Entrustable - the Use of Filmed Reflection to Explore Themes of Struggle, Meaning, and Growth at Harvard Dental and Medical Schools

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Abstract

Background: Reflective practice in medical education has demonstrated benefit in learning, community building, empathy development, and professional identity formation.[1–4]Despite known benefits and widespread adoption of written and verbal reflection in this setting, film-based reflection within medical school training has largely not yet been employed.[5] We aimed to produce a film exploring common themes of struggle and growth within a diverse group of senior students at Harvard Dental and Medical Schools through filmed, semi-structured interviews.

Methods: Interviewees were recruited using digital communication with students who matriculated in August of 2016 and/or those graduating in the Spring of 2020. Interviewees were selected, prioritizing inclusion of those with backgrounds under-represented within healthcare. We developed an open-ended, and semi-structured interview guide, and interviews were filmed with a Canon 6D EOS, Full-Frame DSLR, Canon EF 50mm. 1:1.8 STM lens. Responses were clipped, labeled, and arranged using Final Cut Pro.

Results: Seventeen interviews were conducted with a total run time of 5 hours and 1 minute. The average interview length was 12 minutes and 48 seconds. After clipping and rearranging, the total length of the film was reduced to 1 hour. Responses regarding training challenges were categorized as personal stressors, clinical stressors, and career stressors. Meaningful training experiences included personal growth, interactions with patients and peers, clinical growth, and the ability to advocate and improve systems for patients as an HSDM/HMS student.

Implications: Filmed interview reflections are a feasible method for exploring students' attitudes towards and struggles and growth during dental and medical training. The themes observed within this project reflect previously well-documented themes in the peer-reviewed literature. Though this artistic project was not intended to be a systematic investigation and was thus limited by lack of a formal coding process for interview content and a small sample size, this pilot could serve as a model for similar future film-based reflection to foster humanism and wellness within healthcare, and its completion and results suggest that systematic investigation of the efficacy of this media in achieving these goals would be feasible.

Glossary of Terms and Abbreviations

HMS.....Harvard Medical School

HSDM.....Harvard School of Dental Medicine

HST.....Health Sciences & Technology Program

M1, M2, M3, M4…….....Medical School Years 1-4

D1, D2, D3, D4…….....Dental School Years 1-4

PCE…….....Principal Clinical Experience

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Introduction

Background

Reflection—in a myriad of forms—is integrated within the modern pre-clinical and clinical curricula of most medical schools.[6] Reflective practice has demonstrated benefit in community building, learning, empathy development, and professional identity formation.[1–4] Common modalities for reflection include written work such as poetry, storytelling, personal narratives, and blog posts.[1,2,6–8] Additionally, structured small-group discussion and mentorship pairs are often organized to foster verbal reflection amongst trainees during the wards experience.[8]

Despite known benefits and widespread adoption of written and verbal reflection within the medical education paradigm, there is a paucity of experience implementing film-based reflective practice within medical school training.[5] Given recent successes of digitally-based undergraduate medical education reflection modules, it is feasible that film-based practice (a preferred method of learning amongst modern students) is well adapted to the current educational climate and may offer benefits similar or exceeding more traditional forms of reflection.[9–11]

Innovation

With peer-to-peer filmed interviews, it is possible to obtain candid, comprehensive, and diverse assessment of the medical student experience when compared to prior productions, such as annual yearbooks sponsored by Harvard Medical School or film documentaries like the PBS Nova series, “Doctors’ Diaries.” In prior works attempting to capture and describe themes central to the medical school experience, the film is gathered by professional crews at the time of production. It is likely that this process elicits less candid content and captures fewer student experiences when compared to a peer-to-peer approach.[12] At a time in which healthcare professional and trainee wellness is of great interest, reflective practice should be implemented as a tool to combat burnout. Additionally, no similar film-based reflection sessions currently in place at HSDM/HMS during the M4 year. It is feasible that this pilot could serve as a model for similar future film-based reflection to foster humanism and wellness within healthcare.

Specific Aim

The specific aim of this project is to produce a film that artistically explores a diverse set of student experiences at Harvard Dental and Medical Schools throughout four or more years of training and distills commonly shared themes of challenge, meaning, and growth.

Hypothesis

Given the demonstrated successes of written and verbal reflection as parts of the Harvard Medical School and Harvard School of Dental Medicines' curricula, we hypothesize that a film-based approach will elicit similarly high-quality introspection and descriptions of the contemporary health care trainee experience. In the future, such a product may be used to foster community building, empathy development, and a shared sense of purpose when shared with a larger audience of senior dental and medical students. Further, while not the intended audience, if shared broadly, this honest, reflective, and vulnerable narrative from individuals experiencing undergraduate dental/medical training may promote beneficial reflection amongst pre-health profession students contemplating a career within healthcare.

Student Role

This creative arts project consisted of the following student responsibilities and contributions: project design, semi-structured interview guide formation, student recruitment material production, equipment acquisition, film acquisition, content editing and organization, distillation and summarization of themes, and interpretation of these themes within their sociological, ethnographical, and historical context within this scholarly report. The details of these responsibilities are further described in the methods and discussion sections.

Methods

Project design

To investigate central themes within each trainee's educational experience, we created an open-ended and semi-structured interview guide, with special emphasis in highlighting each individual's paths to medicine, difficulties, and meaningful experiences during training, as well as growth and changes in mindset since initiating training (Appendix, Item 1). Interviewees were also given the opportunity to create and answer their own questions, as to ensure that no unanticipated yet important themes would be overlooked in the interview process.

Ethical Considerations

To inform students of the nature of the interviews and possible use of recorded film, a video release form was created (Appendix, Item 2). Each interviewee was asked to sign and date this form. Students were informed that any content recorded which they wished not to have included would be removed from consideration for inclusion in the final artistic product.

This project did not meet the federal definition of research, as the activities outlined were not defined as a systematic investigation, nor were they designed to develop generalized knowledge. This project serves as a pilot for a potential model of reflection. Interviews and film were not gathered for the purpose of translating to more generalized knowledge, nor was a systematic process used to interpret findings. However, as this project displayed members of the HSDM/HMS community, including personal interview content, the project proposal was provided to the HMS Academy through the Educational Scholarship Survey and Data Access Review system, and on February 24th, 2020, the project was approved without further suggestions.

