

Professionalism Score and Academic Performance in Osteopathic Medical Students

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Context: During the first 2 years of osteopathic medical school, osteopathic manipulative medicine (OMM) courses use an objective professionalism score to measure student timeliness and appropriate dress for learning activities.

Objective: To assess for correlations between this score and the numeric course grades of all first- and second-year basic science and clinical courses at a single osteopathic medical school.

Methods: The professionalism scores obtained for each of the 7 quarters of the OMM course (2007-2012) were compared with the students' numeric final course grades and combined grade point average (GPA) of all courses in the corresponding quarter. Spearman correlation coefficients were used to determine the strength of the relationship between the professionalism score and the final course grades and the combined GPA.

Results: The mean (SD) professionalism score was 98.6% (3.3%), and scores ranged from 23.1% to 100%. Excluding the OMM course, the professionalism score was positively correlated with 29% of first-year course grades and 65% of second-year course grades. The professionalism score was predictive of academic performance in 16 of 23 clinical courses with the highest correlation for Principles of Medicine and Dermatology ($\rho=0.28$ and $\rho=0.25$, respectively). The OMM professionalism score was positively associated with GPA for quarters 1, 6, and 7 ($P=.006$, $P<.001$, and $P<.001$, respectively). Professionalism scores were significantly lower in the second year ($P<.001$).

Conclusion: Objective measures of professionalism correlated with academic performance in many first- and second-year osteopathic medical school courses, particularly clinical courses in the second-year curriculum.

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Within the United States, medical professionalism has been defined as a core competency for physicians by the following organizations that govern medical education and licensure: American Association of Colleges of Osteopathic Medicine,¹ American Osteopathic Association,² National Board of Osteopathic Medical Examiners,³ Accreditation Council for Graduate Medical Education,⁴ and American Association of Medical Colleges.⁵ These organizations have defined professionalism differently, but definitions include the basic elements of competency, integrity, responsiveness, accountability, compassion, and respect for the patient and health care team. These elements are taught during predoctoral medical education through lectures, small group discus-

sions, role playing, role modeling and mentoring, and reflective writing.⁶⁻⁹ Assessing professionalism during medical training is typically accomplished through clerkship evaluations, peer evaluations, self-assessments, and standardized patient encounters. However, assessing professionalism is more difficult than teaching professionalism because of the subjectivity of the elements of professionalism and because no single assessment tool can capture all elements.^{7,10}

McLachlan et al¹¹ created a conscientiousness index, scoring objective elements of professionalism (eg, attendance, completing assignments on time) and comparing the index scores with qualitative evaluations by faculty and with behavioral incidents reports. They found a statistically significant correlation between objective and subjective measures of professionalism. Because lack of professionalism during predoctoral medical education is a predictor of disciplinary action by state medical boards,¹² the correlation between objective measures and subjective behaviors is an objective indicator for future unprofessional behavior.

Papadakis et al,¹² who reported that unprofessional behaviors in predoctoral medical education were associated with later disciplinary action, found that physicians disciplined by state medical boards had lower predoctoral grade point averages (GPAs), suggesting that academic performance correlates with professional behaviors. Further, other studies found students with professional behaviors had higher GPAs and better clerkship evaluations.¹³⁻¹⁵

In 2007, the osteopathic manipulative medicine (OMM) courses at the A.T. Still University-Kirksville College of Osteopathic Medicine began using a professionalism score as part of the course grade. Similar to the index score created by McLachlan et al,¹¹ the professionalism score awards or deducts points for certain behaviors, such as timeliness, appropriate dress, and self-assessments. This score helps osteopathic medical students develop professionalism for patient interactions, ethical principles, collaboration with health profes-

sionals, lifelong learning, and the medicolegal expectations of their future medical practices. Over time, patterns of correlation were seen between students with low professionalism scores and those sent before the school's Promotions Board because of poor academic progress. The current study was developed to assess correlations between the OMM professionalism score, first- and second-year course grades, and overall academic progress. We hypothesized that the professionalism score would correlate with academic performance in first- and second-year osteopathic medical school courses.

