Cultural Change in a Medical School: A Data-Driven Management of Entropy

Timothy Baker, Thomas Schwenk, Melissa Piasecki, Gregory S. Smith, Daniel Reimer, Nicole Jacobs, Gwen Shonkwiler, Jennifer Hagen & Ramona A. Houmanfar

a University of Nevada School of Medicine, Reno, Nevada, USA
b University of Nevada, Reno, Reno, Nevada, USA

Published online: 03 Jun 2015.


To link to this article: http://dx.doi.org/10.1080/01608061.2015.1035826
Cultural Change in a Medical School: A Data-Driven Management of Entropy

TIMOTHY BAKER, THOMAS SCHWENK, and MELISSA PIASECKI
University of Nevada School of Medicine, Reno, Nevada, USA

GREGORY S. SMITH
University of Nevada School of Medicine, Reno, Nevada, USA
and University of Nevada, Reno, Reno, Nevada, USA

DANIEL REIMER
University of Nevada, Reno, Reno, Nevada, USA

NICOLE JACOBS, GWEN SHONKWILER, and JENNIFER HAGEN
University of Nevada School of Medicine, Reno, Nevada, USA

RAMONA A. HOUMANFAR
University of Nevada, Reno, Reno, Nevada, USA

Medical school organizations are incredibly complex entities operating within multifaceted systems that exert multiple environmental pressures on the internal practices of the schools. Moreover, the components of medical schools operate within the contingencies of the medical school as a whole, such as the recent curricular change that occurred at the University of Nevada School of Medicine. That change required organizational and cultural changes in many different areas within the school and at all levels of the school’s organizational hierarchy. Three separate studies were conducted during this time of transition to evaluate the practices of major stakeholders within the organization: emerging leader interviews and a Faculty Forward® survey for faculty and the application of the Implicit Relational Assessment Procedure for students. The results are depictive of ways by which behavioral systemic assessments can serve as important tools for guiding comprehensive and empirically based success in complex organizational systems.
The culture of academic medicine in general, and of medical schools in particular, is thought by many to be different than that of other academic units in higher education and other professional schools. Although a common aphorism in academic medicine is the observation that “when you have seen one medical school, you have seen one,” implying that each medical school is unique in its structure and function, the differences among medical schools are probably less than those between medical schools and other academic and professional schools. The primary reason for these differences is that medical schools are usually responsible for large clinical operations, and the faculty and staff members in medical schools provide clinical care in addition to teaching and conducting research, unlike, for example, engineering schools, which do not generally run major engineering enterprises, or business schools, which do not run corporations.

The result of this fundamental difference is that medical schools are constantly balancing the individual prerogatives and career development needs of their faculty and staff members with the institutional service needs of providing medical care, engaging and serving the community, and managing a major business enterprise. Faculty members who are selected for their initiative, creativity, innovation, independence, and self-motivation are also expected to function as employees of sometimes multibillion-dollar clinical enterprises that serve thousands patients on an annual basis. The most successful of these enterprises create a culture in which individual faculty career needs can be productively matched and balanced with institutional service needs; integrated models of collaborative biomedical and clinical science teaching can be developed; and team-based science can address complex, interdisciplinary medical issues. The resultant culture influences faculty engagement and behavior, curriculum development and implementation, role modeling, professionalism, and the overall success of the institution in meeting its complex missions.

All of these forces have operated in the past few years at the University of Nevada School of Medicine (UNSOM), exacerbated by significant additional economic and political assaults. The state’s severe recession detracted substantially from the school’s funding base, with a potential impact on the school’s accreditation. The school suffered from political instability regarding whether it was adequately serving a geographically large, highly urbanized state with substantial health care inadequacies and disparities and campuses in Reno and Las Vegas, separated by 450 miles. The school had also experienced frequent and turbulent leadership changes in
the school and in its parent university over the preceding 12–15 years. The result was a faculty that was fragmented, disengaged, lacking vision, and distrustful. As described in a common phrase, “The whole was less than the sum of the parts.” Any one individual faculty member was probably meeting his or her professional and academic obligations, working hard and meeting performance expectations, but the school as a whole was not meeting its institutional missions.

Many visual metaphors have been used to describe this situation, including the classic “herding cats” and the related image of “pigs on ice.” A somewhat more elegant image is that of a symphony orchestra, in which the quality of the orchestra’s performance is not simply the cumulative impact of each musician’s ability, but the way in which these abilities are woven together to create music that no one musician could make alone. Intrinsic to these images and metaphors is the concept of managing entropy in an organization. This concept is discussed more widely in business organizations but less so in academia because, in general, there is no need to manage entropy in an organization that has relatively less need to meet larger institutional missions. In the case of medical schools, the need to manage entropy is paramount, and it was particularly so in the case of UNSOM. Our ability to meet our organizational missions was significantly compromised, as was our ability to support the very individual faculty career development needs that had become overly dominant.

Entropy is defined in thermodynamics as the tendency for systems to move from a state of higher organization to one of lower organization (Bar Yam, 1997; Brethower, 1999). It is a measure of randomness or chaos. The entropy of a closed system is constantly increasing and never spontaneously moves from a state of higher entropy to one of lower entropy. Phrased in the converse fashion, closed systems never spontaneously move from a level of lower organization to higher organization (Bar Yam, 1997; Brethower, 1999).

The role of leadership of a complex academic, professional, and corporate organization such as a medical school, to a considerable extent, includes the task of managing entropy. Left to its own direction, a group of highly educated faculty and staff members can generate highly productive, appropriate, and useful programs and activities, none of which may relate to the institution’s overall mission. This may affect the ability of the institution to meet its clinical service, student teaching, residency and fellowship training, research development, and community engagement objectives. There is a critical need to find the correct balance between individual faculty and staff career development needs and institutional needs. This requires the creation of an expectation of accountability by the institution to its members’ career development and by its members to the institution’s mission; a high level, quality, and frequency of communication; transparency regarding the institution’s missions relative to its resources; and, above all else, data-driven
decision making, with the data often coming in the form of behavioral and attitudinal assessments.

In the case of UNSOM, we committed to creating a culture that was at one and the same time more faculty-centered and more driven by institutional missions; more focused on student needs and educational outcomes; more supportive of professional development and scholarship; and more committed to improved clinical, educational, and research operations. Two projects are reported here, one concerning faculty perspectives regarding a major medical student curriculum transformation, and the other a set of student attitudes, bias, and values that influence students’ development of appropriate professional behaviors.

