalizable to other medical schools. Second, the results of this study only represent perceptions of responders and may not be representative of the whole class. Third, our study didn't use any objective measures to determine connectedness, instead a non-validated attitudinal question was utilized. In addition, students might have interpreted "connectedness" differently when responding to the survey. Connectedness can be enhanced by the quality of interactions, by their quantity, or by some combination. Furthermore, these interactions can be task-driven or socio-emotional in origin (Hare 1994, Rovai 2002a). Our study did not differentiate between these variations and further studies are needed to understand the relative contribution of each of these interactions towards connectedness. Fourth, this study focuses on a combination of potential contributors to connectedness that is not necessarily complete, and that emphasizes contributors characteristic of the new curriculum. For example, we didn't investigate the potential contribution of lectures and laboratories that were a hallmark of the old curriculum, but are naturally present in the new curriculum as well. In addition, students were only asked to rank these different contributors at the end of the academic year 2015/2016. The ranking

may therefore be not representative of all students contributing to the connectedness data over several years.

Finally, we didn't consider the effect of differences in “exposure time” of the various potential contributors within the curriculum. Whereas problem-based small group learning occurs on average four hours a week, some of the extracurricular activities might only happen once each quarter. This difference in the “dosing” of different contributors must be kept in mind.

Conclusions

We all have an essential need to feel connected. In medical education, the relationships formed between students and faculty enhance the learning experience and the professional development of our students (Liu, et al. 2007). Furthermore, they are key experiences that students draw on when they find themselves educating their patients. According to our study results, reforming the curriculum and increasing the frequency of learning within smaller intimate environments increases connectedness within the community. Working “within our teams, programs and hospitals” is crucial in the modern medical profession (McKenna, et al. 2016), and true teamwork requires a sense of belonging and connectedness. Medical schools often introduce new curricula, but few assess the impact of the changes on student connectedness and sense of community. Our study should encourage

other institutions to routinely assess their sense of community with any curricular change.

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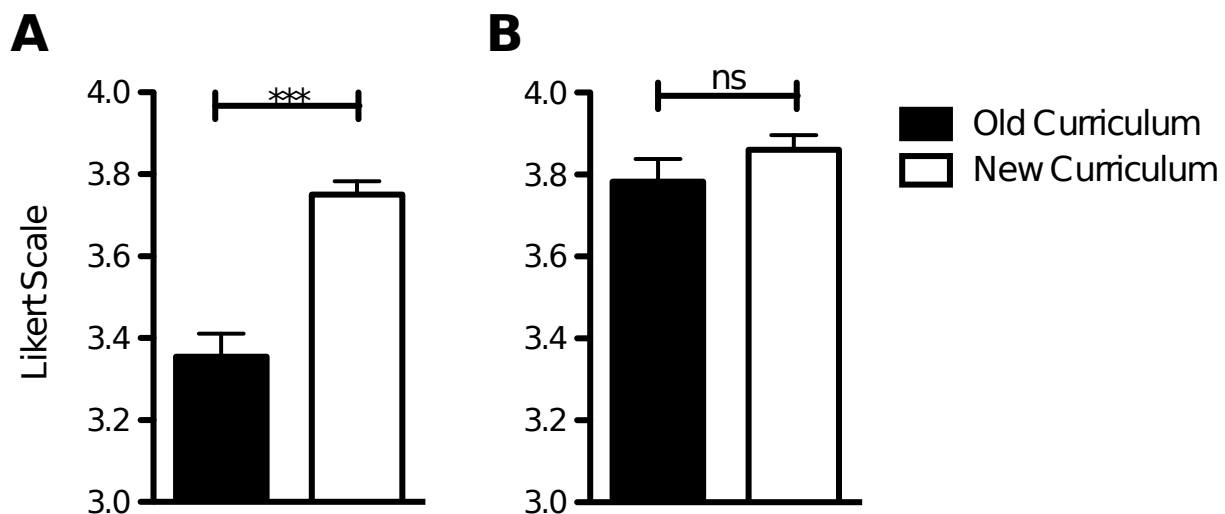


Figure 1: Students' connectedness and resulting sense of community with faculty and among themselves

a) A total of 904 first and second year medical students were evaluated on a five-point Likert scale on their satisfaction with students' connectedness to faculty in the old and new curriculum. 1=Very dissatisfied; 2=Dissatisfied; 3=Neutral; 4=Satisfied; 5=Very

satisfied. Results are presented as percentages of valid total and mean \pm SEM; *** $p < 0.0001$, unpaired t-test.

b) A total of 904 first and second year medical students were evaluated on a five-point Likert scale on their satisfaction with students' connectedness among themselves in the old and new curriculum. 1=Very dissatisfied; 2=Dissatisfied; 3=Neutral; 4=Satisfied; 5=Very satisfied. Results are presented as percentages of valid total and mean \pm SEM; ns= not significant, unpaired t-test.