Student-Interviewee Recruitment

Using recruitment materials (Appendix, Item 3), we advertised the project to all students who matriculated in August of 2016 and those graduating in Spring 2020 via the HSDM/HMS student email Listserv and student messaging service, GroupMe. Seventeen interviewees were selected from a cohort of volunteers. Emphasis was placed on obtaining as diverse of a student

sample as possible, students from HMS, HSDM, HST, Pathways, multiple learning societies, and a broad array of PCE hospital assignments were selected. Further, to ensure that the final creative arts product contributes meaningfully to an environment of inclusion and equity within HSDM/HMS and more broadly within medicine, significant effort was undertaken to ensure that interviewee selection prioritized students with backgrounds traditionally under-represented within dentistry and medicine (students from diverse racial identities, socioeconomic strati, sexual orientations, and with non-traditional backgrounds prior to medical training).

Equipment Acquisition

Creation of the film required the following equipment:

1. Canon 6D EOS, Full-Frame DSLR
2. Canon EF 50mm. 1:1.8 STM lens
3. Manfrotto 56.3'' 5-section tripod
4. Rode Wireless Compact Transmitter/Receiver
5. Knox Clip-On Lavalier Microphone
6. NEEWER 160 LED CN-160 Dimmable Ultra High Power Panel Video Light

Film Acquisition

All interviewees were scheduled and performed at locations of the students' choosing as to ensure they were most at ease for the interview proceedings. Written consent was obtained from all interview subjects as described above. Interviews were filmed using 1920x1080p HD at 29.97 frames per second (FPS).

Audio Recording

To reduce background noise, we used a lavalier microphone as opposed to the Canon 6D Camera's built-in audio source or a boom microphone. A Knox Clip-On microphone was attached to the speaker's collar approximately 10 cm from their mouth. This microphone was then connected to a Rode Wireless Compact Transmitter/Receiver. The combination of lavalier microphone and wireless transmission provided interview subjects with a greater range of movement and ensured that soft and natural speech was audible.

Content Import Process

Raw film was imported into video editing software, Final Cut Pro X, and a project was initiated using the following settings: ProRes 422HQ rendering Codec, Rec 709 color space, stereo audio channels with a sampling rate of 192kHz. Although raw files, high-dynamic-range editing, and higher resolution rendering Codecs would have allowed for a more graphically appealing final product, editing with these settings would have been size prohibitive, as the length of final interviews were over 5 hours and the predicted export file size was greater than 300 gigabytes. Therefore, the settings above were selected to allow the final product to be uploaded to the web without significant compression.

Editing Process

The editing process took place in the following steps:

1. First pass: clipped and deleted leading and trailing video during interviews. Removed all film/audio of interview questions to reserve maximal airtime for student responses.
2. After removal of lead, trail, and interview question film, the videos were viewed in order of interview recording and each response was clipped and labeled depending on 1) the question being answered 2) the themes contained within the students' answers.
3. Prior to deleting any footage, unedited student responses were uploaded to YouTube (but were cataloged as 'unlisted' such that the footage is only viewable to those with the unique link to it) as "source code" to ensure that all responses, even if not included in the final product, were available for interpretation and discussion in the written scholarly report. Full-length, unedited video: https://www.youtube.com/watch?v=jCfXndd9EuI&feature=youtu.be
4. The footage was thematically arranged based on the questions and the content discussed. To add diversity to the viewing experience, interview responses from various students were interleaved to strengthen shared reflections.
5. Exporting Film: Export rendering codec of H.264 was selected given its relatively high-quality compression and moderate file size.
6. The final product was uploaded to YouTube for viewing: https://youtu.be/tsHpxQhAykA

Results

Seventeen filmed student interviews were conducted (n=17). Of the students interviewed, one was enrolled at the dental school, one was enrolled in the medical school's HST curriculum, and fifteen were enrolled in the medical school's Pathways curriculum. Within students in Pathways, at the time of interviews, one was completing an international research year between M3 and M4, and three were enrolled in additional professional degree programs, including two at the Harvard Kennedy School of Government and one at the Harvard Business School. All students matriculated in August of 2016. Prior to editing, the total run time for interview questions and answers measured 5 hours and 1 minute in length. After the removal of leading and trailing clips, as well as questions, the run time was reduced to 3 hours, 37 minutes, 42 seconds. The average interview length was 12 minutes, 48 seconds. The longest interview response time measured 19 minutes and 30 seconds, and the shortest lasted 6 minutes and 2 seconds. After final editing, the completed product was 52 minutes and 32 seconds.

After reviewing the interview films in their totality, responses to interview questions described the following topics: students' pathways to HSDM/HMS, challenges leading up to training, response to professional acceptance from professional school, meaningful interactions throughout training, particular areas of difficulty (with special emphasis on imposter syndrome), changes and growth of personal abilities and perspectives throughout training, and finally, aspirations and fears moving forward toward medical/dental residency and practice.

Discussion

On Selection of Film Style

To promote a personable interview style, students were filmed at close distances (less than 2 meters) using a stationary 56'' Manfrotto tripod. Films were framed in portrait style, focusing on the subject's upper torso, shoulders, and face. To limit background distractions, the subject was brought into sharp focus using short focal lengths. Focal lengths produced a "Bokeh" effect (blurring of lights and images beyond the area of focus). To achieve this effect, a Canon 50 millimeter lens was used given its affordability and low F-stop range (we used values of 1.8 to 2.5 for all films). Higher F-stop values were reserved for interviewees who shifted while speaking to reduce the likelihood of poor focus during a subject readjustment.

To fully illuminate the speakers' faces, reduce shadows, and promote warmth, interviews were recorded using a modified three-point lighting strategy.[12] This strategy required the identification of two natural light sources in each room, and for the third source, we used the NEEWER 160 LED Dimmable panel. Depending on the color of the room's baseline light (natural vs. tungsten) a filter matching the dominant light source was applied for the third source.