INSTITUTIONAL HISTORY AND CULTURE

UNSOM was founded in 1969 as the School of Medical Science, with the first class of 32 medical students matriculating on the campus of the University of Nevada, Reno, in 1971. Philanthropist Howard Hughes’s multi-year, multimillion-dollar financial commitment, along with support from the state legislature, provided the necessary resources to provide medical education in Nevada. For the first 7 years, students attended the School of Medical Science for 2 years, then were required to transfer to an out-of-state school to complete clinical training and receive their MD degrees. This model of medical education resulted in few physicians coming back to complete residency programs and eventually practice medicine in Nevada. In 1978, with increased federal funding, the school was able to negotiate affiliation agreements with nine hospitals and multiple outpatient clinics in Reno and Las Vegas. This growth allowed the medical school to expand the curriculum and provide patient care settings for students to complete their clinical education. Beginning in 1981, UNSOM began awarding the Medical Doctor (MD) degree to graduating students.

All students begin their medical education program in Reno for the first 2 years and complete a minimum of two community-based preceptorships with primary care physicians during this phase of their training. During the third year, all students must spend 18–24 weeks on the Las Vegas campus for surgery and obstetrics and gynecology clerkship rotations, and the remainder of their clinical training can be completed on either campus. Currently, two-thirds of all UNSOM students complete their entire third and fourth years of training in southern Nevada. As a community-based medical school, UNSOM does not have an academic medical center associated with the institution. UNSOM is reliant on a relatively small number of full-time faculty members, numerous community-based physician educators, and support from affiliated public and private hospitals to provide clinical sites for medical student training.
UNSO M AND BEHAVIORAL SYSTEMS ANALYSIS

Because the medical school administration team understood the inherent risks of attempting to measure one’s own performance, a relationship was established with colleagues in the Behavior Analysis Program (Department of Psychology) at the University of Nevada, Reno. It was decided to adopt a behavior analytic approach when describing, evaluating, and assessing UNSOM as an organization. The first step in adopting a behavioral systems approach was to provide a theoretical foundation for the administrative team at the school of medicine. This culminated in a series of seminars on behavior analytic theory, including an overview of behavioral systems analysis. In addition, descriptive accounts of the organization were developed and discussed based on conceptualizations of the macrosystem (Malott, 2003) and the metacontingency (Glenn, 2004; Houmanfar, Rodrigues, & Ward, 2010; Malott, 2003; Malott & Glenn, 2006; Mawhinney, 1992, 2001, 2009).

The complete results of the organizational assessment are outside the scope of this article. However, the relevant aspects of the macrosystem and metacontingencies are discussed briefly.

UNSO M’S MACROSYSTEMS AND METACONTINGENCIES

UNSO M exists within a macrosystem that is defined by numerous cultural, political, and economic factors. The demographics of the state are unique: Nevada is the 7th largest state as defined by geographic size but ranks 35th in population, making it the 9th least densely populated state in the United States. Almost 75% of the state’s population resides in the Las Vegas metropolitan area; however, historically, development began in the northern region of the state where deposits of silver and gold were discovered in the 19th century. Nevada can be described as highly diverse with a single, densely populated urban area and large expanses of sparsely populated mountainous, high-desert areas.

The annual report from the National Education Association in 2014 ranked Nevada 6th in the nation for per capita expenditures on police and fire protection services, 13th in expenditures for corrections, 28th in expenditures for highways, and 50th in expenditures on higher education. State budget appropriations for higher education were reduced by 31% from 2009 to 2013. Because of the state’s severe shortage of health care professionals UNSOM was spared a majority of these budget cuts, with medical education budgets reduced by less than 15% during this same time.

Interactions between the numerous groups, faculty, staff, and administrators create an intricate and interwoven metacontingency, the aggregate product of which is a class of graduating medical students. An analysis of the interlocking behavioral contingencies demonstrated a complex system that
promoted silo-based decision making. There were spheres of interconnect-edness and influence that needed to change in order to successfully carry out a school-wide curricular change. Figure 1 illustrates the metacontingency of medical education and the place it occupies within an even broader metacontingency of health care using Houmanfar et al.’s (2010) elaborated account of metacontingency. Medical schools produce students and trained specialists who then enter into a larger physician workforce. Physicians practice in the context of communities—where their patients reside and also professional communities with specialty-specific traditions and practices. Each of these levels operates within an even broader context—the cultural milieu composed of history, technology, government rules, resources, and institutions. Though other factors also were influencing the change process, the analysis was limited to the faculty and institutional forces driving changes in the medical student curriculum.

**FIGURE 1** The metacontingency of medical education and the broader metacontingency of health care using Houmanfar et al.’s (2010) elaborated account of metacontingency.
Administratively speaking, UNSOM is an academic and budgetary unit of the University of Nevada, Reno, but is heavily influenced by statewide political forces, defined by a historic north versus south regional competition for power, influence, and resources. Between-department interconnectedness was minimal, with little communication occurring across department leadership. This led to a curriculum that was not coordinated by topic or organ system and therefore occasionally contained unintentional redundancies. This system also encouraged competition for class hours, as state dollars were awarded to departments based on the number of classes taught. In addition, there was little incentive to match class content and the knowledge, skills, and abilities required of practicing physicians, as state dollars were not based on content delivered. Basic science faculty and clinical faculty had very little interaction, creating even more silos with minimal feedback loops for organizational self-correction.

MACROSYSTEM AND METACONTINGENCY CHANGES

UNSOM’s program for the MD degree is accredited by the Liaison Committee on Medical Education (LCME). Following the most recent site visit by an accreditation team in 2009, officials from the LCME came to Reno and Las Vegas in early 2010 to meet with university officials and the medical school faculty. The primary purpose of this visit was to emphasize a need for institutional change at UNSOM. There were four primary areas of focus by the LCME: (a) turnover in key medical school leadership positions; (b) an outdated approach to curriculum management and teaching methodologies; (c) stability of revenue sources to adequately fund medical education; and (d) a lack of diversity in the population of students, faculty, and staff members.

LCME officials also noted a perceived lack of curricular oversight by a faculty committee, the Medical Education Steering Committee. These observations stemmed from an existing curriculum that had developed based on the aforementioned competition between departments for state dollars, given that state dollars were awarded based on the number of courses. The result of this competition led to department chairs having a large influence on the curriculum structure with potentially less regard for integrated educational practice.

