Faculty Development to Improve Teaching at a Health Sciences Center: A Needs Assessment


Abstract: There has been increasing interest at health science centers in improving the education of health professionals by offering faculty development activities. In 2007–08, as part of an effort to expand education-related faculty development offerings on campus, the University of Tennessee Health Science Center surveyed faculty members in an effort to identify faculty development activities that would be of interest. Factor analysis of survey data indicated that faculty interests in the areas of teaching and learning can be grouped into six dimensions: development of educational goals and objectives, the use of innovative teaching techniques, clinical teaching, improving traditional teaching skills, addressing teaching challenges, and facilitating participation. There were significant differences in the level of interest in education-related faculty development activities by academic rank and by the college of appointment. Full professors expressed somewhat less interest in faculty development activities than faculty members of lower ranks. Faculty members in the Colleges of Medicine and Dentistry expressed somewhat greater interest in faculty development to improve traditional teaching skills. The policy implications of the survey results are discussed, including the need for faculty development activities that target the needs of specific faculty groups.

Dr. Scarbecz is Professor and Director of Planning and Assessment, College of Dentistry, University of Tennessee Health Science Center; Dr. Russell is Assistant Vice Chancellor, Faculty Administration, University of Tennessee Health Science Center; Dr. Shreve is Associate Dean for Medical Education, College of Medicine, University of Tennessee Health Science Center; Dr. Robinson is Field Experience Coordinator, College of Education, University of Memphis; and Dr. Scheid is Vice Chancellor, Academic, Faculty, and Student Affairs, University of Tennessee Health Science Center. Direct correspondence and requests for reprints to Dr. Mark Scarbecz, College of Dentistry, University of Tennessee Health Science Center, Bioscience Research, 875 Union Ave., Memphis, TN 38163; 901-448-1211 phone; 901-448-1211 fax; mscarbecz@uthsc.edu.

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Although teaching and preparing the next generation of health care professionals “is a core mission for all health science schools,” academic health science centers have typically emphasized research activities and clinical care for their ability to generate revenue and garner prestige, supporting Kerr’s contention that “Society hopes that professors will not neglect their teaching responsibilities but rewards them almost entirely for research and publications.” Similarly, Hendricson et al. note the pervasive assumption in academe that “competence in the biological and clinical sciences naturally morph[s] into competence in the classroom.” Thus, in academic health science centers there is often a mismatch between the pervasive belief “that all faculty have an obligation to teach well, to engage students, and to foster important forms of student learning” and actual faculty commitment to and comfort with their roles as educators—a mismatch that can result in poor teaching, poor learning outcomes for students, and frustration for faculty members.

Faculty frustration in the clinical health sciences may lead to younger faculty members, in particular, opting out of health science education and moving into clinical practice. In a study of dental faculty members carried out in 2005–06 such a trend was observed: 36 percent of faculty separations from dental education involved a move to private practice, and this trend was predominant among younger faculty members. Based on their survey of 1,748 U.S. dental faculty members, Haden et al. reported that significant percentages perceived development activities or mentoring programs as unavailable or less than satisfactory, and suggested that this may be a factor in younger faculty departures from dental education. Moreover, the lack of effective faculty...
development opportunities may serve as a barrier to curriculum change and the adoption of innovative educational strategies such as problem-based learning, because faculty members may lack the skills to effectively implement and integrate these techniques in the curriculum.

The role of faculty member, particularly at health science centers, is best characterized as a “meta-profession.” Individuals come to teaching with discipline-specific expertise, constituting their base-level skills, which are utilized in scholarly activities and clinical care. However, when those individuals become faculty members, they are expected to perform in multiple roles (teaching, administration, and service to the institution and the community) requiring a large set of skills, such as the use of information technology, public speaking, instructional design, conflict management, group process, and many others that go well beyond the base-level skill set. This mismatch between base-level skills and expectations can be particularly challenging in the area of education since most health science center faculty members are hired based on their disciplinary expertise rather than their teaching ability.

Evidence is accumulating that faculty development programs centered on improving teaching can be effective. In a systematic review of faculty development programs in medical education, Steinert et al. found a high level of satisfaction and self-reported increases in teaching skills among faculty members who participated in such programs. While there was insufficient evidence to conclude that faculty development actually changed student learning, the review indicated that students also noticed changes in teaching behavior among faculty members who had participated in development programs.

While faculty development programs to improve teaching show promise, in order to make effective use of limited resources, health science centers may benefit from a needs assessment to determine which particular skills associated with the meta-profession of faculty member need to be augmented. Steiner et al. note that the context in which a faculty development program is offered is a key factor in producing desired outcomes. Context in this sense refers to programs specifically designed to match the needs of particular groups of faculty members. Needs assessment may also be particularly important for obtaining information about the development of necessary faculty skills as dental education and health science education in general evolve to encompass less traditional teaching approaches. Licari notes several trends in dental education, including the transformation of faculty from “knowledge imparters” who primarily lecture to “knowledge developers” who facilitate lifelong learning in students, problem-based learning approaches, and evidence-based practice. To that end, this article describes a needs assessment of education-related faculty development at the University of Tennessee Health Science Center and the lessons learned from that assessment.