On Personal Development As Physician-Trainee

At the outset of this project, the primary goal was to use filmed reflection to explore themes of struggle and growth at Harvard Medical and Dental School, and use these responses to promote community building, learning, empathy development, and assist in professional identity formation amongst senior dental and medical students during the film's creation and debut.

The most significant challenge in this work was setting the interview subject at ease, efficiently scanning for the students' areas of particular interest, and effectively probing with open-ended questions to elicit responses with significant breadth and depth. In this way, the creative arts project allowed me to refine my interviewing technique to elicit higher-quality and more genuine responses, which I believe will improve my clinical practice in the future. Further, I am interested in eventually pursuing medicine-related film advocacy, and this project enhanced my videography and editing skills to better document various important social/medical issues throughout my career as a physician and videographer.

Additionally, as a physician-trainee with aspirations to serve in a role that unites and educates diverse medical trainees (as a clerkship director, residency program director, etc.), this project allowed me to more intimately understand the various personal and professional challenges and barriers that medical trainees face, and allowed me to learn from the personal experiences of many of my peers. I believe this experience enhanced my awareness of these issues and helped prepare me to better foster inclusivity for communities of trainees I intend to work alongside in the future.

Discussion of Themes Common Within Student Responses

Using common themes of reflection within the film product, I will use the remainder of the discussion to categorize each student's response and compare these findings to past sociological, historical, and ethnographic works describing induction into health professions.

Pathways to Dentistry and Medicine

Far and away, the most commonly cited reason for pursuing health professional training among students was secondary to personal, familial, or community exposures to the medical/dental establishment. For many interviewees, however, it was difficult to recall exactly what factors led them to pursue medicine/dentistry, a phenomenon consistent with a previously-described sociological phenomenon: In discussing why students ultimately decide to pursue medicine, Natalie Rogoff, a Norwegian sociologist and expert in social mobility and the professions wrote the following:

> *It should not pass unnoticed that the way in which physicians come to decide on their career has long been a matter of interest to the profession itself...Answers to this type of question do not always prove enlightening. Even those given to introspection and having a good deal of self-awareness are often unable to fathom the reasons or the impulses that led to their choice of a career in medicine...many of those who claim a special calling confess that they are unable to explain why medicine so powerfully attracted them [13]*

For five students who were interviewed, initial interactions with the medical establishment were positive ones, including family members who were care providers in two cases. For students without family members in the health professions, several were provided the opportunity to shadow, meet with physician mentors, or in two cases, hold organs during a surgical procedure. Students reported that these positive interactions heavily influenced their career choices.

However, for four students, initial interactions with the health field were negative; as such, their stated reasons for selecting medicine/dentistry were to "improve" upon a system they believed to be "imperfect." One student described being treated "as a disease and not as a person" as a pediatric oncology patient, while three others observed what they believed to be unfairly distributed medical resources within their communities, causing preventable morbidity

and mortality among members of their social circle and inspiring them to be future advocates for these groups.

Within our sample of students, it was clear that having a physician or dentist as a family member simplified the decision process. It also seemed to increase the likelihood that first-time exposure to medicine would be early and positive in nature. Interestingly, Rogoff's research described this same phenomenon: for students with a physician as a parent, 74% had thought of a career in medicine before the age of fourteen, whereas those without a relative in medicine, only 40% of students thought of a career in medicine before age fourteen.[13] Similar to Rogoff's findings, our interviews revealed that many student respondents without health professional family members reported delays in pursuing their career, mentioning detours prior to training, such as considering nursing school, teaching, business, or law. One interviewee, who self-reported a low socioeconomic background, with parents who worked numerous low-paying jobs, only decided on medicine after age twenty-one and stated that during this delay, he considered numerous other possible professions: first consulting, then business, then medicine. Further, without earlier exposure to medicine, he felt that he had more difficulty when compared to his peers in identifying his specialty of interest and mentors within the field. This anecdote seems to corroborate with what is known of those who decide on medicine at older ages. According to Rogoff et al, of those students who finalize their decision to pursue professional medical careers at an age greater than 21, 91% seriously considered one or more other careers.[13]

Interestingly, among three respondents who reported parents who were manual laborers, two reported that at least one other family member had found medicine. Rogoff's work mentioned this same trend:

It is almost certain that the lower white-collar and manual workers' families who do send a [child] to medical school are atypical in their occupational orientation. Having seen at least one member of the family achieve professional status, they appear to be more eager and more able to see the success repeated.[13]

While having a sibling who achieves the educational status of a healthcare professional seems to lessen barriers for the second child, the difficulties of pursuing this route as a first-generation student of working-class parents without a sibling role-model continue to be severe, even among our student sample at HSDM/HMS. For example, one respondent mentioned that without a role model, strong advisors, or adequate teaching/funding for his

school, his dreams of becoming a physician always seemed out of reach, that “peers laughed at [his] dream,” and that given his own background and lack of educational resources, he felt that all of the “odds were stacked against [him].”

As expected, other respondents shared that it was difficult to recall exactly what factors led them to pursue medicine/dentistry. To aid in memory, we asked respondents who were comfortable to reread their personal statements and share portions which highlighted the perceived reasons for selecting this path at the time of writing this document at an earlier time. Of those who responded, common themes included: ability to interact and connect with humankind, longitudinal relationships, interest in science, creative solution-finding, research, interest in lifelong learning, ability to perform procedures which immediately benefited patients, or in many responses, an interest in improving the health outcomes for members of communities that are underserved. Research conducted on U.K. medical students by McManus et. al found that answers to these questions were, in fact, often oversimplified and overly deterministic (as respondents are less likely to admit more selfish reasons for becoming physicians, and altruistic responses to these questions were reinforced in the admissions process).[14] Nevertheless, in a retrospective analysis of doctors’ most commonly cited reasons for entering medicine by Allen et. al, the most frequently provided responses were similar to those we found within our interviews. They included: “being good at science subjects, wanting a good interesting career, always having wanted to be a doctor, influenced by friends and relations, and wanting to help or work with people.” [15]

One unique characteristic cited by our HSDM/HMS subjects commonly, but not listed as a frequent response by McManus et. al, was the high preponderance of our interviewees whose primary stated reason for pursuing dentistry/medicine was to improve public or global health at large. Though it is possible that this finding marks a shift in perspective amongst medical and dental trainees since the time of Allen’s study, it is also possible that this finding is indicative of a unique sample at HMS/HSDM. This difference in motivations may be self-selected for when compared to those and interviewed as in Allen’s cohort, especially considering both HSDM and HMS share in common mission statements mentioning the goal of fostering the development of leaders in health equity locally and globally.