The rapid population growth in the Las Vegas area over the past 25 years resulted in a shift of the political power base from north to south. The impact of this shift, together with the continued shortage of physicians statewide, resulted in pressure to expand medical education opportunities in southern Nevada. It also altered the needs for staff and faculty by location, with an increased need for clinical faculty in southern Nevada.

In addition, the leadership and hierarchical structure of UNSOM was disrupted. There were multiple changes in leadership at all levels. The medical
school dean position was held by two interim deans over the course of 3 years. A permanent dean was hired in July 2011, 1.5 years after the start of the planning for the curricular change. In addition, the Office of Medical Education was led by an interim associate dean who had been appointed in late 2009. A permanent associate dean for medical education was appointed by the new dean at the beginning of 2012.

The aforementioned factors influenced the climate of the macrosystem, and added attention from the LCME finally precipitated several important changes at UNSOM. First and foremost was a renewed effort to recruit a new dean and provide stable leadership, which was achieved in 2011. The second priority was to begin a process of curricular reform to create a vertically and horizontally integrated curriculum that would rely less on passive modes of classroom instruction, increase student engagement by adopting more interactive teaching modalities, and allow more time for student-directed learning. Curricular integration in medical education is defined in two ways: horizontal integration, defined as teaching foundational science content from disciplines such as anatomy, biochemistry, physiology, and pharmacology concurrently based on an organizing principle such as an organ system or patient presentation; and vertical integration, defined as teaching foundational science content within a clinical context during Years 1 and 2 and reemphasizing foundational science concepts during clinical rotations in Years 3 and 4.

**EVALUATION OF CURRICULAR CHANGE: FACULTY ENGAGEMENT**

UNSOM administrators recognized the importance of assessment and evaluation of the process of change and requested the formation of a committee specifically to create an evaluation strategy. The committee, called the Curriculum Evaluation Group (CEG), was composed of UNSOM administrators; faculty representatives; and consultants from the University of Nevada, Reno, Behavior Analysis Program. The CEG created a strategy to determine the impact of major curricular change on UNSOM. It included measures of student performance on standardized exams (like the Step 1 exam, a national licensing exam that tests the scientific and clinical content that students are exposed to during Years 1 and 2 in medical school) as well as other performance indicators (such as scores on Standardized Patient [SP] exams). SP encounters are an evaluation and training tool that utilize actors in simulated medical settings. A medical student practices clinical skills, such as taking blood pressure and listening to the heart, on the actor. In addition, the student also must engage the actor appropriately, taking a patient history and interacting with the SP as he or she would with a patient. The SPs are trained to evaluate each student on both his or her clinical skill and interpersonal performance.
The CEG also identified the need to determine the impact of the curricular change on the medical school faculty. Unlike the student population, faculty members were not already engaged in recurrent measures that would provide an assessment or evaluation of the effect of curricular change on the faculty during the change. The CEG recommended that an internal feedback loop be created to allow for faculty members to comment on the change process. It was decided that conducting faculty interviews would provide a good indication of faculty members’ interpretations of the change. An additional benefit of the interviews was the opportunity to code and quantify discrete areas that could be used to identify patterns in faculty responding, leading to targeted decision making as the change process progressed.

Faculty Feedback

Following the suggested change by LCME officials, some UNSOM faculty leaders had emerged as champions of the process and were engaged in planning the new curriculum. The new leadership represented faculty from the existing leadership, former course directors, and faculty from clinical departments who had not formerly been involved with teaching students in Years 1 and 2. The CEG determined that this group should be the primary population to select for interviews based on their experience working within UNSOM, their current roles, and their indicated interest in curricular change.

There were three main objectives to these interviews. First, it was important to determine how the faculty members were affected by the change to an integrated, block curriculum. Second, it was important to integrate faculty responses into a descriptive, graphical account and to identify patterns in responding. Third, the descriptive analysis was to be used to provide recommendations in terms of organizational change strategies that promoted faculty engagement and buy-in to other institutions undergoing curricular change.

Method

Participants

The interviews targeted emerging faculty leaders, defined as UNSOM faculty members who had demonstrated interest in the curricular change process by attending at least two meetings regarding the curricular change. Attendance logs were used to determine faculty participation at these meetings. Initially, 22 faculty members were identified as emerging faculty leaders for the first phase of interviews. One year later, an additional 17 faculty members were identified for the second phase of interviews. The groups were mutually exclusive, with no overlap. Faculty who were previously identified for the first phase of interviews were removed from the list for the second phase.
During Phase 1, 15 out of 22 UNSOM faculty members responded and were interviewed during the period of August through November 2011. During Phase 2, 10 out of 17 UNSOM faculty members responded and were interviewed during the period of September 2012 through January 2013.

**PROCEDURE**

UNSOM faculty members who met the criteria were invited through e-mail to participate in the interviews. The e-mail indicated further follow-up by the researchers to solicit their participation and scheduling of the interviews. Included in the e-mail was an information sheet that provided a thorough outline of the study and the interview process. These potential interviewees were then contacted by researchers (via phone and e-mail); were allowed to ask any questions about the research; and, if they agreed to participate, were scheduled for the interview.

The semistructured interviews had a number of preset questions developed by the CEG. However, faculty members were allowed to address related concerns if they came up during the interview process. Participants were informed that the interview would be recorded for the purpose of transcription. In addition, they were asked to give permission for the interviewer to use direct quotes from the interview, if appropriate, and were told that quotes would be used to highlight particular areas and provide examples to UNSOM administration. All direct quotations were anonymized to protect participating faculty.

An audio recording of each interview was then transcribed and compiled using a coding system. The coding system utilized a similar development process to the coding system developed by Smith, Houmanfar, and Denny (2012) to measure social interaction. The system was composed of 12 comment areas: time, effort, money, support, clarity of communication, LCME interaction, administrative interaction, peer interaction, buy-in, student education outcomes, department structure, and faculty development (see Table 1). Each area had an operational definition and was mutually exclusive from all other comment areas. Each comment was also coded as having a positive or negative direction. A positive code meant that the participant mentioned a strength or benefit to the curricular change. A negative code meant that the participant mentioned a weakness or detriment to the curricular change. In combination, each comment was designated both an area (such as money) and a direction (such as positive), for a total of 24 possible coding outcomes.

