

Measuring professional identity formation early in medical school

Adina Kalet^a, Lynn Buckvar-Keltz^a, Victoria Harnik^b, Verna Monson^c, Steven Hubbard^b, Ruth Crowe^a, Hyuksoon S. Song^d and Sandra Yingling^{b,e}

^aDivision of General Internal Medicine and Clinical Innovation, New York University School of Medicine, New York, NY, USA; ^bNew York University School of Medicine, New York, NY, USA; ^cMonson Consulting and Evaluation, Minneapolis, MN, USA; ^dDepartment of Education, Georgian Court University, Lakewood, NJ, USA; ^eDepartment of Medical Education, University of Illinois College of Medicine, Chicago, IL, USA

ABSTRACT

Aim: To assess the feasibility and utility of measuring baseline professional identity formation (PIF) in a theory-based professionalism curriculum for early medical students.

Methods: All 132 entering students completed the professional identity essay (PIE) and the defining issues test (DIT2). Students received score reports with individualized narrative feedback and wrote a structured reflection after a large-group session in which the PIF construct was reviewed. Analysis of PIEs resulted in assignment of a full or transitional PIF stage (1–5). The DIT2 score reflects the proportion of the time students used universal ethical principles to justify a response to 6 moral dilemma cases. Students' reflections were content analyzed.

Results: PIF scores were distributed across stage 2/3, stage 3, stage 3/4, and stage 4. No student scores were in stages 1, 2, 4/5, or 5. The mean DIT2 score was 53% (range 9.7–76.5%); the correlation between PIF stage and DIT score was $\rho = 0.18$ ($p = 0.03$). Students who took an analytic approach to the data and demonstrated both awareness that they are novices and anticipation of continued PIF tended to respond more positively to the feedback.

Conclusions: These PIF scores distributed similarly to novice students in other professions. Developmental-theory based PIF and moral reasoning measures are related. Students reflected on these measures in meaningful ways suggesting utility of measuring PIF scores in medical education.

Introduction

In 2010, the Carnegie Foundation recommended the use of an explicit evidence-based approach to understanding the formation of an ethical medical professional identity (Cooke et al. 2010), which has been defined as a "... representation of self, achieved in stages over time during which the characteristics, values, and norms of the medical profession are internalized" (Cruess et al. 2014). If professional identity formation (PIF) can be reliably and meaningfully measured as a developmental construct, we will be better able to study what contributes to that development as well as understand how to explicitly support trainees' mastery towards medical professionalism. Utilizing a strategy reported by Bebeau et al., we have explored the use of PIF and moral reasoning measures in professionalism remediation to effectively anchor trainees' self-assessment and help them set aspirational goals for their PIF with satisfying results (Bebeau & Faber-Langendoen 2014). We seek to ascertain baseline PIF measures to establish if these are valid for use as part of a program of professionalism curriculum and assessment to guide PIF for all students (van der Vleuten & Schuwirth 2005). We intend to re-assess these students at multiple points in medical school to evaluate if these measures reflect progression of PIF and related moral reasoning in our learners.

Medical students are becoming physicians. The ways in which they form their professional identity along with

Practice points

- A developmental theory-grounded, essay-based measure of PIF is feasible and acceptable as part of a medical professionalism curriculum.
- Kegan PIF stage scores of entering medical students distribute similarly to peer groups in other professional training settings and correlate with a validated measure of moral reasoning.
- Early medical students find receiving feedback on these measures structures their self-reflection on professional identity formation.
- More work needs to be done to establish how these PIF measures should be used in monitoring training progress, shaping professional development and predicting success, and need for remediation.

multiple other identities matters to their present and future well-being and relationships (Monrouxe 2010). This is both, a dynamic personal as well as a complex interpersonal and socio-cultural, highly subjective developmental process. Some theorists posit that early on, in young adults, PIF is a largely externally defined process reinforced in the application process to medical school, which is highly competitive and emphasizes personal achievement. This pressures

young adults seeking entrée into the profession to focus on achievements that are externally defined and individually focused. Medical educators have the important task of guiding these students from early stages in PIF and moral reasoning toward the advanced stages needed to become effective, altruistic physicians, and social justice oriented (Jarvis-Selinger et al. 2012).

Since the 1970s, educators have developed curricular experiences to expose students to issues of professionalism and promote knowledge of ethical principles, the development of humanistic attitudes, and skills of moral reasoning upon which a medical professional identity is formed (Stern & Papadakis 2006). The recent focus on PIF as a starting point for, and central theme of, medical education addresses the concern that professionalism education often has been seen as a superficial effort consisting of "lists of values and behaviors" that can be generated by students with insufficient depth of thought and commitment (Wynia et al. 2014). Rich, longitudinal, multi-method curricula are being implemented to encourage the development of a hardy, resilient medical professional identity (Goldie 2012; Holden et al. 2015), but benchmark measures are not yet available.