Methods

First-Year and Second-Year

Osteopathic Medical School Curriculum

The first 2 years of osteopathic medical school are composed of didactic lectures, early clinical experiences, hands-on physical diagnosis and treatment laboratories, and small group experiences. The first year focuses on basic sciences and the second year on clinical sciences. From 2007 to 2012, the first- and second-year curriculum was composed of 7 quarters that varied in length from 5 to 13 weeks. Each quarter had 4 to 11 distinct courses. The curriculum within a quarter varied from year to year. For the current study, quarters 1 to 3 were defined as first year, and quarters 4 to 7 were defined as second year. Only courses that granted a numeric grade were included in the study.

OMM Curriculum

The OMM curriculum spans the first 2 years of osteopathic medical school and is divided into 7 courses (1 per quarter), focusing on diagnostic palpation and osteopathic manipulative treatment (OMT) techniques and on integration of OMT into patient care. Learning activities include hands-on didactic laboratory sessions, didactic lectures, clinical experiences, and practice sessions. All enrolled students are required to attend all didactic laboratory sessions. Students receive numeric course grades

through multiple-choice summative assessments, practice logs, practice patient documentation from clinical experiences, hands-on practical examinations, and a professionalism score. Students who are absent from a required attendance activity without approval (unexcused absence) may receive a grade point penalty off their final grade.

Professionalism Score

The OMM curriculum began including a professionalism score in quarters 5 to 7 in the 2007-2008 academic year. Starting in 2009, the professionalism score was used during all 7 quarters. The total professionalism score varies by quarter and is dependent on the number of required activities. Required activities include didactic laboratory sessions, clinical experiences, practical examinations, written examinations, and laboratory partner surveys. Each activity is worth a maximum of 10 points, and the total professionalism score equals the number of required activities multiplied by 10 points. Zero or penalty points are assigned for unprofessional behaviors. The professionalism score is worth 10% of the final course grade. Each scored element is described below, and the grading rubric is provided in *Table 1*.

- **Arriving to didactic laboratory sessions on time.** Students are expected to arrive on time and to sign in within the first 10 minutes. After 10 minutes, a late sign-in sheet is available for 20 minutes. If a student is more than 30 minutes late, he or she is counted absent, and the activity must be remediated.
- **Dressing appropriately for didactic laboratory sessions.** Students are expected to dress in clothing that allows for easy palpation during laboratory activities. A list of acceptable and unacceptable clothing is provided at the beginning of each quarter. For each session, students indicate on the daily sign-in sheet whether they are appropriately dressed. Students who are wearing clothing listed as unacceptable are identified by the faculty, and names are checked with the sign-in sheet to identify students who self-reported proper dress.
- **Missed didactic laboratory session, practical examination, or clinical experience.** When a student is absent from a required OMM laboratory activity, including didactic laboratory sessions and practical assessments, with an excused or unexcused absence, he or she must contact the OMM instructional coordinator within 24 hours of returning to campus for remediation of the missed activity. Students are expected to arrive on time to the remediation and may receive all professionalism points for an activity even with a penalty for an unexcused absence.
- **Appropriate attire for practical examinations and clinical experiences.** All students are expected to dress in business-casual attire during patient encounters (clinical experiences and final practical examinations), which includes wearing a clean, short white coat.
- **Arriving to practical examinations and clinical experiences on time.** Students are expected to arrive on time to all practical examinations. Practical examinations are timed, with up to one-fourth of the class completing their examinations during the 6- to 20-minute sessions. A late arrival is counted as an absence, and remediation must be scheduled.
- **Arriving on time to written examinations.** Students are expected to arrive on time to all written examinations. Although students can begin examinations late, arriving after an examination has started is disruptive, and penalty points are assessed.
- **Completing laboratory partner surveys on time.** Students work in pairs to practice diagnosis and OMT skills. To facilitate the learning process, students switch partners several times throughout each quarter. Students are required to submit anonymous evaluations