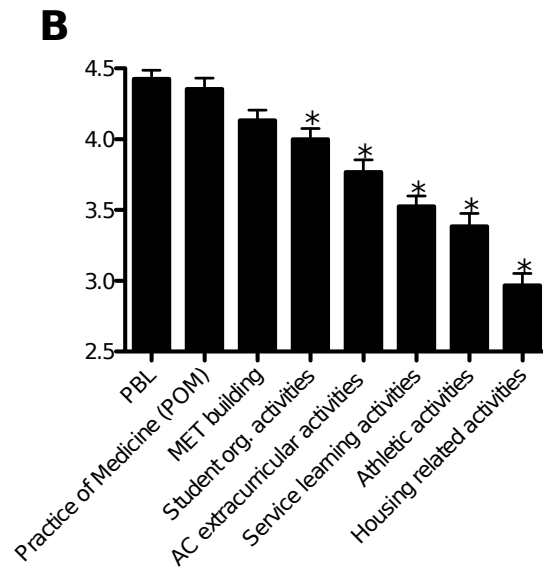
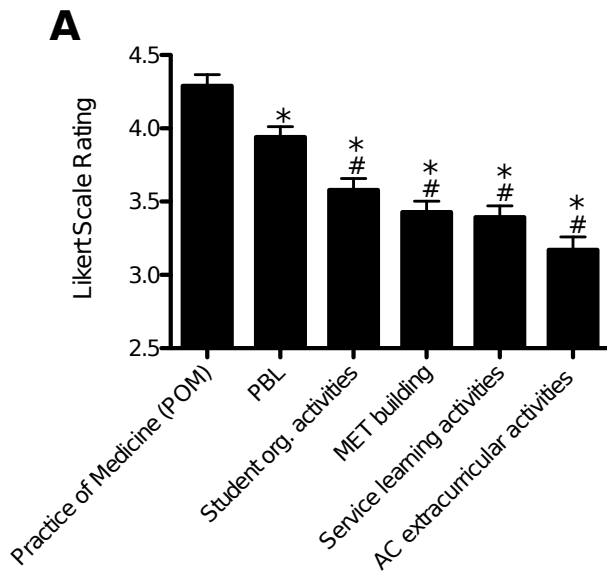


Figure 2: Contributions of different curricular and extracurricular activities on students' connectedness with faculty and among themselves

a) Students were asked to rank the influence of different curricular and extracurricular activities on their sense of connectedness with faculty using a five-point Likert scale 1-5 (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). Results are presented as percentages of valid total and mean \pm SEM; * and # $p < 0.05$; Kruskal-Wallis test with Dunn's post test. * compared to POM, # compared to PBL.

Problem-based learning groups (PBL), activities through student organizations (Student org. activities), Medical Education and Telemedicine Building (MET building), extracurricular activities through academic communities (AC extracurricular activities).

b) Students were asked to rank different aspects of their medical school experience on their sense of connectedness with students on a five-point Likert scale 1-5 (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). Results are presented as percentages of valid total and mean \pm SEM; * and # $p < 0.05$; Kruskal-Wallis test with Dunn's post test. * compared to POM and to PBL.

Problem-based learning groups (PBL), activities through student organizations (student org. activities), Medical Education and

Telemedicine Building (MET building), extracurricular activities through academic communities (AC extracurricular activities).

Curricular elements	Old Curriculum hours (% of total)	New Curriculum hours (% of total)
Lectures	710.8 (57.9)	513.7 (44.4)
Small groups	188.2 (15.3)	346.3 (29.9)
Ad hoc	181.5 (14.8)	79.2 (6.8)
Longitudinal	0 (0)	91.2 (7.9)
(POM)	6.7 (0.5)	175.9 (15.2)

PBL	214.6 (17.5)	115.8 (10.0)
Laboratory	51.7 (4.2)	79.6 (6.9)
Large group problem solving	40.0 (3.3)	88.0 (7.6)
Clinical preceptorship	23.3 (1.9)	12.9 (1.1)
Video/CAL		
Total hours	1228.6	1156.3

Appendix 1: Curriculum change in the UC San Diego School of Medicine

Hours of the old and new curriculum are categorized by teaching modality including lecture, laboratory, small groups (small group setting including “ad hoc”, longitudinal (the Practice of Medicine (POM) course) and Problem-based learning groups (PBL)), large group problem solving, clinical preceptorship and video/ computer-assisted learning (CAL).