**Results**

The results (see Figures 2 and 3) provide a descriptive account of emerging faculty leaders’ perspective on curricular change process. The compiled
### TABLE 1 Coding Categories Used for the Faculty Interviews

<table>
<thead>
<tr>
<th>Coding category</th>
<th>Examples of possible positive comments</th>
<th>Examples of possible negative comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Enough time, more time available</td>
<td>Not enough time, taking up too much time</td>
</tr>
<tr>
<td>Effort</td>
<td>Manageable effort, can be done easily</td>
<td>A lot of effort, too difficult to accomplish</td>
</tr>
<tr>
<td>Money</td>
<td>Reasonable financial support, could promote financial efficiency</td>
<td>Not enough money, lack of efficient approach to financial management</td>
</tr>
<tr>
<td>Support</td>
<td>Reasonable support services, nonteaching faculty involvement</td>
<td>Not enough assistance, support staff or nonteaching faculty</td>
</tr>
<tr>
<td>Communication clarity</td>
<td>Reasons for changes made clear, decisions communicated clearly</td>
<td>Reason for changes unclear, decisions not clearly communicated</td>
</tr>
<tr>
<td>LCME interaction</td>
<td>LCME was helpful, LCME was supportive</td>
<td>LCME was heavy handed, LCME was not supportive</td>
</tr>
<tr>
<td>Administrative interaction</td>
<td>Participation encouraged, discussion of guidelines</td>
<td>Participation discouraged, not encouraged, requirements imposed</td>
</tr>
<tr>
<td>Peer interaction</td>
<td>Constructive decision making with others, better knowledge of others’ work, promotion of collaborative approach to teaching</td>
<td>Unconstructive or uncooperative conversations with others</td>
</tr>
<tr>
<td>Faculty buy-in</td>
<td>Faculty on board, faculty wanted to participate</td>
<td>Faculty not on board, faculty didn’t want to participate</td>
</tr>
<tr>
<td>Student outcomes</td>
<td>Standardize scores increase, placement positions are more prestigious, easier transition between Years 2 and 3, residencies, fellowships</td>
<td>Standardize scores decrease or stay the same, placement positions are less prestigious, difficult transition between Years 2 and 3, residencies, fellowships</td>
</tr>
<tr>
<td>Department structure</td>
<td>Restructuring of departments seems beneficial</td>
<td>Restructuring is not needed or could be detrimental</td>
</tr>
<tr>
<td>Faculty development</td>
<td>Between-department collaboration, more multidisciplinary interaction, increased awareness of others’ expertise and practices, can promote faculty collaboration</td>
<td>Not helpful, can be distracting, can promote competition</td>
</tr>
</tbody>
</table>

Note: The table provides examples for each category but does not include the full definition of each category. LCME = Liaison Committee on Medical Education.

Results were calculated a number of different ways, one of the most useful being the calculation of the percentage of faculty leaders who made at least one comment in each area. These results indicate areas that a large portion of the faculty acknowledged as positive or negative, providing guidance to administrators regarding areas of concern that should be addressed in order
FIGURE 2 The percentage of faculty who made at least one comment in each area during the first phase of the interview process, with positive and negative comments delineated. Faculty members were able to talk about multiple topics in each area, so it is possible that a single faculty member could make at least one positive and at least one negative comment in one area. LCME = Liaison Committee on Medical Education; Admin = administrative; Ed. = education; Dept. = department; Fac. Dev. = faculty development.

FIGURE 3 The percentage of faculty who made at least one comment in each area during the second phase of the interview process, with positive and negative comments delineated. Faculty members were able to talk about multiple topics in each area, so it is possible that a single faculty member could make at least one positive and at least one negative comment in one area. LCME = Liaison Committee on Medical Education; Admin = administrative; Ed. = education; Dept. = department; Fac. Dev. = faculty development.
to facilitate the change and indicating benefits and positive outcomes that could be emphasized and utilized to increase the effectiveness of change. This approach to data collection and analysis removed the potential bias of a single faculty member making numerous negative comments about one area he or she was concerned about, artificially inflating the results to be skewed.

As shown in Figures 2 and 3, areas of concern that were indicated in the first phase of interviews included, for example, concerns about time, money, effort, and support. The time faculty members were putting into preparing for a major curricular shift was substantial, and the faculty expressed concern that the effort was considerable. Many mentioned that the curricular change was occurring with limited to no funding, meaning that most of the emerging leaders who were interviewed were not receiving compensation for their work at the time of the interview. There was also substantial concern, mainly among the basic science faculty, that clinical faculty would not be involved in the planning and implementation of the new curriculum as much as was required. This concern was mainly due to past difficulty integrating clinical faculty into the old curriculum.

Comparing Figure 2 to Figure 3 reveals a substantial drop in concern about time and effort during the second phase, about 40% and 60%, respectively. Concerns about money also dropped considerably, at about 40%, though about 50% of the faculty members still mentioned money as a concern during the second phase. These changes were most likely due to the Phase 2 group observing and interacting with the group from Phase 1. Phase 2 faculty had, at the time of the interviews, seen 1 year successfully planned and implemented, removing some of the uncertainty about the process, which decreased the concerns about time and effort. Support remained about the same, indicating that faculty did not see an indication that they would receive needed support for the curricular change. Far fewer faculty members expressed negative comments regarding the LCME during the second phase compared to the first, which can be attributed to both the length of time between the phases and the fact that other, positive contingencies were affecting organizational change.

Areas indicated by the interviews as benefits had to do with faculty and students. For example, almost all the faculty (85%) in the first phase (see Figure 2) mentioned that peer interaction was one benefit of the change. Many faculty members did not intermingle frequently with anyone outside their department. The new curriculum change process required interdisciplinary teams, requiring faculty to interact with other departments. Faculty indicated their enjoyment at meeting people who had worked in their building for years but whose names they had never had the chance to learn. Many mentioned that they felt stimulated and excited working with individuals they had never worked with before. In addition, students were a priority for faculty. Every faculty member mentioned at least one positive about student education outcomes. These consisted of comments that were complimentary
of the students entering into UNSOM as well as those who had completed UNSOM coursework. Faculty unanimously expressed confidence in the students' ability to succeed, regardless of the curriculum they were exposed to, and said they could see how the new curriculum would help organize the students' learning. There were slightly fewer faculty members who mentioned these benefits during the second phase, though this is mainly attributed to the institutionalization of interdisciplinary work and maintained emphasis on student performance as the highest priority for UNSOM.

APPLICATIONS OF DATA

The results of the interviews were utilized to provide feedback to the administrators at UNSOM in a variety of capacities and have been used to guide organizational changes. The dean was presented with an executive summary of the interview results with detailed analyses too extensive to be addressed here. This included a breakdown of the overall data in multiple different ways as well as an analysis of the change in concern over time. After the first phase, the dean requested that the interview process continue with the second phase of faculty, as presented here. In addition, he requested that the interviews reoccur periodically. The second round of interviews has been completed with the faculty from Phase 1 at this time, though only preliminary results have been calculated.