Table 1.
Professionalism Score Grading Rubric

Scored Activities	Point Value ^a
Arriving to didactic laboratory session on time	5
Arriving late to laboratory session	0
Dressing appropriately for didactic laboratory session	5
Dressing improperly for laboratory (self-assessment)	0
Dressing improperly for laboratory with self-assessment stating proper dress (faculty assessment)	-15
Missed didactic laboratory session/practical examination/clinical experience	
Proactively contacting the instructional coordinator to arrange a remediation	5
Arriving on time and successfully remediating a missed laboratory session	5
Failing to contact the instructional coordinator within 5 business days of missed laboratory session	-5
Failing to arrive on time to remediation session	-5
Appropriate attire for practical examination/clinical experience	5
Improper attire for practical examination/patient encounter	-10
Arriving to practical examination/clinical experiences on time	5
Arriving late to practical assessments	-10
Arriving on time to written examinations (includes midterm and final examinations)	10
Arriving late without an excused absence from Student Services Office	
Arriving 1-5 minutes late	-10
Arriving 6-15 minutes late	-20
Arriving 16-30 minutes late	-30
Arriving after 31 minutes	-40
Completing laboratory partner surveys on time	10
Failing to complete laboratory partner survey by deadline	0

^a Total possible points vary by quarter because the points are based on the number of required activities in that quarter. For each required activity, the point value earned is entered into a spreadsheet with the total points earned equal to the summative total. The total points earned divided by the total possible points are equal to 10% of the final course grade for the quarter.

of each laboratory partner within 1 week of switching to a new partner, with the last survey due at the end of the quarter. Surveys are given to partners at the end of the quarter and may be used by course directors to identify problem students during the quarter. With regard to the professionalism score, students are scored only for the completion of the survey.

Data Collection

The current study was reviewed by the local institutional review board and was determined to be exempt from the need of regular institutional review board evaluation and informed consent. Numeric course grades were obtained from the registrar for quarters 1 to 3 for academic years 2009-2012, for quarter 4 for 2010-2011, and for quarters

Table 2.
Professionalism Score:
Mean Percentage and Ranges by Quarter

Quarter	n	Professionalism Score, %	
		Mean (SD)	Range
1	516	99.5 (1.3)	91.7-100
2	508	99.0 (2.9)	54.2-100
3	497	98.5 (3.1)	83.3-100
4	334	99.5 (2.0)	90.0-100
5	843	96.9 (5.4)	50.0-100
6	835	98.4 (4.7)	23.1-100
7	832	98.3 (3.7)	77.1-100

5 to 7 for 2007-2012. If a student failed a course but remediated with a passing score, the original failing grade was used for data analysis. Raw professionalism scores, final practical and written examination scores, and final OMM course grades were obtained from the OMM instructional coordinator. If a student failed a practical examination but remediated with a passing score, the original failing score was used for data analysis. Students who withdrew from courses before the final course grade was issued were excluded from data analysis.

Data Analysis

The professionalism score for each quarter was converted into a percentage score by dividing the number of points earned by the total possible points. Practical examination scores and written examination scores were determined as percentages by dividing the number of points earned by the total number of possible points. Analyses were conducted on percentage scores rather than on raw scores, because the total possible points for professionalism and examinations varied from quarter to quarter. Spearman correlation coefficients were used to determine the strength of the relationship between the professionalism score for each quarter and the OMM final practical examination score, final written examination score, and final course grade; the final course grades for other courses taken by the student in the same quarter;

and the GPA earned by the student for each quarter. Associations were classified as strong (correlation coefficients ≥ 0.50 or ≤ -0.50), moderate (range of coefficients, 0.30 to < 0.50 or -0.30 to > -0.50), weak (0.10 to < 0.30 or -0.10 to > -0.30), or negligible or no association (> -0.10 or < 0.10).¹⁶ To determine whether the OMM professionalism score differed between first and second years, a general linear mixed model was fit to the data, whereby class and quarter were treated as fixed effects and students were included as random effects. A linear contrast compared the mean professionalism score for quarters 1 to 3 with the mean for quarters 5 to 7. Quarter 4 was not included in the contrast because only 2 of the 5 class groupings had data for that quarter and it was only 5 weeks long. Analyses were conducted using SAS version 9.3 software (SAS Institute Inc). $P \leq .05$ was considered statistically significant.