The movement to emphasize PIF in medical and other professional schools stems in part from the work of moral psychologists who studied the gap between "knowing and doing," noting that the individuals may profess strong beliefs in acting according to the values of a profession, but beliefs alone are insufficient to ensure behaviors if they are not deeply rooted in one's identity (Blasi 1980, 2004). Because we were seeking to measure PIF over time, we have chosen a framework stemming from the work of constructive developmental theorist Robert Kegan, who proposed that identity development is a life-long process of integrating cognitive, social, and emotional capacities which begins before entering professional school and continues throughout professional life (Kegan 1982; Bebeau 2006). Scholars in professional education have built on the theory and methods from lifespan developmental psychology to develop increasingly reliable, valid, and feasible measures of PIF (Eigel 1998; Forsythe et al. 2002; Rule & Bebeau 2005; Bartone et al. 2007; Bebeau 2008; Monson et al. 2008; Monson & Hamilton 2010; Bebeau & Monson 2012).

The professional identity essay (PIE) elicits a respondent's conceptualization of a professional role in society and measures the stages of Kegan's theory adapted for use in professional education (See Table 1) (Kegan 1982). Students write brief narrative responses to seven prompts (Table 2), which are the basis for assigning an overall Kegan stage score to that document by a highly trained expert. The PIE has been validated in cohorts of dental, law and MBA students, and military officer trainees among others (Bebeau & Lewis 2003; Bebeau & Monson 2012). The PIE primarily has been deployed as a formative method to engage students in learning accurate self-assessment and in developing actionable plans for improvement. While the approach is promising, few studies reevaluate PIF measured by the PIE in students as they progress through and beyond training. In a content analysis of dental student identity essays, Monson, Roehrich, and Bebeau found that dental students at stage 3-4 (representing 37 percent of a

Table 1. Kegan stages: the four broad levels of mental complexity relevant for professional education.

- The *Instrumental Mind* (Stage 2)^a is characterized by external definitions of self, a predominance of "either-or" thinking, limited perspective taking ability, and an emphasis on the mastery of technical skills. This stage is characteristic of adolescence and early adulthood.
- Transition* (Stage 2/3), involves increased ability to have perspective, to learn organizational norms from others, and to emphasize mastery beyond technical skills.
- The *Socialized Mind* (Stage 3) is characterized by increased social perspective taking ability among allies or one's in-group members. Understanding and expectations of the professional role is externalized, shaped by interpersonal relationships, observing others, and following the norms and status quo within organizations without question. Some adolescents and most adults are in this stage.
- Transition* (Stage 3/4) is characterized by a greater understanding of one's self in the professional role and greater awareness of choices in dealing with influences that work against a professional's integrity.
- The *Self-Authoring Mind* (Stage 4) involves the ability "to step back enough from the social environment to generate a "seat of judgment" or personal authority that evaluates and makes choices about external expectations." The independence of judgment and problem solving abilities of stage 4 translate to greater fidelity to one's sense of self within the professional role. At stage 4, one can discern negative social influences that can erode one's professional identity and integrity. Effectiveness within high-level professional or leadership roles requires stage 4 capacities.
- Transition* (Stage 4/5) one can understand and reconcile multiple contradictory ways of thinking and being.
- The *Self-Transforming Mind* (Stage 5) is characterized by the ability to examine one's self-authored personal authority, recognize the limits of any one system of constructing meaning, and seek out novel or alternative systems. A recognition of the interdependencies of different systems or ways of being, and an ability to reconcile contradictory or seemingly paradoxical ways of constructing meaning is a hallmark of the emergence

^aStage 1 is characteristic of childhood.

Table 2. The PIE instructions and prompts (modified for use in medicine).

Directions: This essay explores how you understand the meaning of professionalism at this point in your development and how that relates to the formation of an ethical professional identity. Research suggests that the meaning of professionalism and one's identity with the profession evolves throughout one's career. Respond as fully as you can to each of the questions. The purpose is to engage you in self-assessment, reflection and goal setting.

Please answer these questions as fully as you can in 1 hour. Write at least a paragraph for each question.

1. What does being a member of the medical profession mean to you? How did you come to this understanding?
2. What do you expect of yourself as you work towards becoming a full-fledged physician?
3. What will the profession expect of you?
4. What conflicts do you experience or expect to experience between your responsibility to yourself and others—patients, family, and profession? How do you resolve them?
5. What would be the worst thing for you if you failed to live up to the expectations you have set for yourself?
6. What would be the worst thing for you if you failed to live up to the expectations of your patients?
7. What would be the worst thing for you if you failed to live up to what society expects of physicians? How did you come to this understanding?
8. Think of a physician you consider an exemplar of professionalism. Describe why you chose this person, illustrating with an incident or pattern of decisions or actions that supports your choice.
9. Reflect on your experiences in medical school or in the community that have been critical in fostering change in your understanding of what it means to be a professional – to be a physician

cohort) were more likely to state that they expected to make a contribution to society in reducing healthcare disparities, serving medical assistance patients, and volunteering to help those in need, supporting the importance of promoting growth towards more complex stages of identity (Monson et al. 2008).