**University of Tennessee Health Science Center**

The mission of the University of Tennessee Health Science Center (UTHSC) is to “bring the benefits of the health sciences to the achievement and maintenance of human health, with a focus on the citizens of Tennessee and the region, by pursuing an integrated program of education, research, clinical care, and public service.” The UTHSC campus includes the six colleges of Allied Health Sciences (468 students), Dentistry (321), Graduate Health Sciences (265), Medicine (996), Nursing (282), and Pharmacy (726). In addition, faculty members provide educational opportunities, patient care, and professional education and conduct research at campuses in Knoxville, Chattanooga, and Nashville and at numerous hospitals and clinical practice sites across Tennessee. In 2007–08, the campus had a total of 551 tenured or tenure-track faculty members and 3,058 students. The campus also had an additional 714 faculty members who were not on the tenure track; most of these (504) were in the College of Medicine.

Recently, the campus has placed greater emphasis on its educational mission. In 2007, a campus-wide Faculty Development Task Force was created by the vice chancellor for academic, faculty, and student affairs to develop strategies for enhancing the scholarship of teaching and learning and to create faculty evaluation systems that can document and reward educational excellence. The task force worked to identify faculty needs, offer programs to address some of those needs, and spearhead the establishment of a Faculty Resource Center, which is developing a comprehensive approach to improving faculty teaching skills. This approach includes developing a central repository of resources and information that faculty members can use for teaching and providing timely and effective faculty development opportunities.
The task force developed a survey asking faculty members what types of education-related activities would be of most interest and value to them. This article reports on the development and results of that survey. We discuss differences in perceived interest for faculty development by academic rank and by discipline within the health science center. We also attempt to identify underlying patterns in faculty development needs in an attempt to determine if certain types of education-related activities are particularly valued over others. Hopefully, this information will not only aid UTHSC in the development of timely, effective, and cost-effective faculty development programs in teaching and learning, but will assist other health science centers to identify relevant areas for a faculty development focus.

A better understanding of faculty development needs in teaching and learning may also assist health science centers in creating programs for incoming faculty members. New faculty members whose graduate careers were spent at research-intensive institutions may have had little or no opportunity to teach and/or develop effective teaching skills. Additionally, health care disciplines, such as dentistry, have many faculty members who have no previous teaching background whatsoever since about half of new dental faculty members come from private dental practice.

Survey Development

The Office of Academic, Faculty, and Student Affairs and the Faculty Development Task Force, which was comprised of faculty members and staff from all areas of the campus community, developed a survey to assess faculty development needs in teaching and learning. Utilizing surveys from other institutions as models, thirty-two Likert-scale questions were developed and categorized into the following four areas: Preparing for a Course (Category C: nine items), Delivering Instruction (Category D: eleven items), Evaluating Instruction (Category E: five items), and General Items (Category G: seven items). Faculty members were asked to rate the importance of each activity on an ordinal scale from 1 to 3, with 1 corresponding to Not Important, 2 corresponding to Somewhat Important, and 3 corresponding to Very Important. Respondents were also asked which faculty development needs in the areas of teaching and learning they would like to see addressed first, as well as their academic rank and the college of their primary academic appointment. Last, the survey provided the opportunity for respondents to make open-ended comments.

The survey was placed on the SurveyMonkey.com (Portland, OR) website, which is a commercial portal for the deployment of web-based surveys. The vice chancellor for academic, faculty, and student affairs sent an e-mail to all faculty members, inviting them to respond to the survey. The e-mail noted that results of the survey would be used to plan future faculty development offerings and that faculty input was needed “as to the topics that would be of most interest and value to you.” Reminder e-mails were sent periodically during the survey period, which lasted approximately one month. The survey took approximately ten minutes to complete.

Upon completion of the survey, data were tabulated and presented to the Faculty Development Task Force. Additionally, a data file was constructed for in-depth analysis of the results. All analyses were conducted using Statistical Package for the Social Sciences for Windows, Release 16.0 (SPSS, Chicago, IL) statistical software. P values <.05 were considered to be statistically significant.

The analysis proceeded in three stages. First, we examined basic demographic trends in the sample. Second, we examined individual question responses and differences across academic rank and college of faculty appointment using analysis of variance and t-tests with Bonferroni correction for pairwise differences. Third, factor analysis was conducted to identify underlying factors or groupings of desired faculty development activities in teaching and learning. We constructed indexes for each of the identified factors and used the statistical tests described above to look for differences across ranks and colleges.

Results

A total of 280 faculty members responded to the survey. Table 1 shows the number of respondents by college of appointment and academic rank. Because of the small number of cases, respondents who did not provide an academic rank (n=23) or reported Instructor (n=13) or Other (n=1) were excluded from analysis when rank was an independent variable. Similarly, respondents who did not report their college (n=23) or who reported affiliation with the library (n=1) or Graduate Health Sciences (n=9) were excluded from analysis when college was an independent variable.
It was not possible to accurately calculate a response rate because the survey did not ask about respondents’ tenure status. Thus, we do not know the number of tenured/tenure-track faculty members who responded versus the number of respondents who were not on the tenure track or ineligible for tenure. Based on a denominator of all campus faculty members (n=1,265), our response rate was 280/1,265 or 22 percent; based on a denominator of all tenured/tenure-track faculty members, our response rate was 280/551 or 50 percent.

Analysis of Individual Items

Table 2 shows the top ten rated items, based on the mean rating given (1=Not Important, 2=Somewhat Important, 3=Very Important). Four items were from the Preparing for a Course (Section C) portion of the survey: “Constructing quality test questions and evaluating test results,” “Developing instructional goals and objectives,” “Selecting teaching strategies appropriate to goals,” and “Designing problem/case-based teaching activities or clinical vignettes.” Three items were from the Delivering Instruction (Section D) portion of the survey: “Lecture presentation skills,” “Encouraging student participation in classes,” and “Teaching strategies beyond the lecture.”