Results

The mean number of students assessed for the OMM professionalism score was 624 per quarter, but the number per quarter varied from 334 in quarter 4 to 843 in quarter 5. The mean (SD) professionalism score for all 7 quarters was 98.6% (3.3%). Individual professionalism scores ranged from 23.1% to 100%. The mean percentage score and range for each quarter are presented in Table 2. Quarter 1 had the highest mean (SD) professionalism score (99.5% [1.3%]), and quarter 5 had the lowest (96.9% [5.4%]). There was a significant difference between professionalism scores of first-year and second-year students ($P < .001$).

The associations between the OMM professionalism score and OMM final practical examination score, final written examination score, and final course grade are presented in Table 3. The professionalism score was positively associated with final course grade for quarters 1, 2, 3, 5, 6, and 7 ($P = .001$, $P = .006$, $P = .004$, $P < .001$, $P < .001$, and $P < .001$, respectively). The professionalism score was significantly associated with the final written

examination scores for quarters 6 and 7 ($P<.001$ and $P=.004$, respectively).

The associations between the OMM professionalism score and individual non-OMM final course grades are presented in *Table 4*. Of the 40 first- and second-year courses with numeric final course grades, the academic performance in 21 of these was significantly associated with the professionalism score obtained during the same quarter. These 21 courses included 16 clinical science and 5 basic science courses, 5 in the first and 16 in the second year. Further, the Spearman correlation was classified as weak for 16 courses and as negligible for 5 courses. Principles of Medicine 1 and Dermatology demonstrated the highest degree of positive correlation ($\rho=0.28$ and $\rho=0.25$, respectively). Pathology 3 demonstrated a significant negative correlation with the professionalism score ($\rho=-0.09$; $P=.009$).

Although the number of courses per quarter varied during the study, the OMM professionalism score was statistically associated with the final numerically graded, non-OMM course grades for 3 of 5 courses in quarter 1, 0 of 6 in quarter 2, 2 of 7 in quarter 3, 0 of 3 in quarter 4, 4 of 7 in quarter 5, 7 of 9 in quarter 6, and 6 of 7 in quarter 7. The associations between the professionalism score and overall GPA earned for the quarter are presented in *Table 5*. The professionalism score was positively associated with GPA for quarters 1, 6, and 7 ($P=.006$, $P<.001$, and $P<.001$, respectively).

Discussion

Results of the current study demonstrated a correlation between professional behaviors and academic achievement, particularly in clinical courses. The American Association of Colleges of Osteopathic Medicine has defined 9 performance indicators for the professionalism core competency: knowledge, humanistic behavior, primacy of patient need, accountability, continuous learning, ethics, cultural competency, professional and personal self-care, and honest and transparent business

Table 3.
Association Between Professionalism Score and OMM Final Examinations and Overall Course Grades by Quarter^a

OMM Outcome Measure	n	Spearman Correlation Coefficient ^b	P Value ^c
Quarter 1			
Final practical examination	515	0.05	.23
Final written examination	516	0.06	.20
Final course grade	516	0.14	.001
Quarter 2			
Final practical examination	508	0.05	.21
Final written examination	508	0.04	.32
Final course grade	508	0.12	.006
Quarter 3			
Final practical examination	497	0.06	.18
Final written examination	497	0.07	.14
Final course grade	497	0.13	.004
Quarter 4			
Final practical examination	334	-0.04	.48
Final written examination	332	0.04	.47
Final course grade	332	0.04	.48
Quarter 5			
Final practical examination	842	-0.009	.79
Final written examination	843	-0.06	.08
Final course grade	842	0.17	<.001
Quarter 6			
Final practical examination	835	0.05	.15
Final written examination	835	0.15	<.001
Final course grade	830	0.21	<.001
Quarter 7			
Final practical examination	832	0.06	.06
Final written examination	832	0.10	.004
Final course grade	832	0.16	<.001

^a The professionalism grade accounted for 10% of the final osteopathic manipulative medicine (OMM) course grade.