General results and a brief methodology were presented to UNSOM faculty during a town hall meeting. This presentation was followed up by a lunch with the dean targeting a select few who had been invited to participate in the CEG interviews. This lunch provided a venue for dialogue between the dean and faculty members about the curriculum change. Many of the faculty expressed their satisfaction with the lunch and the chance to interact directly with the dean to discuss their concerns and enjoy their successes. The development of this feedback system demonstrated the utility of communication networks across hierarchical structure in the promotion of a collaborative approach toward the management of a complex social system (Houmanfar, Rodrigues, & Smith, 2009).

A secondary feedback mechanism that provided data on faculty members' satisfaction with their teaching roles, as well as many other areas, was a Faculty Forward© survey administered in the spring of 2013. The Faculty Forward program uses a comprehensive, validated survey instrument that measures levels of satisfaction with 14 domains of faculty professional life, including institutional mission, fairness, relationships, compensation, and global satisfaction. The survey is administered by the Association of American Medical Colleges (AAMC), responses are de-identified and aggregated, and an \( N = 5 \) rule is used so that individuals' responses are anonymous. The AAMC benchmarked UNSOM's data with other participating schools that had recently completed the survey as well as data from a peer group of schools.
Cultural Change in a Medical School

with similar characteristics to UNSOM. Schools in earlier cohorts have published their findings as well as resulting work in leadership development, promotion, and mentoring (Bunton et al., 2012).

Our administration of the Faculty Forward program in the spring of 2013 resulted in an 83.4% response rate compared to an average response rate of 61.7% in the national cohort. At the outset of UNSOM’s Faculty Forward project, the dean appointed a taskforce of academic and administrative faculty to generate participation, analyze the data, and recommend program planning based on our results. Each department chair received his or her department data for discussion with the respective department faculty members. Based on that discussion, each chair was asked to populate a report template that included an action plan. Using the overall school data and the chairs’ reports, the taskforce identified key themes with the Faculty Forward data set. Our faculty indicated high degrees of satisfaction with their work and colleagues. Faculty members expressed a desire for improvement in communication, mentoring, clarity of promotion and tenure guidelines, as well as support for part-time and administrative faculty.

The University of Nevada, Reno, Institutional Review Board approved our request to submit the list of faculty members who had participated in the CEG interviews to the AAMC so that we could compare the CEG responses with the Faculty Forward results. Specifically, we sought to compare levels of satisfaction among the CEG participants with the overall faculty responses. Faculty members who participated in the CEG were given the option to opt out of this process, and none chose to do so.

The AAMC provided aggregated data for the CEG faculty members, and the results demonstrated that on almost every question for which there was a significant difference between groups, as demonstrated by the Mann–Whitney U test, the CEG respondents reported less satisfaction than the overall faculty (see Table 2). One interpretation of these results is that self-selected curricular leaders may have higher expectations regarding their own

<table>
<thead>
<tr>
<th>Faculty Forward survey question</th>
<th>CEG subgroup (N = 23)</th>
<th>UNSOM total (N = 229)</th>
<th>p (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The dean’s priorities for the medical school are reasonable</td>
<td>3.00 (0.97)</td>
<td>3.67 (0.88)</td>
<td>.0021</td>
</tr>
<tr>
<td>My department is successful in retaining racial/ethnic minority faculty members</td>
<td>3.05 (1.19)</td>
<td>3.64 (0.82)</td>
<td>.017</td>
</tr>
<tr>
<td>My overall compensation</td>
<td>3.64 (1.14)</td>
<td>2.98 (1.1)</td>
<td>.0131</td>
</tr>
</tbody>
</table>

Note. CEG = Curriculum Evaluation Group; UNSOM = University of Nevada School of Medicine; CI = confidence interval.
career development, as well as those associated with the success of the school of medicine. Moreover, these individuals’ engagement with the curricular change process allowed for more direct observation and understanding of the impact of change at the individual and organizational levels.

It is also important to note that the curriculum reform was occurring in the context of increased productivity demands for clinical faculty and increased competitiveness for research dollars for the basic science faculty. Although the dean’s office committed significant funds to support the process of curricular development, it was in the context of a need to increase clinical productivity. The aforementioned results correlated with those from the CEG faculty interviews in terms of significant faculty concerns associated with resources, especially pertaining to the commitment of clinical faculty members’ time. The overall data collected through CEG interviews and Faculty Forward programs demonstrated a greater sense of urgency for (a) program development to address the concerns of these faculty leaders in education and (b) a better understanding of the importance of clearly communicating what changes are being made directly as a response to their input.

RESULTING ORGANIZATIONAL CHANGE

From 2010 to August 2012, UNSOM administrators working together with faculty members from the basic science and clinical departments in Reno and Las Vegas worked continuously to create new curricular content for the first 2 years of the curriculum. From the start, this restructuring process was a faculty-driven, bottom-up process facilitated by the Office of Medical Education.

The Office of Medical Education provided administrative support and established regular channels of communication with the faculty members on northern and southern campuses for an inclusive restructuring process. All faculty members were invited to participate in the initial statewide teleconference planning sessions during which institutional objectives were revised. Documents were posted and shared on a website to promote transparency during the change process. Participating faculty members were encouraged to contact colleagues at other medical schools and research curricular structures being used in other LCME-accredited schools. After a faculty-wide vote was conducted and a decision made in late 2010 to adopt an organ-based, block structure similar to the model the University of California at Los Angeles (UCLA) had developed and implemented, UNSOM received collegial support from faculty peers at UCLA’s David Geffen School of Medicine as a result of outreach efforts by UNSOM faculty.

Beginning in late 2011, a curricular restructuring account was set up for the Office of Medical Education with state dollars that had been redirected from UNSOM departments that had previously administered courses in the old curriculum. This signaled a shift in funding priorities and in curricular
control from department chairs to the Office of Medical Education and the Medical Education Steering Committee. Support for faculty efforts in planning and implementing the new integrated curriculum was a frequently discussed topic at faculty meetings, and the dean was proactive in addressing this issue by providing financial support in the form of teaching stipends for those willing to serve as block leaders in the new curriculum.

The dean also changed the administrative infrastructure at UNSOM by creating a new senior-level position designed to provide direct oversight of the medical education program. This included admissions, student affairs, curriculum management, faculty development, and continuing medical education. Previously all of these units had operated independently and reported directly to the dean.