There was widespread agreement among faculty members of the various colleges in the ratings of these items. For eight of the top ten items, there was no statistically significant difference in mean rating across colleges. For the remaining two items, “Constructing quality test questions and evaluating test results” and “Lecture presentation skills,” between-college differences are described below.

Relative to the standard deviation in the rating of the items, the difference in rating between the highest rated item (“Constructing quality test questions and evaluating test results,” Mean=2.60) and the tenth highest rated item (“Assessing educational needs,” Mean=2.33) was small. Differences in the Importance ratings emerged across categories of academic rank and across colleges. Table 3 lists those items that had significantly different ratings (p<.05) across academic ranks, based on a one-way Analysis of Variance. Of the thirty-two items on the survey, only nine items resulted in statistically significant differences in rating by rank. The category with the most statistically significant differences across ranks (four items) is Category E: Evaluating Instruction. For all the items in Table 3, full professors ranked the items as less important areas of faculty development than faculty members of lower ranks, although this did not always translate into statistically significant differences between the two groups. However, even among full professors, all the items have a rating near 2.0 (Somewhat Important) or greater. A post hoc analysis identified significant differences between academic rank pairs. For all the items in Table 3,
there were no differences in the importance rating between assistant and associate professors. A statistically significant difference between assistant and full professors was more common, with assistant professors rating items more highly than full professors for seven of the items. Both assistant and associate professors rated “Using educational activities for promotion and tenure” as a more important faculty development activity than did full professors.

Table 4 lists those items that had significantly different ratings (p<.05) across colleges of the Health Science Center, based on a one-way Analysis of Variance. Eleven of the thirty-two items had statistically significant differences in mean importance ratings across colleges. Only one item from the Preparing for a Course (C) category was rated differently across colleges: “Constructing quality test questions and evaluating test results.” Seven out of eleven items in the Delivering Instruction (D) category had significantly different ratings across colleges, which may reflect differences in instructional modalities across colleges, especially for advanced students in those programs whose instruction is no longer primarily lecture-based. No items from the Evaluating Instruction (E) category were rated differently across colleges, and three out of seven items in the General category were rated differently across colleges.
Post hoc analysis identified significant pairwise differences in ratings between the faculties of different colleges. Many of these differences were between the Colleges of Allied Health and Nursing when compared to the College of Medicine. College of Medicine faculty members rated the following items higher than College of Nursing and/or Allied Health faculty members: D1, D8, and D9. With the exception of D1 “Lecture presentation skills,” these items are related to small-group or one-to-one instruction. College of Medicine faculty members rated the following items lower than Nursing and/or Allied Health: D3, D4, D5, G2, G3, and G7. These items were related to the use of technology, teaching learners from different generations, using databases, and managing classroom challenges.

Only two items were rated differently by College of Dentistry faculty members compared to those from other colleges. College of Dentistry respondents rated “Lecture presentation skills” (D1) as a significantly more important faculty development activity than College of Allied Health respondents.

**Factor Analysis**

Individual item analysis is instructive as a mechanism for determining what areas of faculty development are important in teaching and learning. However, in the present study, we used factor analysis to provide additional insight into the basic dimensions around which faculty development activities are organized. The underlying factors revealed in a factor analysis may better reflect the central themes around which faculty organize their priorities for development activities related to teaching and learning.

Factor analysis is a data-reduction technique. Portney and Watkins note that “factor analysis is used to examine a large set of variables that represent elements of an abstract construct, and to reduce it to a smaller, more manageable set of underlying concepts.” Factor analysis has been used previously in many other types of health science education research to identify underlying dimensions of student evaluations of clinical and preclinical teaching, students’ motivation for attending dental school, sources of

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**Table 4. Survey items with statistically significant (p<.05) different means across colleges**