^b Spearman correlation coefficients were used to measure the strength of the association with the professionalism score.

^c Correlations were considered statistically significant at $P\leq.05$.

Table 4.
Association Between Professionalism Score and First-Year and Second-Year Grades by Course

Course	Classification	n	Spearman Correlation Coefficient ^b	P Value ^b
1st Year				
Anatomy 1	Basic science	516	0.10	.02
Anatomy 2	Basic science	499	0.05	.26
Biochemistry 1	Basic science	516	0.06	.21
Biochemistry 2	Basic science	497	0.05	.28
Biochemistry 3	Basic science	155	0.06	.47
Complete Doctor 1	Clinical science	516	0.18	<.001
Complete Doctor 2	Clinical science	500	0.08	.08
Complete Doctor 3	Clinical science	489	0.10	.03
Histology 1	Basic science	516	0.12	.006
Histology 2	Basic science	337	0.08	.14
Immunology	Basic science	493	0.07	.12
Microbiology	Basic science	487	0.04	.33
Neuroscience 1	Basic science	485	0.09	.04
Pathology 1	Clinical science	485	0.03	.49
Physiology 1	Basic science	172	0.05	.55
Physiology 2	Basic science	495	0.004	.93
Physiology 3	Basic science	483	0.02	.71

(continued)

practices.¹ The OMM professionalism score of the current study measures punctuality, appropriate dress, personal responsibility, and honesty.

The positive correlation of the professionalism score with 29% of final grades in first-year courses and 65% in second-year courses suggests that professionalism may be more closely related to clinical knowledge than to basic science knowledge. The significant decrease in mean professionalism scores from quarters 1 through 3 to quarters 5 through 7 suggests that professionalism should be emphasized during the second year. These findings support the theory that professionalism decreases early in medical education.¹⁷ Some educators believe the decline in professionalism is related to the White Coat Ceremony, whereby students are inducted into the profession. The

White Coat Ceremony was designed to convey the magnitude of responsibility associated with being a physician, but instead it may encourage a sense of entitlement and of belonging to an elite club.¹⁸⁻²⁰ At the osteopathic medical school of the current study, the White Coat Ceremony occurs within the first few weeks after matriculation, and our results suggest that professionalism declines in the last quarters of the second year. Therefore, our findings do not support a relationship between the ceremony and a decline in professionalism.

Papadakis et al¹² found that a lack of professionalism during predoctoral medical education was a predictor of disciplinary action by the state medical board in California, and 96% of those disciplinary actions were for professionalism issues. The same study found that GPA

Table 4 (continued).
Association Between Professionalism Score and First-Year and Second-Year Grades by Course

Course	Classification	n	Spearman Correlation Coefficient ^b	P Value ^b
2nd Year				
Complete Doctor 4	Clinical science	328	0.09	.09
Complete Doctor 5	Clinical science	160	0.06	.42
Complete Doctor 7	Clinical science	822	0.13	<.001
Dermatology	Clinical science	823	0.25	<.001
Infectious Disease	Clinical science	832	0.04	.24
Neuroscience 2	Basic science	836	-0.01	.75
Neuroscience 3	Clinical science	825	0.14	<.001
Nutrition	Basic science	328	0.002	.97
Orthopedic Surgery	Clinical science	826	0.09	.01
Pathology 2	Clinical science	328	0.07	.23
Pathology 3	Clinical science	838	-0.09	.009
Pathology 4	Clinical science	826	0.07	.05
Pathology 5	Clinical science	502	0.12	.006
Pediatrics	Clinical science	821	0.13	<.001
Pharmacology 1	Basic science	837	0.12	<.001
Pharmacology 2	Basic science	825	0.15	<.001
Principles of Medicine 1	Clinical science	836	0.28	<.001
Principles of Medicine 2	Clinical science	826	0.05	.17
Principles of Medicine 3	Clinical science	821	0.14	<.001
Principles of Surgery 1	Clinical science	670	0.14	<.001
Principles of Surgery 2	Clinical science	822	0.19	<.001
Rheumatic Diseases	Clinical science	658	0.17	<.001
Women's Health	Clinical science	826	0.10	.006