The success of the faculty engagement project prompted further collaboration between UNSOM and the Behavior Analysis Program in another critical area of curricular change, namely, student engagement. In accordance with the curricular redesign required by LCME standards, UNSOM adopted an emerging behavioral assessment technology, the Implicit Relational Assessment Procedure (IRAP; Barnes-Holmes, Barnes-Holmes, Stewart, & Boles, 2010), and produced an online, Web-based version of the assessment, which has been used to assess the implicit attitudes of medical students. To date, first-, second-, and third-year students have been assessed with this tool at various points in their medical education and training as the initial phases of a long-term, longitudinal assessment of multiple classes of students as they progress through medical school and beyond (e.g., entering medical school, after Year 2, after Year 4, after residency). An overview of the development and implementation of this project, including how the data are shaping curricular redesign, is provided in the following sections.

CURRICULAR MANAGEMENT OF IMPLICIT ATTITUDES OF MEDICAL STUDENTS: STUDENT ENGAGEMENT

Medical education is a complex and difficult (often seemingly impossible) task: to take a diverse group of students and, over the course of just 4 years, transform them from laypersons to physicians—physicians responsible for making life-and-death decisions on a daily basis. In total, 18,156 students graduated from U.S. allopathic (i.e., MD-granting) medical schools in 2013 (AAMC, 2013). Although this clearly shows it is not impossible, it is certainly well recognized that it is an incredibly difficult task.

Just making doctors, however, is not sufficient. Society demands, rightfully so, that we make good doctors. A lengthy debate regarding how to operationally define what it means to be a good doctor could occur, but any list of desirable characteristics is likely to include some basic qualities, such as smart, compassionate, empathetic, fair, and socially aware, among many
others. In reality, what defines a good doctor rests with the values of the individual patient, as it is in the interaction between the physician and the patient that the social significance of medicine predominantly rests.

It is paradoxical that the process of creating a physician can be destructive to the desired outcome of making a “good” physician. As is universally known, medical school is difficult. It is arguably the most difficult professional school to which one can be accepted and then succeed. Beyond the stress of the 4 years of medical school lies residency training, in which students specialize in fields such as surgery, internal medicine, or pediatrics. Residency training can last from 3 to 7 years, and it is not uncommon for these physicians to work for 24 hr straight (and in recent years, as long as 30 or even 36 hr straight) and upward of 80 hr per week.

Medical education is also unique in that the transition between medical school and residency training is unpredictable, incredibly stressful, and not entirely in the control of the person experiencing it. The National Residency Matching Program pairs graduating students with a residency program using an algorithm to match students and residency programs based on mutual interest in each other. The result can be an added layer of stress to bear at the end of medical school due to uncertainty over where one will be spending the next few years of one’s life. When taken together, the processes of applying to, matriculating from, and succeeding in medical school, added to the processes of applying to, being matched in, and succeeding in residency training, lead to a long-standing and substantial amount of stress. What does this amount of stress do to a student?

It is well known that empathy scores tend to decrease over the course of medical school (Neumann et al., 2011). However, it is unclear whether the stress of medical school reduces compassion, empathy, and other traits ascribed to a “good” doctor or whether it merely unmasks a lack of compassion and empathy that was already present in students.

Given the tremendous amount of stress, burnout is a major concern for physicians and those in training. Burnout in the professional setting is characterized by feelings of emotional exhaustion, depersonalization, and a low feeling of personal accomplishment (Maslach & Jackson, 1981). Many factors can contribute to the development of burnout, including the process of becoming a physician. Dyrbaye and colleagues (2014) recently assessed burnout among medical students, resident physicians, and early career physicians using a standard tool in the field, the Maslach Burnout Inventory (MBI; Maslach & Jackson, 1981). This tool includes three scales that assess the areas of emotional exhaustion, depersonalization, and sense of personal accomplishment. Dyrbaye et al. categorized a person as exhibiting professional burnout if he or she scored high on either the emotional exhaustion or the depersonalization domain. Their results showed that the scores of 55.9% of medical students, 60.3% of residents/fellows, and 51.4% of early career physicians were indicative of clinically significant levels of professional burnout.
Implicit Attitudes

The data from Dyrbye et al. (2014) represent explicit measures of burnout in that they are based on self-report, survey-type responses. Explicit measures are generally characterized by self-report measurement methods, in which the respondent has time to consider the response being provided. As a result, these measures suffer from common challenges associated with self-report, such as inaccurate or falsified responses due to self-presentational strategies on the part of the respondent to conceal certain attitudes.

Explicit measures, in this case of attitudes, are contrasted with implicit measures of attitudes, which have been measured through various computer-based programs designed in part to circumvent the aforementioned concerns with explicit measures. For the present purposes, attitudes are defined as verbal judgments or evaluations pertaining to specific stimuli or concepts. Implicit attitudes are described as being brief, immediate (sometimes referred to as automatic) verbal reactions to stimuli that people encounter and are considered less susceptible to control by the respondent, especially when they are forced to be emitted very quickly under time pressure (Barnes-Holmes et al., 2010). Implicit assessment tools measure response latencies of respondents to various combinations of stimuli presented onscreen. The response latencies to different pairings of stimuli are calculated into D-scores, which essentially represent a Cohen’s $d$ effect size of latency differences, which in turn are used to infer a person’s implicit attitudes pertaining to the stimuli presented in the implicit assessment (see Barnes-Holmes et al., 2010, for a detailed review).

The IRAP (Barnes-Holmes et al., 2010; Levin, Hayes, & Waltz, 2010) was the implicit assessment tool utilized for assessing implicit attitudes regarding burnout at UNSOM, and it was borne out of a behavior analytic theory of language and cognition known as relational frame theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001). Simply stated, RFT asserts that complex human behavior consists of relational responding between many stimuli (including arbitrary stimuli) and thus forms the basis of language and human cognition. Stimuli, which in the case of language are arbitrary symbols, words, and phrases, are not simply associated with one another independent of any context but rather are related to one another (through the behavior of relating) and nonarbitrary stimuli based on their meaning. The term meaning itself can evoke a lengthy discussion, but for the present purposes, it is understood as stimulus function. Stimulus functions of various stimuli are in turn derived from experiences shaped through operant learning. Therefore, the way an individual relationally responds to stimuli is based on the current stimulus functions of those stimuli, which are a product of the sum of the individual’s experiences with those stimuli and current contextual influence. Thus, relational responding between two specific stimuli, as is the case in
a standard IRAP procedure, is different for different people, with different learning histories, in different contexts.