<table>
<thead>
<tr>
<th></th>
<th>Allied Health</th>
<th>Dentistry</th>
<th>Medicine</th>
<th>Nursing</th>
<th>Pharmacy</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C9</td>
<td>Constructing quality test questions and evaluating test results</td>
<td>2.61 (0.69)</td>
<td>2.65 (0.71)</td>
<td>2.48 (0.68)</td>
<td>2.70 (0.61)</td>
<td>2.82 (0.44)</td>
</tr>
<tr>
<td>D1</td>
<td>Lecture presentation skills</td>
<td>2.36 (0.83)</td>
<td>2.48 (0.67)</td>
<td>2.61 (0.60)</td>
<td>1.88 (0.78)</td>
<td>2.55 (0.88)</td>
</tr>
<tr>
<td>D3</td>
<td>Teaching using various “smart” technologies and computers (podcasts, Wikis, videocasts, etc.)</td>
<td>2.46 (0.69)</td>
<td>2.13 (0.63)</td>
<td>2.19 (0.70)</td>
<td>2.63 (0.56)</td>
<td>2.33 (0.63)</td>
</tr>
<tr>
<td>D4</td>
<td>Conducting hybrid (mix of face-to-face and online) and online classes</td>
<td>2.39 (0.74)</td>
<td>1.78 (0.67)</td>
<td>1.91 (0.80)</td>
<td>2.35 (0.80)</td>
<td>1.96 (0.75)</td>
</tr>
<tr>
<td>D5</td>
<td>Concept mapping</td>
<td>2.11 (0.80)</td>
<td>1.78 (0.67)</td>
<td>1.75 (0.63)</td>
<td>2.30 (0.67)</td>
<td>1.93 (0.77)</td>
</tr>
<tr>
<td>D7</td>
<td>Facilitating small-group discussion</td>
<td>2.04 (0.84)</td>
<td>2.00 (0.74)</td>
<td>2.34 (0.69)</td>
<td>2.04 (0.84)</td>
<td>2.44 (0.65)</td>
</tr>
<tr>
<td>D8</td>
<td>Teaching in the inpatient service</td>
<td>1.57 (0.79)</td>
<td>2.00 (0.80)</td>
<td>2.14 (0.87)</td>
<td>1.52 (0.77)</td>
<td>1.96 (0.81)</td>
</tr>
<tr>
<td>D9</td>
<td>Clinical precepting (which would be one-to-one or one-to-few)</td>
<td>1.75 (0.75)</td>
<td>2.17 (0.72)</td>
<td>2.22 (0.80)</td>
<td>1.76 (0.78)</td>
<td>2.23 (0.84)</td>
</tr>
<tr>
<td>G2</td>
<td>Teaching learners from different generations</td>
<td>2.25 (0.65)</td>
<td>1.95 (0.79)</td>
<td>2.12 (0.71)</td>
<td>2.52 (0.71)</td>
<td>1.76 (0.75)</td>
</tr>
<tr>
<td>G3</td>
<td>Bibliographic database instruction: how to use databases</td>
<td>2.32 (0.67)</td>
<td>1.91 (0.53)</td>
<td>1.92 (0.74)</td>
<td>2.38 (0.64)</td>
<td>1.90 (0.72)</td>
</tr>
<tr>
<td>G7</td>
<td>Managing classroom challenges</td>
<td>2.44 (0.70)</td>
<td>2.24 (0.70)</td>
<td>2.02 (0.66)</td>
<td>2.32 (0.85)</td>
<td>2.28 (0.64)</td>
</tr>
</tbody>
</table>

*Note: Numbers in parentheses are standard deviations. Items with the same alphabetic superscripts indicate a statistically significant difference (p<.05) between pairs of groups means, based on post hoc analysis (t-test with Bonferroni correction). See Appendix for one-way analysis of variance table to accompany this table.*
stress among dental students, consumer quality assessment of dentistry, and attitudes toward health care issues. It has also been used extensively in psychological and epidemiological research, particularly to facilitate the development of scales and indexes for patient assessment and behavior. Factor analysis can also show the relative contribution of each factor or dimension to the total variance in the data.

The thirty-two faculty development items in our study were analyzed using principal components factor analysis with a varimax rotation. The stopping point for establishing factors was an eigenvalue of 1.0. The factor loadings resulting from factor analysis represent the correlation between each item and an underlying factor, and thus represent the strength of the relationship between an item and an underlying factor. Items that loaded at .40 or greater were included as an item for a given factor. A factor analysis resulted in six factors, which accounted for 60 percent of the variance in the items. Cronbach’s alpha (\(\alpha\)), a measure of the reliability of an index, was also calculated for the items that made up each of the six factors. The deletion of single items from any of the factors did not improve the overall reliability of the factors.

Table 5 lists the items that make up the six factors, the percentage of variance explained by each factor, and Cronbach’s alpha for each of the six factors when the factor is treated as an index. Six simple additive indexes were constructed by summing the items for each factor and dividing by the number of items. The lowest possible index value was 1.0, and the highest possible value was 3.0. Index means and standard deviations are also shown in Table 5.

The factor analysis reveals that the faculty development activities that faculty members deem important revolve around six central themes or dimensions that do not necessarily correspond to the original categories in the survey. The reliability of the factors ranged from .72 to .89. We refer to Factor 1 as a Goals factor as it is comprised of development items that refer to the larger purposes of teaching: setting goals, objectives and strategies, and tying those objectives not only to instructional delivery but to student evaluation strategies as well. Factor 2 is described as an Innovation factor since the items that load on this factor refer not only to the use of advanced technologies in education but the use of innovative techniques to teach what is commonly referred to as the millennials or Net Generation. Factor 3 focuses primarily on teaching and evaluating students in Clinical settings. We refer to Factor 4 as the Tradition factor because the items that load on this factor appear to deal with the more traditional aspects of didactic teaching such as making a syllabus and preparing and delivering lectures. Factor 5 refers to areas of teaching and learning that may be particular Challenges for faculty, including using teaching materials for promotion and tenure. Last, Factor 6 is a factor focusing on Participation. For the entire sample, there were pairwise differences in index means. The Innovation and Clinical factors had significantly lower mean ratings than the other four factors (\(p<.05\)).

As described above, index means were calculated and compared across academic ranks and across colleges. Table 6 presents the index means across academic ranks, and Table 7 presents the index means across colleges. Full professors generally rated the importance of all six factors lower than did associate or assistant professors, but only three factors have statistically significant different means across academic ranks: Goals, Innovation, and Challenges. For the Goals and Challenges factors, full professors’ ratings of importance were significantly lower than the ratings of faculty members at lower academic ranks. Assistant professors scored significantly higher on the importance of the Goals factor than full professors, and both assistant and associate professors scored significantly higher on the Challenges factor than did full professors. There was little difference across academic ranks on the rating of the Traditional and Clinical teaching factors. For all three academic ranks, mean ratings on these factors are lower than mean ratings on the Challenges and Goals factors.