Moral reasoning

Moral dilemmas in medicine typically do not have a single right answer. Mature professionals tend to respond to such dilemmas based on ethical or professional principles, rather than personal interest or narrowly defined rules (Rest 1986, 1994; Beauchamp & Childress 2001). Of concern is the findings from research using highly validated measures of moral reasoning and related capacities that suggests that medical training blunts sensitivity to moral dilemmas and slows the expected age and education-based growth in moral reasoning (Self et al. 1993; Patenaude et al. 2003; Bebeau & Faber-Langendoen 2014; Murrell 2014). The defining issues test (DIT2) measures the types of moral arguments an individual finds persuasive when confronted with a moral problem and therefore is a measure of moral judgment – a necessary but not sufficient component of moral behavior (Bebeau 2002). The DIT2 presents a series of written cases of moral dilemmas and asks respondents to choose an action from a list, and then to rank a set of justification statements as to how important each statement was in their choice. Justifications for actions tend to cluster in three general moral schemas based on: protecting personal interests (PI), upholding rules and maintaining norms (MN), and applying universal ethical principles (often referred to as “post-conventional thinking” and measured as N2 scores). Scores across cases reveal the pattern of each individual’s relative preference for each schema (PI, MN, N2) (Rest 1986, 1994). The DIT2 has been extensively validated and is highly resistant to social desirability bias (Rest et al. 1999). Given that both PIF and moral development theoretical frameworks have a shared basis in constructive developmental theories (e.g. Piaget, Kohlberg), we would expect them to be correlated.

Methods

All 132 entering medical students (class of 2019) completed a PIE and DIT2 electronically. All but two were enrolled in our IRB approved research registry, allowing us to utilize educational data for purposes of research (Gillespie et al. 2016).

Curricular context

A decade ago, along with many medical schools, we implemented a case-based and student-led professionalism curriculum spanning our four-year curriculum (Horlick et al. 2009) and an online portfolio to promote learners’ professional development (Kalet et al. 2007). In 2015, (class of 2019), we introduced PIF during orientation, using the framework of Cruess (Cruess et al. 2014) and Bebeau (Bebeau & Faber-Langendoen 2014). To facilitate self-awareness students completed both the PIE and the DIT2. On average, students completed both instruments within an hour. Three-weeks later, students received a detailed, individualized, six-page narrative feedback report from an expert (VM) (See Supplementary Appendix). During a large-group debriefing session, the concepts of PIF were reviewed and students wrote portfolio reflections to the following prompts: “Now that you have received your feedback, write your first impressions of your PIE and DIT2

information – What surprised you? What “rings true”? What information is helpful to you?”

Scoring and data analysis

Professional identity essay scoring

PIEs were scored by a lifespan, developmental educational psychologist (VM) with expertise in measurement of moral capacities in professional education (Lahey et al. 1988; Bebeau & Monson 2012). Each student was assigned a Kegan PIF stage score in an individualized report with narrative feedback to each student. Five months later, the primary rater (VM) re-rated and a second trained rater rated 12 randomly selected PIEs (10%) to establish reliability (inter-rater ICC 0.83, 95% CI [0.57–0.96], intra-rater ICC 0.85, 95% CI [0.50–0.93]).

Defining issues test scoring

The Center for the Study of Ethical Development at the University of Alabama (Development) scored DIT2s using established algorithms and provided metrics of students’ preferred moral schema (personal interest, maintaining norms, post conventional (N2)). For simplicity in this paper we report only the N2 score, which reflects the proportion of time students applied a social contract orientation or universal principles approach to the cases.

Quantitative

We analyzed de-identified data from consenting students ($N=130$). Kegan PIF stages were categorized by stages and half stages (transitional), the N2 score is reported as a percentage and range. Spearman’s and Pearson’s correlation coefficient between Kegan PIF stages and N2 scores were similar. To further explore the relationship among these measures, we dichotomized the Kegan PIF Stages into low (2.5 and 3) and high (3.5 and 4) and conducted a one-way analysis of variance (ANOVA) looking for significant differences in N2 Scores.

Qualitative

A directed and summative content analysis of students’ reflections was conducted by two readers (SY, RC) (Hsieh & Shannon 2005). The first reader (SY) defined a set of thematic categories and subcategories (Table 3) which were then grouped into three clusters: positive responses (student reported feeling positive about the exercise, or feeling positive about the journey ahead of them in medical school), neutral responses (student discussed metrics, had an analytic approach to their data), and negative responses (students reported disappointment with their feedback, or reported feeling negative or confused about the exercise). After a training set (30) during which two readers (SY, RC) discussed disagreements to resolve discrepancies, they each independently applied the code categories to each student’s reflections. Table 3 shows the frequency for the 9 of 17 response categories that showed adequate inter-rater reliability

Table 3. Content analysis: themes, subthemes, rater agreement, frequency, and example de-identified quotes.