As an example, consider the Major League Baseball team the Chicago Cubs. Depending on where someone is from (e.g., Chicago vs. St. Louis, the north side of Chicago vs. the south side of Chicago), the stimulus “Chicago Cubs” in all forms (e.g., written words, spoken words, team symbol, and the team of players themselves) may participate in an entirely different relational frame with regard to the concept (or stimulus) of “good” (i.e., the stimulus function). Some people will respond to one stimulus, “Chicago Cubs,” in terms of (i.e., relationally to) another stimulus, “good,” as though they are similar or equivalent, whereas others will relationally respond to those stimuli as being dissimilar or opposite of each other. Furthermore, the speed with which one emits these relational responses will vary based on his or her history of responding to those stimuli as such. The way a person relationally responds to various stimuli (thus determining his or her stimulus functions) is a product of the person’s lifelong experiences (e.g., being raised on the north side vs. the south side of Chicago) and culture.

Applied to medical education, RFT suggests that a group of medical students, diverse in many ways, including demographically, culturally, and educationally, will present a diverse set of implicit attitudes. Those who make the choice to enter the field of medicine come from diverse backgrounds and from a variety of cultures, with a wide range of experiences having shaped their attitudes and the way they interact with the world around them. With few exceptions, an undergraduate degree is a requirement for entrance to medical school, but generally the prerequisite coursework prior to matriculation is not standard from school to school. Furthermore, there is no “correct” undergraduate path or major, so some students may have backgrounds in the sciences, whereas others may have obtained degrees in the humanities. The diversity of educational experience is additive to the demographic diversity and cultural diversity represented in a typical medical school class. Because it is the culmination of a lifetime of experiences, in all aspects of life, that forms the basis of the implicit attitudes of each individual, a diverse group of people, such as that seen in a medical school class, would bring with them a diverse set of attitudes.

The foregoing discussion raises important questions, such as, What are the implicit attitudes medical students bring to the table when they first enter medical school? and, How do these implicit attitudes evolve over the course of medical education and training? These questions represent the primary purpose of the ongoing research program described next, which utilized the IRAP to assess the implicit attitudes of medical students at UNSOM. As noted, this research program is ongoing, with the initial phase (i.e., assessing baseline implicit attitudes of incoming medical students) well under way and the extended phases of assessing longitudinal, within-cohort changes in implicit
attitudes—with and without specific intervention—just becoming available for study.

Method

Participants

During their orientation week of medical school, 59 first-year (Year 1) medical students at UNSOM were assessed using the IRAP. In addition, 45 students were assessed during the brief transition course between their second and third years (Year 3) of medical school. The particular IRAP targeted relational responses between the categorical stimuli “I am” and “I am not,” which signified an assessment of an attitude toward a personal characteristic students felt about themselves, to eight specific burnout target stimuli, which were “competent,” “caring,” “enthusiastic,” “positive,” “callous,” “drained,” “overwhelmed,” and “stressed” (see Figure 4 for a screenshot example of the procedure).

Procedure

During the assessment, students were initially presented with a burnout-related target stimulus, such as “competent,” and a categorical stimulus, such as “I am,” and were asked for a binary relational response, with the two possible options being “yes” and “no.” In certain IRAP preparations, such as the Mixed-Trial IRAP (Levin et al., 2010), an additional stimulus is presented onscreen as an additional contextual cue that allows attitudes toward individual stimuli to be assessed, as opposed to only groups of similar stimuli (see Levin et al., 2010, for a detailed explanation). In the present study, these additional stimuli were “agree” and “disagree” (see Figure 4), such that students were asked to either agree or disagree with respect to their own personal attitudes as they responded to each presentation of certain stimuli.

For example, on an “agree” trial, if the students felt they were competent, they would press the key on the keyboard that corresponded with “yes.” On a “disagree” trial, students would necessarily answer the opposite of what they answered on the “agree” trial; thus, if they felt they were competent, they would press the key on the keyboard that corresponded with “no,” essentially disagreeing with their explicit attitudes. The converse was also true, whereby if students truly felt they were not competent, they would select “no” during the “agree” trial and “yes” during the “disagree” trial. It should be noted, however, that although a student may not have wanted to admit to feeling incompetent, for example, and would therefore not have answered such on an “agree” trial, the assessment does not rely on an honest response during “agree” trials and thus can handle situations in which students may provide inaccurate/falsified responses in the presence of the “agree” and “disagree” stimuli.
FIGURE 4 Screenshots of Implicit Relational Assessment Procedure (IRAP) computer program used to assess students’ implicit attitudes. Burnout IRAP stimuli shown with “agree” stimulus (upper panel) and “disagree” stimulus (lower panel). “Agree” trials were presented with a light green background and “disagree” trials were presented with a light red background to facilitate discriminative properties of the task.

In addition, as is common to virtually all implicit attitude assessment tools, it was important for students to respond to each trial rapidly, within a 3-s time constraint. If a student took too long to respond to the stimuli in a given trial, the program prompted them to “GO FASTER!” by displaying that text onscreen in bold red font.

Results

Group-level analyses of the two classes of students indicated that the Year 1 students generally did not exhibit implicit biases associated with being burned out. However, the Year 3 students exhibited implicit biases that were associated with a greater degree of burnout, relative to the Year 1 students, for the majority of the eight burnout stimuli assessed, with the exceptions of “caring” and “callous” (see Figure 5). Independent-samples t tests conducted for each stimulus between the two classes of students indicated that the differences in group-level D-scores were significantly different for the “drained”
and “stressed” stimuli and approached statistical significance for the “enthusiastic” stimulus: “drained,” \( t(1, 56) = -2.18, p = .03 \); “stressed,” \( t(1, 66) = -3.14, p = .002 \); “enthusiastic,” \( t(1, 94) = 1.84, p = .07 \).

Figures 6 and 7 depict histograms of students’ IRAP results for two individual stimuli (“enthusiastic” and “stressed,” respectively), categorized into strong, moderate, weak, or neutral IRAP effects, based on D-scores. It was found that although the majority of Year 1 students demonstrated moderate to strong implicit biases of being enthusiastic, there were some students who displayed opposing implicit biases (i.e., weak to moderate bias of not being enthusiastic). A similar pattern for the Year 1 students was observed for the “stressed” stimulus, in which nearly 40% of Year 1 students exhibited a strong bias of not being stressed, however nearly 25% of students demonstrated an implicit bias of being stressed to at least some extent (i.e., weak, moderate, or strong). With regard to both individual stimuli, it was observed that the Year 3 students generally demonstrated a shift toward being more burned out (i.e., less enthusiastic and more stressed).