Reaction to HSDM/HMS Acceptance

When asked about their initial response to admission into HSDM/HMS, the most commonly reported reaction was disbelief. Multiple students mentioned that they verified that

they were the proper email or phone recipient for the acceptance. Other students reported immediately informing their parents or guardians of this news, noting that family members (in the case of two respondents) responded differently to their Harvard acceptance than other school acceptances. Other students described feeling overwhelmed, in “shock” or “fear” that they might not fit in.

Though some negative responses were reported, more commonly, students reported feelings of “joy,” “relief,” and an overwhelming sense that the “sacrifices [they] had made were worth it.” Another student mentioned that the news felt like “the start of something better.” This feeling of relief is corroborated by a study conducted by Thielens et. al, which found differing reactions between students accepted to medical school when compared to law school:

> *We note that medical students, taken as a whole, anticipate a decrease in the level of competition after their entrance to medical school. Perhaps this reflects a feeling on the part of students that, though competition will, of course, continue into professional school, they are "over the hump": they have already won out in the competition to enter medicine. Although their success in obtaining prestigious internships may depend in part on their standing in school, their future as members of the profession should not, since neither flunking out of school nor subsequent struggle for a livelihood is likely. [16]*

In line with Thielens’ findings, within our filmed interviews, the majority of respondents felt that acceptance into medical/dental school meant the promise of a less competitive and more rewarding training experience than their pre-medical/pre-dental undergraduate studies.

Early Experiences at HSDM/HMS

Almost all student-interviewees mentioned that the start of medical and dental school was a unique environment in which students forged more numerous, deeper, and more gratifying relationships than they had in earlier educational environments, or at any point following D1/M1. Several students spontaneously described D1/M1 specifically as the “best year in [their] life.” Given Thielens’ findings, it is possible that this experience was augmented through removal of the competitive stimuli experienced by many trainees throughout the pre-clinical environment. However, after this brief window during D1/M1, many respondents mentioned that in the later clinical years that followed (when evaluations became increasingly

important for future careers), they again felt “isolated,” “disconnected,” and found it difficult to forge and maintain similarly high-quality relationships at HSDM/HMS.

Difficulties During Training

When asked about the most difficult aspects of medical and dental training, responses fell within the following broad categories: personal stressors, clinical stressors, medical/dental cultural stressors, and career path stressors.

Personal Stressors

A commonly cited personal stressor throughout the training experience was “imposter syndrome,” a phenomenon shared by students and faculty that is defined as chronic feelings of self-doubt and fear of being discovered as an intellectual fraud.[17] Students shared that when they compared themselves to peers, they felt they were “not good enough for medicine,” “not good enough to become a doctor,” or in one case, that they “had waited too long before coming to medical school” and would, therefore, be unable to meet the expectations for medical training. Other forms of imposter syndrome focused on personal identity: one student reported feeling “like people of [their] background had traditionally not been in places like Harvard,” that their acceptance was a “mistake.” Another reported their identity as an underrepresented student “caused them to wonder if [they] took another students’ place.”

One student mentioned that she “had heard of imposter syndrome, but when [she] started medical school, [she] did not believe in it nor did [she] think it would affect [her]. Now after completing [her] away rotations, [she] believe[s] in it. It’s a thing.” Respondents mentioned that situations that triggered imposter syndrome were: the interview process (due to its comparative nature and common probing questions such as, “why, over other applicants we are meeting today, do you deserve to be here?” Other students mentioned that imposter syndrome was triggered by attendings, residents, and faculty who did not understand, nor relate to the backgrounds of students underrepresented in medicine (low socioeconomic status, no physician role models in family, racial minorities), and who felt they needed to hide portions of their background to “fit in” with a traditionally more affluent culture within medicine.

Based on our responses, it also seemed that imposter syndrome was driven, in some part, by dentistry’s/medicine’s culture of frequent, and at times, personally focused feedback. Following rotations, students must meet with attendings or clerkship leadership to receive comprehensive reviews regarding their clinical performance. In several cases reflected upon by

students, this feedback was personal and extremely negative. Most students mentioned feedback which either directly compared them to other students or led them to compare themselves to the others. This already anxiety-ridden process was only exacerbated when the feedback mentioned specifically targeted a given student's personality traits, as opposed to their clinical skills. Students found personal feedback to be "petty," to "lack empathy," and was cited as a particularly stressful portion of dental/medical clinical training, as it led students to question their own social and clinical instincts. For example, one student received the feedback that they "[were] too agreeable," which they felt directly targeted them as a person, not as a developing clinician. She even received feedback that when meeting a resident at a "social gathering" she shook his hand, instead of hugging him, and he stated that this was "too formal," and led her to question the social cues that led her to make this decision.

When asked what improved feelings of imposter syndrome, nearly all students referred to "being vulnerable" and "vocalizing" feelings of inadequacy with members of their dental/medical community as especially important. By expressing shared struggles, students became aware that even the peers they idolized experienced imposter syndrome. This process promoted mutual understanding to alleviate this specific stressor. With the idea of vulnerability in mind, one student discussed his desire for a cultural shift within medicine and dentistry which incentivized and encouraged attendings, residents, and peers to share imperfections and personal struggles within the healthcare profession. He felt that this sort of cultural change would begin to deconstruct the complex known "effortless imperfection," or the tendency to conceal one's own struggles within the training process while simultaneously expressing and demonstrating skills and strengths. This particular student felt that more senior dentists and clinicians must share the struggles and obstacles they have encountered on their path to excellence, so that trainee struggles are normalized, instead of being seen as a sign of deficiency, or an inability to reach their desired career goals.