Theme category Summary	Exemplar quote
1. The feedback they received (ratings and narrative): matched their self-perception (39%) ^a did not match and student was negative or disappointed (18%) ^a did not match and was pleasant surprise (12%) ^a did not match and response was neither positive nor negative (28%) ^a	"I can view it as a kind of road map with a goal for where I want to go in my professional development." "I am pleased with the results showing that I had internalized the importance of compassion. This is something I value highly in myself." "I was surprised that there are aspects of my own way of thinking that I do not notice. I think that it was helpful to get a third party perspective on my own self-conceptualization of my professional identity."
2. Affective response to the exercise: positive/negative (21%/curious/confused (8%)	"I am curious as to how I can move from stage 4 to stage 5 in my personal professional identity." "This information was complementary and a positive exercise to see where I am at with my professional identity and development."
3. Thoughts about their upcoming journey through medical school positive thoughts/concerned thoughts (5%) ^a	"Knowing where I am in my professional identity stage is super helpful, just so I can be aware of how I should be approaching my medical school career at this point and to keep stepping back and remaining reflective."
4. Recognition of self as novice (34%) ^a	"It is also helpful to know where the median lies in order to compare myself to my peers and know that we are all at the stage we need to be, considering we have just embarked on the journey that is the practice of medicine."
5. Described a plan for the future, to move beyond current PIF stage (73%) ^a	"Regarding transitioning to Stage 4, the report resonates a lot on what I have been thinking of as the next step of my growth." "I hope to someday achieve supreme court levels of post conventional reasoning." "As I learn how to interact with patients, learn the science behind diseases, and understand the larger network of health care, I will further learn from those experiences and possibly improve upon the scale of Kegan Stages of Mental Complexity."
6. Questions about metrics of the instruments: response to cases versus actual behavioral response how to use the information issues of validity	"I think this provides a bit of a background in terms of an external evaluation of where I am, and I appreciate the feedback, but I am completely unsure how to actually move forward with this information."
7. General mental/emotional state of student: reader concerned by tone of reflection	"It is tough to bear such personal scrutiny On the other hand, it is a nudge to continue progressing, academically and professionally and a reassurance in the process that underlies such maturation." "I never feel like I measure up, which leads to me being chronically disappointed in myself. Like right now."
8. Analytical approach to feedback data	"I was encouraged by the fact that my PIE results indicated that I am in stage 4, the self-authoring mind. I am able to remove myself from situations that require complicated problem solving so that I can evaluate things objectively. I need practice doing this in ethical dilemmas so that I can reconcile the discrepancy between my PIE score and my DIT-2 score."

^aCoding agreement Kappa >0.3, % of 130 student reflections coded into these categories.

(Cohen's kappa >0.300) (Landis & Koch 1977). The remaining categories were useful for descriptive purposes and hypothesis generation.

Results

Complete PIE and DIT data were available for 129/130 (99%) consenting students. This class is 57% women; average age is 23 (range 18–34, SD 1.7). Kegan PIF stage scores distributed as follows: stage 1: 0 (0%), 2: 0 (0%), 2–3: 16 (12%), 3: 59 (45%), 3–4: 49 (37%) 4: 6 (4%), 4–5: 0 (0%), 5: 0 (0%). The mean DIT2 N2 score was 54 (range 9.7–76.5) indicating a strong preference for post conventional moral reasoning (N2) relative to maintaining norms and personal interests justifications for their moral reasoning. The correlation between N2 score and Kegan PIF stage was $\rho = 0.18$ ($p = 0.03$). The mean DIT N2 differed by Kegan PIF stages (early, 52.0 (SD = 11.8) vs. late, 56.0 (SD = 11.1) ($p = 0.046$).

Content analysis of student reflective writing on PIE stage and DIT score report

Table 3 lists identified themes. Of the 130 students, 117 (90%) reported positive reactions to the PIF curriculum. Mixed negative reactions (28/130, 21%, not mutually

exclusive) included confusion, concern about future training, or dissatisfaction with the gap between their self-perception and the results. Very few reported only negative reactions. Students who described an analytic approach to evaluating their feedback tended not to report negative reactions, even when they were surprised by the feedback.

Reflective writing that explicitly included a discussion of the Kegan PIF stage or DIT data tended not to include negative affect. About half of the students demonstrated analytic or reflective processing of feedback, citing, and interpreting their scores ($N = 70/130$; 53%). Of these students, 59 (84%) were coded as having only positive or neutral comments, while 11 (16%) students reported some negative affect, (e.g. confusion or disappointment that results did not match how they saw themselves). Even students with initial negative affect about their results tended to have positive plans for their development. Only 28 (21%) students expressed negative affect. Of these, 23 (82%) were initially disappointed when results did not match how they saw themselves, but reported being committed to professional identity development.