As shown in Table 7, four of the six factors had statistically significant different means across colleges: Innovation, Tradition, Challenges, and Participation. However, there is no consistency across colleges in terms of how the faculty within a college rated a given factor relative to the rating given to that factor by the faculties of other colleges. While College of Nursing faculty members rated the Tradition factor lower than those from all of the other colleges, they rated the Innovation factor more highly. College of Medicine faculty members rated the Challenge factor significantly lower than College of Pharmacy faculty members, as well as those from other colleges, while they were in relative agreement with respondents from the other colleges on other factors. The factor with the least variation in mean rating across colleges was the Goals factor. Respondents from all colleges tended to rate this factor relatively highly, compared to the other factors.
Table 5. Results of factor analysis: factor loadings, percent of variance explained by each factor, factor reliability (α), index means, and standard deviations

<table>
<thead>
<tr>
<th>C1</th>
<th>Developing instructional goals and objectives</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
<th>Factor 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2</td>
<td>Selecting teaching strategies appropriate to goals</td>
<td>0.646</td>
<td>0.740</td>
<td></td>
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<tr>
<td>C4</td>
<td>Identifying learning styles and corresponding instructional examples and uses</td>
<td>0.618</td>
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</tr>
<tr>
<td>C5</td>
<td>Instructional design</td>
<td>0.570</td>
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<tr>
<td>C6</td>
<td>Designing problem/case-based teaching activities or clinical vignettes</td>
<td>0.405</td>
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<tr>
<td>D2</td>
<td>Teaching strategies beyond the lecture</td>
<td>0.633</td>
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<tr>
<td>E1</td>
<td>Assessing educational needs</td>
<td>0.637</td>
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<tr>
<td>E2</td>
<td>Identifying and assisting students who are experiencing difficulty</td>
<td>0.581</td>
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<tr>
<td>E3</td>
<td>Developing educational evaluation strategies for courses and clerkships</td>
<td>0.667</td>
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<tr>
<td>E4</td>
<td>Tying educational objectives to course evaluations</td>
<td>0.625</td>
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<tr>
<td>D3</td>
<td>Teaching using various “smart” technologies and computers (podcasts, Wikis, videocasts, etc.)</td>
<td></td>
<td>0.760</td>
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<tr>
<td>D4</td>
<td>Conducting hybrid (mix of face-to-face and online) and online classes</td>
<td></td>
<td>0.727</td>
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<tr>
<td>D5</td>
<td>Concept mapping</td>
<td>0.584</td>
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</tr>
<tr>
<td>G2</td>
<td>Teaching learners from different generations</td>
<td>0.518</td>
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<tr>
<td>G3</td>
<td>Bibliographic database instruction: how to use databases</td>
<td>0.680</td>
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<tr>
<td>G4</td>
<td>Developing a curriculum implementation plan</td>
<td>0.578</td>
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<tr>
<td>G5</td>
<td>Learning new (and old) technologies</td>
<td>0.539</td>
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<tr>
<td>D8</td>
<td>Teaching in the inpatient service</td>
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<td>0.815</td>
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<tr>
<td>D9</td>
<td>Clinical precepting (which would be one-to-one or one-to-few)</td>
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<td>0.874</td>
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<tr>
<td>D10</td>
<td>Teaching using simulation/standardized patients</td>
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<td>0.503</td>
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<tr>
<td>E5</td>
<td>Evaluation of learners in clinical teaching</td>
<td></td>
<td></td>
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<td>0.704</td>
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<tr>
<td>C3</td>
<td>Developing a syllabus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.649</td>
<td></td>
</tr>
<tr>
<td>C7</td>
<td>Preparing materials for class (handouts and other supplementary materials)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.734</td>
<td></td>
</tr>
<tr>
<td>C8</td>
<td>Developing and using PowerPoint/multimedia presentations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.808</td>
</tr>
<tr>
<td>D1</td>
<td>Lecture presentation skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.550</td>
</tr>
<tr>
<td>C9</td>
<td>Constructing quality test questions and evaluating test results</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.584</td>
</tr>
<tr>
<td>D11</td>
<td>Teaching in a large classroom (online or face-to-face)</td>
<td></td>
<td></td>
<td></td>
<td>0.636</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G6</td>
<td>Using educational activities for promotion and tenure</td>
<td></td>
<td></td>
<td></td>
<td>0.588</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G7</td>
<td>Managing classroom challenges</td>
<td></td>
<td></td>
<td></td>
<td>0.583</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D6</td>
<td>Encouraging student participation in classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.538</td>
</tr>
<tr>
<td>D7</td>
<td>Facilitating small-group discussion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.557</td>
</tr>
</tbody>
</table>

Percent of Variance Explained: 17.4% 11.8% 9.3% 9.0% 8.7% 4.3%
Cronbach’s Alpha: .891 .829 .814 .771 .723 .731
Index Mean (1-3): 2.37 2.07 2.03 2.31 2.30 2.33
Index Standard Deviation: .49 .51 .65 .56 .53 .64
There were statistically significant pairwise differences across colleges for three factors: Innovation, Tradition, and Challenges. College of Medicine faculty members had significantly lower ratings on the Innovation factor than those from the Colleges of Allied Health or Nursing. Dentistry and Medicine faculty members had significantly higher mean ratings on the Tradition factor than Nursing faculty members. In fact, the Dental faculty rated the Tradition and Goals factors as more important than other development factors. Finally, the Pharmacy faculty had significantly higher mean ratings on the Challenges factor than the College of Medicine faculty.