APPLICATIONS OF DATA

The data presented here allow medical educators the opportunity to assess baseline attitudes as they are, to document the evolution of these implicit attitudes within classes on a longitudinal basis, and to develop interventions toward preventing decline and promoting improvement. Although we did
FIGURE 6 Histogram of student D-scores for the “enthusiastic” stimulus across two different classes of students. Year 1 students completed the Implicit Relational Assessment Procedure (IRAP) during the orientation week of medical school entrance, and Year 3 students completed the IRAP during the transition course between Years 2 and 3 of medical school. Not access and evaluate individual student data, the results provided do allow for curricular interventions aimed at an entire class. One major area of focus is based on the concept of self-awareness. One expectation is that

FIGURE 7 Histogram of student D-scores for the “stressed” stimulus across two different classes of students. Year 1 students completed the Implicit Relational Assessment Procedure (IRAP) during the orientation week of medical school entrance, and Year 3 students completed the IRAP during the transition course between Years 2 and 3 of medical school.
merely bringing to the attention of the students the fact that they exhibit these implicit attitudes, and the extent to which they may be completely at odds with students’ established explicit attitudes, will be helpful in developing a context for students’ ongoing development as physicians. There is some evidence in clinical medicine (Green et al., 2007) to suggest that being aware of an implicit attitude may by itself reduce some of the potential negative impact of implicit biases.

RESULTING ORGANIZATIONAL CHANGE

IRAP data pertaining to a range of target concepts have allowed for the design of specific curricular interventions to address areas such as implicit bias (e.g., implicit bias toward stigmatized groups of patients, such as obese, poor, and transgender patients). Thus far, we have incorporated content on mindfulness, acceptance and commitment training, perspective taking, and values clarification toward numerous targets of implicit attitude assessments beyond just burnout (e.g., obesity). Beyond the curriculum, data such as these inform cocurricular programs at UNSOM as well. The Student Wellness Program aims to combat many of the sources of burnout before they become a problem. Although it is too early to assess the impact this may have on the education of future physicians (i.e., outcome measures), the hope is that it will be a positive one.

As previously noted, the process of educating physicians is a complex and challenging undertaking. Students enter medical school with an incredible diversity of backgrounds, experiences, and abilities, all of which factor into the physician they become. In today’s society, there is a tremendous social significance to health care, and people feel the impact of this industry every day. At the center of this social significance is the interaction and relationship between the patient and the physician. It is a relationship that dates back thousands of years and forms the cornerstone of health care. If this relationship can be impacted by the implicit attitudes of physicians, then the more thoroughly these attitudes can be understood, the better this relationship and industry as a whole will be. Utilizing tools such as the IRAP provides an incremental improvement toward this end, in part through the opportunity to affect curricular change in medical school, the goal of which is to continue to improve the quality of education provided to future physicians and to ultimately make better doctors.

GENERAL DISCUSSION

The concurrent interdisciplinary projects described in this article demonstrate the value of bringing behavioral systems and behavior analytic approaches to bear on the complex levels of organizational functioning of a highly unique,
incredibly important organization, the aggregate product of which is a steady stream of society’s future health care professionals. This value was proactively recognized by the leadership of UNSOM, who reached out to systems and behavior specialists on the same campus in order to optimize the management and effectiveness of large-scale organizational change. By focusing on organization-wide communication across hierarchical levels and horizontally within levels, and through identifying emerging, informal leaders and soliciting their feedback and concerns using multiple methods, such as interviews and surveys, UNSOM and its interdisciplinary partners have been able to facilitate a massive organizational change effort to redesign its curriculum and realign the personal goals of its diverse employees with the primary organizational mission. In conjunction with this effort, the use of emerging assessment technology coupled with contemporary theory on complex human behavior (i.e., RFT) has allowed UNSOM administrators to identify additional targets for curricular change, such as implicit bias. These educational targets are generally either ignored or missed entirely (i.e., the hidden curriculum of medical school) in more traditional medical school curricula, or they are addressed in a manner that has been subjectively and anecdotally regarded as ineffective. However, RFT and various applications of RFT (e.g., acceptance and commitment therapy [Hayes, Strosahl, & Wilson, 1999] and acceptance and commitment training) suggest nontraditional, theory-based approaches to addressing implicit biases that open up new avenues for researching the effects of curricular interventions on implicit bias throughout medical training. More traditional aspects of performance management and behavior analytic practice will also provide objective, performance-based outcome data with which to evaluate the ongoing interdisciplinary efforts at UNSOM. Future evaluation efforts along these lines at UNSOM will highlight important outcome measures, such as students’ standardized test scores, graduation rates, success in obtaining residencies, dropout rates, and so on.

Conclusion

Medical school leaders and administrators pay close attention to data. Every year they receive the results of annual student surveys, student scores on national examinations, and the school’s results on the residency match. This information is important for internal and external use and helps make adjustments to the curriculum, advising, and other institutional operations.

The collaboration between UNSOM and the Behavior Analysis Program in the Department of Psychology has opened up another portal of data. This interdisciplinary experience has demonstrated that with a behavior scientific vantage point, we have the ability to gain a deeper understanding of attitudes that impact students’ approach to patients as well as some of the contingencies that influence faculty engagement and institutional culture.
Understanding these contingencies allows for more thoughtful alignment of faculty rewards with institutional missions.

Leading a large, complex educational institution such as a medical school is ultimately a task of managing and changing culture. As the common saying goes, “Culture trumps strategy,” yet changing culture is known to be extraordinarily difficult. Managing entropy is a critical and immediate task for the medical school’s leadership team, reducing it to some extent so as to focus faculty and staff energy on institutional missions but not so much as to stifle the creativity and innovation necessary for long-term success. The major institutional changes required are culture driven. Changing organizational practices is most effective when data driven. The multidisciplinary collaboration described in this article along with the use of several other data sources demonstrate the value of behavioral assessment and analysis of the attitudes and behaviors of faculty and staff members and students in driving these decisions. As members of an institution with complex and socially significant missions, we embrace this information as a means of improving our primary product—skilled and compassionate physicians.

ACKNOWLEDGMENTS

Portions of this article were presented at the Special Seminar on Leadership and Cultural Change, May 23, 2014, in Chicago, Illinois.

REFERENCES