Students who explicitly referred to themselves as novices tended not to express negative affect. Of the 44 students (34%) who identified as novices, only 5 of them had negative affect (11%) compared with 26% (23/87) of those not identifying as novices.

Most of the cohort did not question the validity of the metrics (118/130, 90%). The 10% of students who did, described how the results did not match their self-perception.

Discussion

If we accept that PIF should be a foundational goal of medical education, then we must understand its development and seek measurements that are valid both for formative and summative assessment purposes (Cooke et al. 2010; Cruess et al. 2016). We found that it was feasible to provide each student with a PIF stage, their preferred moral reasoning schema and individualized feedback. This approach is acceptable and intriguing to our students and potentially has utility as an approach to competency-based professionalism curricula.

The distribution of the Kegan PIF stages among our students is similar to that of other age-comparable professional students (Bebeau & Monson 2012). Fully-developed professional identity is signaled by the shift from other- to self-defined identity (stage 3-4) (Bebeau 2008). While not strictly age-dependent, this shift most often takes place at the age of early- to mid-30s – which is after residency training for most North American physicians. So we must take a long-term view of PIF in physicians. Many adults in the general population do not develop beyond the Kegan stages of adolescence (stage 2, 13%) or early adulthood (stage 3, 46%) and less than 1% achieve stage 5 (Kegan & Lahey 2009). However, it is arguable that physicians must reach higher levels than the average adult to honor our social contract. In studies of moral identity, those at later-stages of PIF are more likely to focus on service to others, less likely to articulate concerns motivated by self-interest, be perceived as more effective by peers (Kegan & Lahey 2016), and less vulnerable to the disconnect between what is taught and what is actually practiced – known as the hidden curriculum (Kegan & Lahey 2016).

Is this a valid evidence-based way to guide PIF for medical trainees? As we have described, there is theory that supports the interpretation of Kegan PIF stages and DIT scores as we have used them. We measured PIF with acceptable inter- and intra-rater reliability. The student reflections provided support for response process validity, with clear evidence they understood the constructs (Cook & Beckman 2006). Measured concurrently, PIE scores and DIT2 N2 are correlated, as we would expect, since these are developmental frameworks that measure different but related developmental constructs. It is yet to be seen if this measure tracks individual development over time, changes in response to interventions, or predicts the need for remediation or disciplinary actions.

In general, our students were activated by the exercise and intrigued to learn about their baseline PIF. Those with an analytical approach to their PIF feedback and an awareness of themselves as novices tended to have emotionally positive responses, including anticipation of acquiring mastery. Personalized PIF stage data expanded the conversation beyond a focus on lapses in professionalism into a conversation about a mastery approach to the development of professional “wisdom” (Rees, 2005; McGaghie 2015).

Thought leaders argue that linear staged models of adult development are too simplistic (Rees 2005) and we agree. We do not anticipate that PIF in medical students proceeds in a smooth, predictable, linear manner and fully anticipate it will be shown to have individualized paths and be context sensitive. But, it is not yet known, and therefore why we are pursuing this work. We combined a relatively objective psychometric in the positivist tradition, the DIT2, with a measure based on qualitative data scored by a skilled rater, the PIE. We hope this allows us to go beyond the “surface” understanding obtained by checklists of values, personality traits, or behaviors in understanding medical professionalism.

The disappointment of a small number of students receiving earlier than expected PIF stage scores may reflect their perception that this is a flaw rather than stage in life-long growth. This stance can interfere with learning (Blackwell et al. 2007). Since medical students are selected based on their individual accomplishments, it is appropriate for them to enter medical school focused on personal achievement. However, they must move on to commit to the principles and values of the medical profession as defined by our social contract. This means a commitment to addressing the complexities of being a member of the community of practice (Hafferty & Levinson 2008; Levinson et al. 2014). A learning culture in which students seek feedback and engage in dialog about their professional development enables the needed shift in mindset for students who feel their identity is only reflected in perfect or near perfect achievements. Physicians capable of such introspection are needed to lead change in the culture of medical practice from competitive to cooperative (Hafferty & Castellani 2010), because such a culture is associated with improved outcomes for both the health of patients and organizations’ ability to thrive in an increasingly competitive marketplace (Brennan & Monson 2014).

This preliminary experience of one medical school is based on one measurement episode, without individualized coaching beyond the written report. Expansion of this approach is currently limited by the small number of faculty mentors with sufficient understanding of PIF framework and its use in coaching students. While many scholars are exploring medical professional identity formation as highly complex, culturally, and socially constructed (Stern & Papadakis 2006; Monrouxe 2010; Goldie 2012; Jarvis-Selinger et al 2012; Eppich et al. 2016; Helmich et al. 2016), we choose to take the post-positivist view that a synthetic measurement, even when not perfect, would be a meaningful and valuable contribution to our understanding and promotion of healthy PIF. While this approach has limitations it will allow us, in a limited way, to explore quantitatively how admissions data, in particular multiple mini interview scores, evidence of community service, and prior clinical roles, correlate with Kegan PIF stage scores and how, in turn, this is reflected in performance in medical school. In collaboration with other schools, we hope to determine how to best give students updates on their PIE as their training progresses, and to determine how students may use this information in actively shaping their professional development, describe PIF’s developmental course and its ability to predict success and need for remediation.