Discussion

The needs analysis of faculty development interests in the areas of teaching revealed some important trends that may be instructive for other health science centers interested in creating faculty development activities to improve education.

First, faculty interest in development activities does not fall into neat, preconceived categories. Our factor analysis found that faculty interests at the UTHSC are organized into six factors or domains centered around developing Goals and Objectives, the

<table>
<thead>
<tr>
<th>Table 6. Index means by academic rank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor: Goals</strong></td>
</tr>
<tr>
<td>Assist</td>
</tr>
<tr>
<td>2.46</td>
</tr>
<tr>
<td>(0.43)</td>
</tr>
<tr>
<td>Assoc</td>
</tr>
<tr>
<td>2.44</td>
</tr>
<tr>
<td>(0.48)</td>
</tr>
<tr>
<td>Full</td>
</tr>
<tr>
<td>2.26</td>
</tr>
<tr>
<td>(0.49)</td>
</tr>
<tr>
<td>Sig.</td>
</tr>
<tr>
<td>.012</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 7. Index means across colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor: Goals</strong></td>
</tr>
<tr>
<td>Allied Health</td>
</tr>
<tr>
<td>2.41</td>
</tr>
<tr>
<td>(0.59)</td>
</tr>
<tr>
<td>Dentistry</td>
</tr>
<tr>
<td>2.46</td>
</tr>
<tr>
<td>(0.34)</td>
</tr>
<tr>
<td>2.36</td>
</tr>
<tr>
<td>(0.43)</td>
</tr>
<tr>
<td>Medicine</td>
</tr>
<tr>
<td>2.31</td>
</tr>
<tr>
<td>(0.61)</td>
</tr>
<tr>
<td>2.47</td>
</tr>
<tr>
<td>(0.43)</td>
</tr>
<tr>
<td>Sig.</td>
</tr>
<tr>
<td>0.515</td>
</tr>
</tbody>
</table>

Note: Numbers in parentheses are standard deviations. Factors with the same alphabetic superscripts indicate a statistically significant difference (p<.05) between pairs of groups means, based on post hoc analysis (t-test with Bonferroni correction). See Appendix for one-way analysis of variance table to accompany this table.

<table>
<thead>
<tr>
<th>Table 7. Index means across colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor: Innovation</strong></td>
</tr>
<tr>
<td>Assist</td>
</tr>
<tr>
<td>2.35</td>
</tr>
<tr>
<td>(0.50)</td>
</tr>
<tr>
<td>Assoc</td>
</tr>
<tr>
<td>2.02</td>
</tr>
<tr>
<td>(0.52)</td>
</tr>
<tr>
<td>1.98*b</td>
</tr>
<tr>
<td>(0.67)</td>
</tr>
<tr>
<td>Full</td>
</tr>
<tr>
<td>2.38</td>
</tr>
<tr>
<td>(0.55)</td>
</tr>
<tr>
<td>2.05</td>
</tr>
<tr>
<td>(0.46)</td>
</tr>
<tr>
<td>Sig.</td>
</tr>
<tr>
<td>0.000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 7. Index means across colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor: Clinical</strong></td>
</tr>
<tr>
<td>Allied Health</td>
</tr>
<tr>
<td>1.89</td>
</tr>
<tr>
<td>(0.59)</td>
</tr>
<tr>
<td>Dentistry</td>
</tr>
<tr>
<td>2.19</td>
</tr>
<tr>
<td>(0.52)</td>
</tr>
<tr>
<td>2.10</td>
</tr>
<tr>
<td>(0.47)</td>
</tr>
<tr>
<td>Medicine</td>
</tr>
<tr>
<td>1.92</td>
</tr>
<tr>
<td>(0.67)</td>
</tr>
<tr>
<td>2.09</td>
</tr>
<tr>
<td>(0.58)</td>
</tr>
<tr>
<td>Sig.</td>
</tr>
<tr>
<td>0.312</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 7. Index means across colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor: Tradition</strong></td>
</tr>
<tr>
<td>Allied Health</td>
</tr>
<tr>
<td>2.30</td>
</tr>
<tr>
<td>(0.69)</td>
</tr>
<tr>
<td>Dentistry</td>
</tr>
<tr>
<td>2.46*a</td>
</tr>
<tr>
<td>(0.50)</td>
</tr>
<tr>
<td>2.37*b</td>
</tr>
<tr>
<td>(0.48)</td>
</tr>
<tr>
<td>Medicine</td>
</tr>
<tr>
<td>1.98*a</td>
</tr>
<tr>
<td>(0.50)</td>
</tr>
<tr>
<td>2.31</td>
</tr>
<tr>
<td>(0.66)</td>
</tr>
<tr>
<td>Sig.</td>
</tr>
<tr>
<td>0.018</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 7. Index means across colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor: Challenges</strong></td>
</tr>
<tr>
<td>Allied Health</td>
</tr>
<tr>
<td>2.43</td>
</tr>
<tr>
<td>(0.61)</td>
</tr>
<tr>
<td>Dentistry</td>
</tr>
<tr>
<td>2.25</td>
</tr>
<tr>
<td>(0.52)</td>
</tr>
<tr>
<td>2.22*a</td>
</tr>
<tr>
<td>(0.49)</td>
</tr>
<tr>
<td>Medicine</td>
</tr>
<tr>
<td>2.33</td>
</tr>
<tr>
<td>(0.65)</td>
</tr>
<tr>
<td>2.53*a</td>
</tr>
<tr>
<td>(0.65)</td>
</tr>
<tr>
<td>Sig.</td>
</tr>
<tr>
<td>0.007</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 7. Index means across colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor: Participation</strong></td>
</tr>
<tr>
<td>Allied Health</td>
</tr>
<tr>
<td>2.20</td>
</tr>
<tr>
<td>(0.74)</td>
</tr>
<tr>
<td>Dentistry</td>
</tr>
<tr>
<td>2.22</td>
</tr>
<tr>
<td>(0.56)</td>
</tr>
<tr>
<td>2.39</td>
</tr>
<tr>
<td>(0.58)</td>
</tr>
<tr>
<td>Medicine</td>
</tr>
<tr>
<td>2.10</td>
</tr>
<tr>
<td>(0.80)</td>
</tr>
<tr>
<td>2.49</td>
</tr>
<tr>
<td>(0.55)</td>
</tr>
<tr>
<td>Sig.</td>
</tr>
<tr>
<td>0.046</td>
</tr>
</tbody>
</table>