Disconnection from family, peers, and other support systems was another theme commonly cited by student-interviewees. This stressor resulted from 1) limited time for socialization within the constraints of clinical work and standardized test preparation, 2) far distances between trainees and their support networks (especially in the case of students with families on the West Coast and outside of the United States), 3) a feeling that peers in dental/medical school were overly burdened and too preoccupied to listen to concerns or spend quality time together, even when support was desperately needed.

While three student interviewees mentioned that personal distress and isolation became most acute whilst studying for multiple standardized exams and meeting clinical demands, others shared that their lowest points and periods of isolation from peers occurred after significant personal or familial emergencies occurred during the clinical experience and made balancing clinical responsibilities and relating with peers acutely difficult.

Similar to our student respondents, a qualitative study conducted in 2018 aimed at characterizing the major psychological stressors amongst 5,000 medical students from 9 U.S. institutions found that the stressors with the greatest impact on student wellbeing included: excessive workload, difficulties with time management, conflicts in work-life balance and relationships, and difficult medical school peer relations.[18] These findings, in conjunction with our own students' responses, expose the complex and deleterious interplay of excessive workload on personal relationships and work-life balance as a primary source of stress within medical and dental training.

Cultural Stressors

Most respondents mentioned the culture of healthcare as a significant stressor throughout their training experience, and their discussions can be broadly categorized into three themes: 1) The cultural tendency to focus only on patient care/administrative tasks during work, and deprioritize the importance of forging interpersonal relationships among team members (sparse time invested in learning teammates' backgrounds, interests, hobbies, etc.), 2) the medical and dental profession's rigid hierarchy (with attendings at the top, followed by residents, nursing, staff, and then students), and 3) a culture of high-stakes learning and evaluation, with little space for uncertainty or mistakes, even in cases of clinically 'low-stakes' decision-making.

Regarding the first cultural stressor (deprioritizing interpersonal relationships), one student described clinical work as feeling "robotic," "depersonalized," and "cold." He stated that without forging relationships and building team camaraderie, work felt mundane, and left him exhausted, less productive, and disinterested in returning to work. Especially as these types of relationships have traditionally been very important throughout his life while at work in other settings which provided more time for this type of activity.

Regarding the second stressor (hierarchy), the medical/dental hierarchy was an anticipated and powerful negative experience in training. One student described that, on the first day of his orthopedics rotation, he was forced to take the stairs to the 17th floor before he had been given the opportunity to set down his heavy book bag or use the bathroom - tasks he

completed without complaint, for fear of seeming ‘needy’. One student stated that this culture, which prioritizes respect for authority above individual needs, identity, and mutual respect, was “abusive” and led him to reconsider his decision to become a doctor. Three students mentioned that compared to peers in alternative professional fields (business, consulting, etc.), they felt far less respected, despite numerous years of education, training, work, and leadership prior to medical school, compared to their peers outside of medicine. Two other respondents mentioned that this hierarchy prevented them from providing optimal care for their patients, stating that attending physicians made decisions which they did not agree with, especially when presented with patients with complicated social situations that the students felt they were more informed upon given their own cultural background (use of interpreters for medication instructions, understanding of difficulties of finding transportation to appointments, etc.). When attendings dismissed a patient’s barriers to care as “non-compliance,” they felt they were pressured to go along with this faulty conclusion.

It seems from our student interviewers that the current power structure of medicine remains prone to abuse. Unsurprisingly, the peer-reviewed literature comments on the role of the medical hierarchy in burnout: in one review, produced by Angoff et al., the prevalence of mistreatment of clinical trainees was found to be “between 59 percent to 76 percent among medical students and residents” (Cook et al. 2014; Fnais et al. 2014; Fried et al. 2012; Heru et al. 2009). Faculty, patients, fellow students, residents, and nurses contribute to an environment that conveys a lack of respect for trainees and imparts feelings of low self-worth and powerlessness to trainees that are associated with burnout (Fried et al. 2012). Even more concerning, this environment may prevent positive intervention, inhibiting trainees from speaking up and, consequently, compromising the treatment and care of patients (Hafferty et al. 2015; Hafler et al. 2011; Hundert et al. 1996). [19]

Regarding the third stressor (culture of high-stakes evaluation), students described how the lofty expectations and “zero mistakes” clinical environment of healthcare often permeates into the learning process and serves as a source of challenge. Several students described the process of “pimping”, which evaluates a student based on her/his knowledge through on-the-spot questions, as unfair, as it tests many concepts that only experience itself can teach. In particular, several students without medical providers in their family who had few exposures to medicine prior to medical school reported feeling disadvantaged during these interactions, asking “when and how could I have learned that? I just started this rotation.”

On clinical rotations, students felt uncomfortable asking questions and making mistakes. Many felt they needed to prove themselves over, and over again, as they moved through each rotation and step of training. Even if extremely successful on one rotation, within one month, they would shift to another clinical environment in which nobody knew them, their strengths and weaknesses, and they would again be met with scrutiny. This stressor was especially present during “Away Rotations,” a tradition in which competitive residency programs vet students during a 1-month long experience. In completing these rotations, students leave their home institutions and complete an internship at another hospital they are interested in applying for residency. At these new locations, faculty, residents, and staff are entirely unaware of the students' past performance, and the stakes are high.

During our interviews, one student provided a particularly salient example of this: when orienting on the first day of her away rotation, the Clerkship Director (Attending) in charge of her grade told the student that if they made a single mistake, she would not be invited to return for an interview for that program in the coming fall. During the remainder of the month, in clinical interactions, social interactions with teams, and when responding to questions asked (with hostility) in the operating room, she spent tremendous mental energy wondering if “she had made a mistake.” This was exacerbated by the common medical and dental process known as “pimping.” In which students are quizzed repeatedly on the extent of their medical knowledge, a process that many students feel is unnecessarily hostile and which does not foster a supportive learning environment and growth mindset. This probing process of pimping is also a known cause of burnout, according to Villwock et. al, who studied “shame-based learning” as a potential source of burnout and imposter syndrome amongst medical students in the United States, providing the following suggestion:

> *However, with the large numbers of trainees struggling with imposter syndrome, burnout, and the associated psychological comorbidities, a shift away from the traditional “shame-based” learning and “pimping” to more of an open and consistent educational dialogue may be needed.[20]*

Adding to the difficulties of the apprenticeship model, students highlighted that many clinical concepts (how to provide feedback to an attending, when to call a nurse for an unstable patient, how to send a fax, where to find food for patients, etc.) were evaluated and included in grades, but were not formally taught to all students in a standardized way. This knowledge, expected but not taught, is known by many learners at the “hidden curriculum,” and several students commented that trying to learn these important lessons (which were used to compare them to

other students), added additional stress to the already stressful adjustment to the clinical culture, knowledge acquisition, and steep time demands.