Conclusions

Traditionally, teaching about medical professionalism is focused on virtues, character “traits”, and expected behaviors. Over several decades, we have deconstructed the behavioral manifestations of professionalism and created measurable competencies (Irby & Hamstra 2016). A strong capacity for moral reasoning and commitment to professional values makes medical trainees less susceptible to situational factors (e.g. fatigue, ambiguity, emotional stress), which may cause lapses in professionalism. By adding a psychological development framework to character and behavior perspectives, we can better understand professional identity and professionalism and, more importantly, how the students themselves can influence the process of being able to “think, act, and feel like a physician” (Cruess et al. 2014).

Acknowledgments

We are deeply indebted to Muriel J. Bebeau, PhD, Professor in the Department of Primary Dental Care, School of Dentistry, University of Minnesota and formerly, Director of the Center for the Study of Ethical Development for her remarkable and inspiring contributions to the field and her generous mentoring and support for our work. We thank Michelle Tichy, PhD, Assistant Professor, Department of Educational Psychology & Foundations, University of Northern Iowa, for her contribution to establishing reliability of the Professional Identity Formation Essay, Ms. Heather Dumorne for assistance in manuscript preparation, Melvin Rosenfeld, PhD, Senior Associate Dean for Medical Education for his support for this project and Professors Richard and Sylvia Cruess for providing feedback on an earlier version of this manuscript. This work was supported by the Office of Student Affairs and Office of Medical Education of the New York University School of Medicine.

Ethical approval

This work was reviewed as part of the IRB approved research registry, allowing us to utilize educational data for purposes of research.

Disclosure statement

The authors reports no conflicts of interest. The authors alone are responsible for the content and writing of the article.

Glossary

Professional Identify Formation: Medical professional identify formation (PIF) is both a process of personal development and a social construction and has long been claimed to be the fundamental goal of the learning process in medical education (Cooke et al. 2010). In 1957, Merton stated that the task of medical education is to provide the medical trainee “with a professional identity so that he comes to think, act, and feel like a physician” (as quoted by Cruess et al. (2016), italics theirs).” It has been further defined as an ongoing, self-reflective process aimed at developing habits of “thinking, feeling and acting” that allow learners to be compassionate and socially responsible physicians (Cooke 2010 quoting Ware and Castellini 2000). A staged, developmental framework for PIF has been applied in health professions education (Bebeau & Faber-Langendoen 2014). There is an enthusiastic dialog in the medical education literature about whether PIF can be measured. And it was recently proposed that we add PIF to the tip of Miller’s Pyramid for the assessment of clinical competence and performance (Cruess et al. 2016).

Notes on contributors

Adina Kalet, M.D., M.P.H. directs the Research on Medical Education Outcomes unit at NYU School of Medicine, has received the SGIM National Award for Scholarship in Medical Education in 2008, and is the co-editor of the book *Remediation in Medical Education: A Midcourse Correction*, published by Springer.

Lynn Buckvar-Keltz, M.D. is the director of the medical student advisory program at NYU School of Medicine and was dean for student affairs for nine years. Her research interests include medical student professional development and preparedness for transition to residency.

Victoria Harnik, Ph.D is the associate dean for curriculum at the New York University School of Medicine, the content director for Anatomy in interdisciplinary pre-clerkship modules and co-authored the Elsevier’s *Integrated Anatomy and Embryology* textbook and an iBook series *Virtual Prosections: The Series*.

Verna Monson, Ph.D is a lifespan developmental psychologist (Ph.D., University of Minnesota, 2009) in independent practice. Dr. Monson is an expert in assessment of professional identity formation for graduate medical education and remediation of lapses in professionalism. She is currently engaged as a consultant to New York University Medical School.

Steven Hubbard, Ph.D is the Director of Student Affairs for NYU’s School of Medicine. He also teaches courses at NYU in learning assessment, leadership, and student development. He and his colleague Dr. Frances stage are currently updating their book *Linking Theory and Practice: Case Studies for Working with College Students*.

Ruth Crowe, M.D., Ph.D is the Director of Practice of Medicine, the core clinical skills training module given throughout pre-clerkship training. She is also Director of Integrated Clinical Skills, working to collaborate across the UME spectrum to integrate core clinical skills training and assessment.

Hyuksoon S. Song, Ph.D is teaching pre-service and in-service teachers in Georgian Court University, New Jersey as an assistant professor of education. For the last decade, he also participates in medical education research by designing studies, analyzing data, and drafting manuscripts.