Note: Numbers in parentheses are standard deviations. Factors with the same alphabetic superscripts indicate a statistically significant difference (p<.05) between pairs of groups means, based on post hoc analysis (t-test with Bonferroni correction). See Appendix for one-way analysis of variance table to accompany this table.
use of Innovative teaching practices, Clinical instruction, the Traditional aspects of teaching, confronting particular teaching Challenges, and fostering Student Participation. Overall, faculty interest in developing Goals and Objectives was highest, while faculty interest in Clinical Instruction and in using Innovation in teaching was lowest.

In a study by Hand, a sample of dental educators associated with the American Dental Education Association (ADEA) identified a set of competencies for the dental educator, including many skills similar to the items found in our Goals and Objectives factor. The interest among faculty members in developing Goals and Objectives may reflect an interest and recognition on their part to get the basics of teaching done right. Setting appropriate goals and objectives for instruction and developing instruction and assessment related to those goals and objectives may be of particular importance in health science centers, where the curriculum is dense, focused on teaching a vast amount of highly technical information, and where much of the curriculum is mandated by the professional health care organizations that oversee and accredit professional schools. The Innovation factor includes several items related to technology. As noted by Licari, if the emphasis in faculty development is “solely on technology, it is probable that the outcome will be the creation of an e-version of current curriculum courses with very little change or integration.” While much faculty development in teaching and learning seems to focus on the use of new technologies, this may not be the highest area of interest among faculty members.

Second, there are significant differences in interest in education-related faculty development activities by academic rank. For instance, compared to full professors, assistant and associate professors on average expressed a higher interest in faculty development related to Goals and Objectives and dealing with teaching Challenges. With respect to individual items, “Using educational activities for promotion and tenure” is perceived as a more important faculty development activity for assistant and associate professors than for full professors. The high level of interest among lower-ranked faculty members in determining how their educational activities count for tenure and promotion was somewhat surprising given the traditional emphasis on research accomplishments for tenure/promotion. This may reflect a genuine interest in teaching among junior faculty members. It may also represent a response to campus changes in the metrics employed for tenure and promotion. At the time the survey was conducted, the UTHSC was launching a new evaluation system for tenure and promotion that included an increased emphasis on teaching. Thus, newer faculty members may have recognized the value of enhancing teaching skills as a vehicle for career advancement.

There may, of course, be other explanations for the perceived differences in importance of education-related faculty development activities by academic rank. For example, these differences could also reflect differences in perceived levels of teaching competence. Faculty members were told that the results of the survey were to be used to plan future faculty development offerings and that, therefore, they should rate the faculty development “topics that would be of most interest and value to you.” Full professors may not be less interested in these topics than more junior faculty members, but they may perceive themselves to be more competent in teaching and thus perceive less of a personal need for development in this area.

Third, there are significant differences in interest in education-related faculty development activities by college of appointment. Nursing and Allied Health faculty members expressed greater interest in technology-related activities than College of Medicine faculty members. Pharmacy faculty members expressed greater interest in activities related to teaching challenges than medical faculty members. Conversely, medical and dental faculty members expressed greater interest, on average, than their nursing colleagues in activities related to the traditional aspects of teaching, which include lecturing and constructing a syllabus.

Differences across colleges may reflect differences in the level of experience of faculty members in the different colleges. Inexperienced educators in the Colleges of Medicine and Dentistry who come to academe from private practice or a research-intensive graduate program may be in need of training in the very practical aspects of teaching if they are thrust into the lecture hall with little preparation. Conversely, many of these same faculty members who come into academe with years of clinical experience may feel very comfortable with clinical instruction and may not perceive the need for additional development in this area. Rather, they may believe that their strong clinical skills automatically translate into effective clinical teaching skills. This may explain why, in our survey, faculty members across all colleges, relative to other development dimensions, placed little importance on faculty development related to clinical instruction.
Differences across colleges may also reflect differences in the teaching modalities expected of faculty members in the colleges based on the educational traditions of the different disciplines, as well as the size and composition of their different student bodies. Colleges with diverse programs and student bodies, such as Allied Health, or colleges that utilize distance education for delivery of their educational programs, such as Nursing, may have a greater need to use technology in their teaching.