^a Spearman correlation coefficients were used to measure the strength of the association with the professionalism score.

^b Correlations were considered statistically significant at $P \leq .05$.

predicted disciplinary action: physicians with lower GPAs were more likely to appear before state disciplinary boards.¹² The current study found that the OMM professionalism score was positively associated with overall GPA for quarters 1, 6, and 7; quarters 6 and 7 occurred immediately prior to clinical rotations. Considering that the professionalism score was also correlated with final

grades in 16 of 23 second-year courses, active training in professionalism should occur in the second year.

Because the OMM professionalism score accounts for 10% of the final course grade, the significant relationship with the final OMM course grade is not surprising. No association was found between the professionalism score and the final practical examination score, sug-

Table 5.
Association Between Professionalism Score
and Total Grade Point Average by Quarter

Quarter	n	Spearman Correlation Coefficient ^a	P Value ^b
1	516	0.12	.006
2	500	0.05	.26
3	487	0.09	.06
4	328	0.06	.24
5	838	0.05	.12
6	826	0.15	<.001
7	819	0.17	<.001

^a Spearman correlation coefficients were used to measure the strength of the association with the professionalism score.

^b Correlations were considered statistically significant at $P \leq .05$.

gesting that professionalism is not significantly related to psychomotor skill acquisition or performance.

In the current study, the number of unexcused absences was not obtained; therefore, we could not assess the relationship between unexcused absence penalties and professionalism scores. Students with unexcused absences could receive full professionalism points by promptly arranging remediation. Because of attendance policies in other first- and second-year courses, the professional score was not correlated with other required-attendance courses.

The current study did not assess for subjective behaviors and attributes (interpersonal skills, altruism, empathy, compassion, personal values), which are important components of medical professionalism. Individual elements of the professionalism score, such as timeliness and appropriate dress, could not be assessed separately because the data were not available for many quarters. Some elements of professionalism may have been scored inconsistently. The late sign-in sheet may have been posted later than 10 minutes after the start of class, allowing late students to sign in as if on time. During some curricular units (eg, upper-extremity OMT), deduction

for unacceptable clothing (eg, denim jeans) may not have been strictly enforced.

The number of students enrolled in the different courses within the same quarter varied, mostly owing to students on reduced academic schedules because of previous course failures. The academic performance of students on reduced schedules was not considered separately from that of other students. Longitudinal data for all 7 quarters were available only for 2 classes because the professionalism score was initially assessed only in quarters 5 to 7. Future studies should longitudinally assess students from matriculation through graduation and beyond. Finally, the mean professionalism score was high (98.6%), but the range exceeded 15 percentage points in 5 of 7 quarters. Future studies could improve overall academic progress and reduce the likelihood of future disciplinary action.

Conclusion

The current study demonstrated that objective measures of professionalism correlate with academic performance in first- and second-year osteopathic medical school courses, particularly for clinical courses in the second year. Identifying indicators of future performance facilitates corrective action to improve student academic and clinical performance. By teaching and assessing medical professionalism longitudinally throughout medical school, educators can monitor students to ensure continued growth and development.

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Author Contributions

Dr Snider conceived of the idea for the study. Dr Snider and Ms Johnson provided substantial contributions to design, acquisition of data, analysis and interpretation of data; drafted the article or revised it critically for important intellectual content; and gave final approval of the version of the article to be published.

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