Sandra Yingling, Ph.D is the Associate Dean for Educational Planning at the University of Illinois College of Medicine, and Assistant Professor in the Department of Medical Education. While at NYU, Dr. Yingling focused on evaluation and assessment, technology-enhanced education, and graduation requirements for clinical skills competence.

Previous presentations

Day One of Medical School: Welcome to Evidence-Based Professional Identity Formation, NEGEA April 28–30, 2016, Providence, RI, Short Communication.

Measuring Professional Identity Development in Medical Students, Academy for Professionalism in Health Care, 4th Annual Meeting, April 8–9, 2016, Philadelphia, PA, Oral Presentation.

Funding

This work was supported by the Office of Student Affairs and Office of Medical Education of the New York University School of Medicine.

References

- Bartone PT, Snook SA, Forsythe GB, Lewis P, Bullis RC. 2007. Psychosocial development and leader performance of military officer cadets. *Leadersh Q.* 18:490–504.
- Beauchamp TL, Childress JF. 2001. *Principles of biomedical ethics*. 5th ed. New York, USA: Oxford University Press.
- Bebeau M, Lewis P. 2003. *Manual for assessing and promoting identity formation*. Center for the Study of Ethical Development, University of Alabama. Available from: <http://ethicaldevelopment.ua.edu/selected-publications.html>.