Overall, it is concerning that even in the current medical culture at Harvard Medical and Dental Schools, the powerful hierarchy continues to silence students with important and diverse backgrounds and perspectives from advocating for patients, particularly marginalized patients. This imperfect system leads trainees to experience a conflict of consciousness while caring for patients under the supervision of a superior, and ultimately, contributes to burn-out.

Clinical Stressors

In addition to stressors inherent to the culture of medicine and dentistry, students frequently spoke to the challenges of learning the immense and ever-growing fund of medical and procedural knowledge expected of proficient clinicians, and the apparent lack of formalized structure within medicine and dentistry to support students in this steep learning curve. For example, several interviewees mentioned that when compared to undergraduate studies, clinical medical and dental training was far more difficult. Tests covered a broader range of content, taking months to years to study for an examination, instead of “a few days” as was common in undergraduate work. Several students stated that when compared to past studies, where one noticed progress and felt accomplished after several days of review, in medicine and dentistry, this was not the case. Despite weeks of studying on clinical rotations, trainees frequently recounted that they did not feel “measurably closer” to knowing those things that were expected of them as doctors. There was always another question, symptom, procedure, or aspect of pathophysiology they did not fully grasp. Further, when medicine failed a patient, trainees reported feeling stress, uncertain if it was their fault, the fault of the team, or the fault of medicine or dentistry in general. This inability to decipher whether such failures are due to one’s own incompetence or to the impossibility of knowing all things is well documented within *The Evolution of Medical Uncertainty* by the medical sociologist Renée Fox:

> *No one can have at [their] command all skills and all knowledge of the lore of medicine...There are innumerable questions to which no physician, however well trained, can as yet provide answers...This consists of difficulty in distinguishing between personal ignorance or ineptitude and the limitations of present medical knowledge...To be puzzled, ignorant, unable to understand; to lack needed knowledge or relevant skill; to err, falter, or fail, without always being sure whether it is ‘your fault’ or ‘the fault of the field’... is especially painful and serious when the work that you do is medical. [21]*

Others commented that not only was digesting the vast content of medicine/dentistry stressful, but that in the traditional apprenticeship model of education, the learning process was dependent on which faculty and patients you had (by chance) been assigned to learn from and care for, and thus lacked sufficient structure and framework to ensure that content is learned systematically and in proper order. Feeling responsible for all of their learning but without experience in knowing which areas are important, and which are not left students overwhelmed. This was especially during the Internal Medicine and General Surgery rotations, when students' knowledge was frequently probed during rounds and in the operating room, respectively. Students remarked that during rotations, they never felt they knew enough, rarely knew the specific content areas toward which they should direct their mental energies, and struggled to find appropriate resources for learning this information accurately and efficiently. For many students, when they received feedback that was provided to students to "work on your fund of knowledge," the pool of knowledge felt so deep that it was impossible to know how to intervene.

A final commonly cited clinical stressor was that of the immense emotional intensity of most clinical interactions, compounded with what many trainees described as a feeling that they only had a "limited pool" of empathy to meet these patients. Trainees stated that as time wore on, and especially when sleep deprived or with multiple complicated patients, they felt they were unable to offer the truest or full empathy they wished for each patient. In addition to the innate stress that this caused, students felt further stress and felt guilty for providing the care they viewed as "unempathetic" or not up to their own standards. The high emotional and intellectual demand of medical and dental practice was well described by Renée Fox: "For, however familiar and routine it may be, or seemingly unthreatening and nontragic, no medical action or interaction that involves a patient is trivial or completely ordinary." After high stakes event after high stakes event, trainees and clinicians feel expended, as if they have no more emotional strength or support to offer. While experiencing guilt due to failing to meet one's own standards for "caring," trainees underscored the challenge balancing the demands of studying, understanding, and enacting competent medical care for patients with that of leaving the time, space, and emotional support required to serve as the caring providers they initially aspired to be. Interview subjects stated that at times, it felt like these two demands were competing. For example, one could not remain in a room listening to a family's struggles, while simultaneously

discussing management strategies with the team, ordering lab tests and pain medications, and documenting their care plan. In essence, the more time and energy a student expended in mastering clinical concepts and becoming competent, the less time existed for being an available listener for patients, family, and teammates.

This seemingly “zero-sum” balance between the goals of competence and humanism were described by Mary-Jo and Byron Good in their shared work, *Learning Medicine*:

> *As the pressure grows to learn the basic sciences necessary for competence, students increasingly express fears that they will not be able to balance these two goals, that they may be a “zero-sum,” that in their struggle to achieve competence they may lose those caring qualities that led them to study medicine.[22]*

The significance of this point was underscored by several other responses, especially to the question “how have you changed since beginning training.” Many students responded that there most significant point of change was 1) that medicine and dentistry is more imperfect than they anticipated as an idealistic pre-medical and pre-clerkship student, and 2) that in exchange for competence, they felt they lost a portion of the empathetic, humanistic skills capacity they began training with.

Meaningful portions of training experience

When students were asked which portions of the training experience were most meaningful to them, responses included: personal growth (development of steady professional identity, improving one’s insight into their strengths, weaknesses, and passions), clinical growth (learning to effectively treat patients both procedurally and medically, improving communication with patients, formation of longitudinal therapeutic relationships), interpersonal growth (building relationships with and camaraderie amongst peer trainees), and extra-clinical impact (ability to contribute to research, political advocacy, community engagement, policy leadership, recruitment, and mentorship).