- Bebeau MJ. 2002. The defining issues test and the four component model: contributions to professional education. *J Moral Educ.* 31:271–295.
- Bebeau MJ. 2006. Evidence-based character development. In: Kenny N, Shelton W, editors. *Lost virtue: professional character development and medical education* Oxford: Elsevier; p. 47–86.
- Bebeau MJ. 2008. Promoting ethical development and professionalism: insights from educational research in the professions. *U St Thomas Law J.* 5:366.
- Bebeau MJ, Faber-Langendoen K. 2014. Remediating lapses in professionalism. In: Kalet A, Chou C, editors. *Remediation in medical education.* New York: Springer; p. 103–127.
- Bebeau MJ, Monson VE. (2012). Professional identity formation and transformation across the life span. In: Mckee A, Eraut M, editors. *Learning trajectories, innovation and identity for professional development.* London: Springer; p. 135–162.
- Blackwell LS, Trzesniewski KH, Dweck CS. 2007. Implicit theories of intelligence predict achievement across an adolescent transition: a longitudinal study and an intervention. *Child Dev.* 78:246–263.
- Blasi A. 1980. Bridging moral cognition and moral action: a critical review of the literature. *Psychol Bull.* 88:1.
- Blasi A. 2004. Neither personality nor cognition: an alternative approach to the nature of the self. In: Lightfoot C, Lalonde C, Chandler M, editors. *Changing conceptions of psychological life.* Mahwah: Erlbaum; p. 3–25.
- Brennan MD, Monson V. 2014. Professionalism: good for patients and health care organizations. *Mayo Clin Proc.* 89:644–652.
- Cook DA, Beckman TJ. 2006. Current concepts in validity and reliability for psychometric instruments: theory and application. *Am J Med.* 119:166.e167–116.
- Cooke M, Irby DM, O'Brien BC. 2010. *Educating physicians: a call for reform of medical school and residency.* San Francisco: John Wiley & Sons.
- Cruess RL, Cruess SR, Boudreau JD, Snell L, Steinert Y. 2014. Reframing medical education to support professional identity formation. *Acad Med.* 89:1446–1451.
- Cruess RL, Cruess SR, Steinert Y. 2016. Amending Miller's pyramid to include professional identity formation. *Acad Med.* 91:180–185.
- DIT Developmental and Experimental Indicies [Internet]. 2016 [cited 2016 December 18] Available from: <http://ethicaldevelopment.ua.edu/information-provided-by-the-dit.html>.
- Eigel KM. 1998. *Leader effectiveness: a constructive developmental view and investigation [dissertation].* Athens (GA): University of Georgia.
- Eppich W, Rethans J-J, Teunissen PW, Dornan T. (2016). Learning to work together through talk: continuing professional development in medicine. In: Billet S, Dymock D, Choy S, editors. *Supporting learning across working life.* Switzerland: Springer International; p. 47–73.
- Forsythe GB, Snook S, Lewis P, Bartone PT. 2002. Making sense of officership: developing a professional identity for 21st century army officers. In: Matthews LJ, editor. *The future of the army profession.* New York: McGraw Hill; p. 357–378.
- Gillespie C, Zabar S, Altshuler L, Fox J, Pusic M, Xu J, Kalet A. 2016. The Research on Medical Education Outcomes (ROME) registry: addressing ethical and practical challenges of using “bigger,” longitudinal educational data. *Acad Med.* 91:690–695.
- Goldie J. 2012. The formation of professional identity in medical students: considerations for educators. *Med Teach.* 34:e641–e648.
- Hafferty FW, Castellani B. 2010. The increasing complexities of professionalism. *Acad Med.* 85:288–301.
- Hafferty FW, Levinson D. 2008. Moving beyond nostalgia and motives: towards a complexity science view of medical professionalism. *Perspect Biol Med.* 51:599–615.
- Helmich E, Yeh H, Kalet A, Al-Eraky M. 2016. Becoming a doctor in different cultures: towards a cross-cultural approach to supporting a professional identity formation in medicine. *Acad Med.* Epub.
- Holden MD, Buck E, Luk J, Ambriz F, Boisauvin EV, Clark MA, Mihalic AP, Sadler JZ, Sapire KJ, Spike JP, et al. 2015. Professional identity formation: creating a longitudinal framework through TIME (Transformation in Medical Education). *Acad Med.* 90:761–767.
- Horlick M, Masterton D, Kalet A. 2009. Learning skills of professionalism: a student-led professionalism curriculum. *Med Educ Online.* 11:26.
- Hsieh HF, Shannon SE. 2005. Three approaches to qualitative content analysis. *Qual Health Res.* 15:1277–1288.
- Irby DM, Hamstra SJ. 2016. Parting the clouds: three professionalism frameworks in medical education. *Acad Med.* doi: 10.1097/acm.0000000000001190.
- Jarvis-Selinger S, Pratt DD, Regehr G. 2012. Competency is not enough: integrating identity formation into the medical education discourse. *Acad Med.* 87:1185–1190.
- Kalet AL, Sanger J, Chase J, Keller A, Schwartz MD, Fishman ML, Garfall AL, Kitay A. 2007. Promoting professionalism through an online professional development portfolio: successes, joys, and frustrations. *Acad Med.* 82:1065–1072.
- Kegan R. 1982. *The evolving self.* Cambridge (MA): Harvard University Press.
- Kegan R, Lahey LL. 2009. *Immunity to change: how to overcome it and unlock potential in yourself and your organization.* Boston: Harvard Business Press.
- Kegan R, Lahey LL. 2016. *An everyone culture: becoming a deliberately developmental organization.* Boston: Harvard Business Review Press.
- Lahey L, Souvaine E, Kegan R, Goodman R, Felix S. 1988. *A guide to the subject-object interview: its administration and interpretation.* Cambridge (MA): Harvard University, Graduate School of Education, Laboratory of Human Development.
- Landis JR, Koch GG. 1977. The measurement of observer agreement for categorical data. *Biometrics.* 33:159–174.
- Levinson W, Ginsburg S, Hafferty F, Lucey CR. 2014. *Understanding medical professionalism.* New York: McGraw Hill Professional.
- McGaghie WC. 2015. Mastery learning: it is time for medical education to join the 21st century. *Acad Med.* 90:1438–1441.
- Monrouxe LV. 2010. Identity, identification and medical education: why should we care? *Med Educ.* 44:40–49.
- Monson V, Roehrich S, Bebeau M. 2008. Developing civic capacity of professionals: a methodology for assessing identity. *Proceedings of the Annual Conference of the American Educational Research Association, New York.*
- Monson VE, Hamilton NW. 2010. Entering law students' conceptions of an ethical professional identity and the role of the lawyer in society. *J Legal Prof.* 35:385.
- Murrell VS. 2014. The failure of medical education to develop moral reasoning in medical students. *Int J Med Educ.* 5:219–225.
- Patenaude J, Niyonsenga T, Fafard D. 2003. Changes in students' moral development during medical school: a cohort study. *Cmaj.* 168:840–844.
- Rees C. 2005. Proto-professionalism and the three questions about development. *Med Educ.* 39:9–11.
- Rest JR. 1986. *Moral development: advances in research and theory.* New York: Praeger.
- Rest JR. 1994. *Moral development in the professions: psychology and applied ethics.* Hillsdale (NJ): Erlbaum.
- Rest JR, Bebeau MJ, Thoma SJ. 1999. Postconventional moral thinking: a neo-Kohlbergian approach. Mahwah: Erlbaum.
- Rule JT, Bebeau MJ. 2005. *Dentists who care: inspiring stories of professional commitment.* Chicago: Quintessence Publishing Company.
- Self DJ, Schrader DE, Baldwin DC Jr, Wolinsky FD. 1993. The moral development of medical students: a pilot study of the possible influence of medical education. *Med Educ.* 27:26–34.
- Stern DT, Papadakis M. 2006. The developing physician – becoming a professional. *N Engl J Med.* 355:1794–1799.
- van der Vleuten CP, Schuwirth LW. 2005. Assessing professional competence: from methods to programmes. *Med Educ.* 39:309–317.
- Wynia MK, Papadakis MA, Sullivan WM, Hafferty FW. 2014. More than a list of values and desired behaviors: a foundational understanding of medical professionalism. *Acad Med.* 89:712–714.