Personal Growth

In many ways, the experiences that medical and dental students were exposed to throughout training promoted personal growth that students found meaningful. A handful of

students mentioned that in the feedback-intensive culture of medicine, they were able to more clearly understand tendencies that previously went unacknowledged. Students reported feeling more aware of their own weaknesses, strengths, personal desires, and career ambitions. Though this incited feelings of distress (realization that one student no longer wished to be a career researcher, another student's realization that a significant portion of her joy in medicine stemmed not from clinical care, but from recruitment of underrepresented peers, and finally, a student's ability to meet his own weaknesses--which existed even before medical school--and come to terms with those he can improve upon, and those he must instead learn to accept). In general, students found this process liberating, as it allowed them to feel "comfortable in their skin" as opposed to continuing to operate as an undifferentiated professional with endless possibilities, skills, and plans for self-improvement. In sum, students began to understand who they were, what they enjoyed, and which goals were within and not within their ultimate plan.

Clinical Growth

Though many students recounted their frustrations in being unable to fully lead in a patient's care (unable to sign orders, determine the final plan, conduct operations, etc.), many still felt that they were able to benefit the health and wellbeing of patients, even as a medical student. This position - which allowed students to advocate for their patients, answer questions for patients, assist in procedures and care planning - felt tremendously rewarding for students when these opportunities arose. Students stated that being able to support patients emotionally was a common way in which they felt impactful as a student: three students recounted the power of having the time and energy to commit to getting to know patients on a deeper level, and in ways, leverage this connection to impact the patient's medical or dental care. Though limited in their role, patients felt that between forming relationships with patients, advocating for patients, assisting and conducting procedures on patients, and formation of longitudinal and therapeutic relationships provided the lion share of meaning to medical students. Students said these very interactions reassured them that "what they did counts," that "it was worth the time," "made an impact." One student mentioned how fortunate she and many of her classmates felt to be doing something they loved each day.

Interpersonal Growth

During M1, one student conducted a patient interview in front of the class. The evening prior, this M1 asked her peers to don the colors of “Ovarian Cancer Awareness Month” in honor of the patient and the cause. The following day, she and the patient became emotional as they looked to the crowd and saw a collection of nearly 200 HSDM/HMS students wearing the color teal. This highlighted to her what was most meaningful about training at HSDM/HMS: being surrounded by caring, talented, and like-minded peers who were almost always willing to make an effort to rally behind and advocate for an individual in need. Other students mentioned that being surrounded by such diverse and talented peers allowed him to “integrate” similar strengths/qualities in himself, and another student mentioned that sharing relationships with intellectual and similarly minded individuals allowed them to forge deeper relationships than he had enjoyed prior.

The meaningful experience of connecting and sharing memories with classmates seemed, almost universally so, to begin during M1/D1, and taper off following the end of shared classroom time (i.e. with the beginning of the PCE or work in the dental clinic). It seemed that after the PCE began, students either remained connected with a smaller group of peers or that they invested less time altogether in these types of relationships. At least three students cited the shared “FABRIC” show, which honors the diversity of HSDM/HMS and the African Diaspora, as the keystone of these relationships. Many felt that this show united all peers in a sense of similar purpose and awe by the backgrounds and talents of their peers.

Students mentioned that the relationships forged during M1/D1 proved important and protective against stressors during the clinical years. For one student, after his wife had a child during the training process, other students rallied around his family and provided them with support. Later after he was deployed to Afghanistan, the class did the same. Other students made references to vacations they shared with classmates, which provided them with the opportunity to learn about each other outside of medicine, and discuss shared struggles, which prevented them from feeling alone. Finally, one student (a member of Deferred Action for Childhood Arrivals, or DACA) mentioned how meaningful it was when her classmates joined in a quadrangle-wide rally in support of policies that allowed students like her to remain in medical training. Events like these demonstrated to students that they were valued members of their communities, and worthy of respect and time, no matter the stressors of medicine.

Meaning in Leadership and Advocacy

Students found it particularly meaningful that even as medical and dental students, they were able to not only advocate on a clinical level, but also at a population level using research, advocating for systems change, or using their credentials as political leverage. In fact, several students specifically mentioned that this respect as a student at HSDM/HMS was one aspect they will miss most as after graduation. Generally, students felt that the environment in dental and medical school has been inspiring, and the opportunity to work with peers who also desire to improve systems as a rewarding part of the process.

Limitations

This work sought to use filmed reflection to explore themes of struggle and growth at Harvard Dental and Medical Schools, but interpretation and applicability of the final product are primarily limited due to sample size and potential selection bias from voluntary participation and intentional over-representation of students from ethnic and socioeconomic groups underrepresented within medicine. In addition to sample biases, there are several other limitations to the study. The study was performed at a single institution (HMS/HSDM) and consisted of primarily fourth-year students in the medical school's "Pathways" program. As such, there was an underrepresentation of dental students, HST students, MD-PhD students, and students who matriculated before Fall of 2016. Further, the results may be biased by particular time-period they were collected, and may not accurately depict those themes during future/past periods. Additionally, analysis of themes discussed within the filmed interviews was not systematic, as this project did not employ a structured review process for the content (themes were cataloged and categorized, but not formally coded). Additionally, given the importance of discovering themes most important to students, interviewees were allowed to respond only to those questions they preferred to answer. This meant that not all students responded to the same questions, limiting inter-student comparison. Finally, although the students were advised that they were allowed to request any content they wished not to be shared not be included in the final product, it is likely that students' responses were altered due to perceived possibility of answers being viewed by others or responding to biases or perceived biases on the part of the student interviewer.

Conclusions

Filmed-interview reflections are a feasible and potentially meaningful method for exploring students' attitudes towards the medical and dental school training processes and educational environment. Responses obtained within this creative arts project, in general, focused on challenges, stressors, and meaningful portions of the training experience, and those common themes were interpreted in the context of medical sociology peer-reviewed literature.

Among those students interviewed, stressors generally fell within the following categories: personal stressors (family events, distance from support system, limited time for self-care, limited time for social engagement, imposter syndrome), clinical stressors (expectation of mastery of immense amount of content within a short time span, operating within an imperfect/unjust medical system, rigid hierarchy with potential for abusive leadership, observation of unavoidable patient suffering, personal/insulting feedback, high-pressure performance pressure, culture of "effortless perfection"), and career stress (necessity to determine area of specialization/primary patient population, searching for mentors, residency interview process, burdensome graduation requirements, lack of support for students underrepresented within medicine). Meaningful portions of training experience included: personal growth (development of steady professional identity, camaraderie amongst peer trainees, learning to incorporate peer strengths into personal identity), clinical growth (learning to effectively treat patients both procedurally and medically, improving communication with patients, formation of longitudinal therapeutic relationships, ability to contribute to research, mentorship, or clinical leadership).

Reflection and sharing of struggles is an important practice for dental and medical trainees. Evidence suggests that this process is beneficial in community building, learning, empathy development, and professional identity formation.[1–4]. This practice is particularly important for senior medical and dental trainees nearing the beginning of their careers as credentialed medical professionals and residents. Filmed-interviews may expose a different set of themes than other forms of reflection (such as essay-based, poetry, artistic, etc.). In future iterations of this project, it would be feasible to evaluate the effect that viewing such a film has on various aspects of trainee wellness. This project was primarily limited by its specific sample

of students, and lack of systematic process for interviews and coding of filmed content. A larger sample, a more structured interview process, and a formal thematic coding process would be necessary to more fully and accurately explore and interpret filmed-reflections of medical and dental trainees.

Areas for future work could include an in-depth assessment of imposter syndrome at Harvard Medical/Dental School, as nearly all interview subjects mentioned this concept as a significant contributor to stress throughout the training experience. Further ideas would be incorporating a pre/post-film debut survey to assess whether or not viewing these reflections elicited any thoughts or emotions. Finally, this film could be used for students considering a career in the medical profession, as well as students about to embark on clinical portions of training (during M1, M2, D1, D2 years).

Appendix

Appendix Item 1: Interview Guide Instructions For Students

Student Interview Guide: "Entrustable - The Use of Filmed Reflection to Explore Themes of Struggle and Growth at Harvard Medical and Dental School"

Notes:

- The filmed interview should take approximately thirty minutes
- Only portions of the footage will be used; speak freely and authentically, as all content you do not want to be used will be removed at your request
- If you wish to be included in the film, please sign the video release form

Questions (pick 5 to answer):

1. What initially inspired you to become a healthcare provider?
2. If you feel comfortable, please read aloud a meaningful portion from your personal statement to dental/medical school. Since writing this, how have you changed?
3. What was it like to receive your acceptance to HMS/HSDM?
4. Share a time during training in which you felt different from your colleagues or that you did not belong in medicine or dentistry. Why did you think this way?
5. If you had one piece of honest advice to offer a student considering dentistry/medicine, but who is unsure, what would it be?
6. What has been the most challenging part of dental/medical school for you?
7. Who helped you get to medical/dental school? How?
8. Who helped you survive medical/dental school?
9. Is there anyone in our class that you'd like to thank?
10. What are you looking forward to being finished with after graduating from HSDM/HMS?
11. What will you miss most about HSDM/HMS?
12. Describe a meaningful memory with HSDM/HMS classmates.
13. What was it like to decide on your specialty of choice?
14. What are you most nervous about during residency?
15. What are you most looking forward to during residency?
16. Create your own question and answer it (the goal of the film is to reflect on growth, set-backs, and your personal and authentic experience at HSDM/HMS).

Again, if you decide at any point that you wish to have anything you said not be included in the film, please let me know, and I will be sure to remove it.

Appendix Item 2: Video Release Form

VIDEO RELEASE FORM

I, _____(Full Name), hereby grant permission to Jeffrey Robert Herrala, the rights of my image, in video or still, and of the likeness and sound of my voice as recorded on audio or video without payment or any other consideration. I understand that my image may be edited, copied, exhibited, published or distributed and waive the right to inspect or approve the finished product wherein my likeness appears. Additionally, I waive any right to royalties or other compensation arising or related to the use of my image or recording. I also understand that this material may be used in diverse educational settings within an unrestricted geographic area.

Photographic, audio or video recordings may be used for ANY USE which may include but is not limited to:

- ☐ Presentations;
- ☐ Courses;
- ☐ Online/Internet Videos;
- ☐ Media;
- ☐ News (Press);

By signing this release, I understand this permission signifies that photographic or video recordings of me may be electronically displayed via the Internet or in the public educational setting.

I will be consulted about the use of the photographs or video recording for any purpose other than those listed above. There is no time limit on the validity of this release nor is there any geographic limitation on where these materials may be distributed. This release applies to photographic, audio or video recordings collected as part of the sessions listed on this document only.

By signing this release, I acknowledge that I have completely read and fully understand the above release and agree to be bound thereby. I hereby release any and all claims against any person or organization utilizing this material for educational purposes.

Address: 25 Shattuck St, Boston, MA 02115

Signature _____ Date_____

Harvard Dental/Medical School Students:

TL;DR: (1) I'm making an HSDM/HMS film using crowd-sourced videos from our class! (2) Please upload any videos you have from your time at HSDM/HMS here https://tinyurl.com/HarvardClassFilm. (3) Please sign the release form at the link above to appear in the film.

For my "Creative Arts" SIM project, I'm editing what I hope to be a representation of our journey through dental and medical school in a class video. My hope is to be maximally inclusive and include students who matriculated in 2016, or who will graduate in 2020. Videos need not be perfect and can be serious, silly, profound, or anything in between.

If you have any (ideally) landscape-oriented videos from your time at HSDM/HMS that you'd be willing to share, I would greatly appreciate your uploading them to https://tinyurl.com/HarvardClassFilm. To appear in the film, HSDM/HMS asked that everyone sign a release form (in the 'Required Release Form' folder within the link above).

The final debut will be on Thursday, March 18th at 6PM in the Amphitheater! Afterwards, I will share it online via a password-protected link for invited users to view it.

Thank you for your time,
Jeff Herrala, HMS MS4

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