We recognize the limitations of our survey. Academic rank is not always a good proxy for level of teaching experience. First, part-time clinical faculty members at the assistant professor level may have many years of clinical teaching experience. Thus, in retrospect, it would have been useful to have asked more detailed questions about faculty demographics, including age and previous teaching experience, as well as faculty members’ perceived level of teaching competence. A larger sample size would have allowed us to look more closely at the association between previous teaching experience and interest in faculty development opportunities and would have also provided us with greater statistical power to examine between-group differences. Second, a greater number of response categories for our survey items may have allowed us to more accurately estimate the level of interest in faculty development activities, although more response categories may have required respondents to make finer distinctions in their level of interest than that which actually existed. Last, although we use the term “needs analysis,” our survey was not designed to distinguish between faculty interest and actual faculty need. Faculty members may report not being interested in a particular development opportunity, but that does not necessarily mean they do not need the activity to become more effective educators. Despite these shortcomings, the results of our analysis have some important implications for the design and delivery of faculty development programs to enhance teaching skills.

It is clear from the analysis reported here that one size does not fit all. In an era of tight budgets, providing generic education-related faculty development programs to all faculty members across an institution may be cost-effective and attractive, but may not be effective in improving teaching and, hopefully, student learning, given the myriad teaching challenges confronting those in different disciplines, particularly in the health sciences. Steinert et al. note that successful faculty development programs are “developed to meet the needs of a particular group of faculty members in a particular course.” Thus, those providing development programs need to be attentive to the demographics of their faculty members, who come from diverse disciplines, with different backgrounds and varying levels of teaching experience.

This suggests that a multifaceted approach to faculty development may be required to improve teaching skills among the faculties at professional schools. Within colleges, one-to-one faculty development via informal or formal mentoring programs may help professional schools to enhance faculty skills. Professional organizations associated with health science education can assist in faculty development by creating programs such as the ADEA/Academy for Academic Leadership’s Institute for Teaching and Learning, which not only teaches specific skills but provides the opportunity for faculty members who have common teaching and learning interests to develop connections and opportunities for future collaboration. Online instruction and teaching resources such as MedEdPORTAL may provide educators with additional resources to improve teaching.

Identifying commonalities in faculty development across faculty groups may be as important, if not more important, than identifying differences. Despite the fact that there were differences in faculty development interests across faculties from different colleges in our study, there were many commonalities as well. Faculties from different colleges may be able to identify common needs and interests and collaborate to create faculty development programs that address those common concerns. Thus, institutions that are implementing intraprofessional or cross-college faculty development programs would be advised to conduct a needs assessment similar to that reported here, so that joint interests in faculty development, when they exist across colleges, can be effectively addressed.

The need for effective faculty development in the health sciences is also driven by significant changes occurring in the health care environment in the United States. The move to an evidence-based model of care will require a greater emphasis on problem-based learning, lifelong learning, and evidence-based care in the health sciences curricula. Licari suggests that effective faculty development is a prerequisite to transforming the health science curriculum (in particular, the dental curriculum) into an active learning environment. Thus, health science centers and their professional schools are challenged to be creative in providing faculty development...
activities related to teaching that meet the needs of their current and future faculties and student bodies.

REFERENCES

13. University of Tennessee Health Science Center. Fact sheet: about the University of Tennessee Health Science Center. Memphis: University of Tennessee Health Science Center, 2008.
# APPENDIX

## One-Way Analysis of Variance Tables to Accompany Tables 3, 4, 6, and 7

### Table 3A. Survey items with statistically significant different means ($p<.05$) across academic rank: ANOVA tables

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C4 Identifying learning styles and corresponding instructional examples and uses</td>
<td>Between Groups</td>
<td>3.24</td>
<td>2</td>
<td>1.62</td>
<td>3.44</td>
<td>.034</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>111.12</td>
<td>236</td>
<td>.47</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>114.36</td>
<td>238</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D2 Teaching strategies beyond the lecture</td>
<td>Between Groups</td>
<td>3.78</td>
<td>2</td>
<td>1.89</td>
<td>4.12</td>
<td>.017</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>107.33</td>
<td>234</td>
<td>.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>111.11</td>
<td>236</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D11 Teaching in a large classroom (online or face-to-face)</td>
<td>Between Groups</td>
<td>4.59</td>
<td>2</td>
<td>2.30</td>
<td>4.26</td>
<td>.015</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>127.28</td>
<td>236</td>
<td>.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
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<td>238</td>
<td></td>
<td></td>
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<tr>
<td>E1 Assessing educational needs</td>
<td>Between Groups</td>
<td>3.57</td>
<td>2</td>
<td>1.79</td>
<td>3.93</td>
<td>.021</td>
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<tr>
<td></td>
<td>Within Groups</td>
<td>107.76</td>
<td>237</td>
<td>.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>111.33</td>
<td>239</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E2 Identifying and assisting students who are experiencing difficulty</td>
<td>Between Groups</td>
<td>3.66</td>
<td>2</td>
<td>1.83</td>
<td>4.60</td>
<td>.011</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>94.00</td>
<td>236</td>
<td>.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>97.67</td>
<td>238</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E3 Developing educational evaluation strategies for courses and clerkships</td>
<td>Between Groups</td>
<td>3.83</td>
<td>2</td>
<td>1.91</td>
<td>3.84</td>
<td>.023</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>116.69</td>
<td>234</td>
<td>.50</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
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<td>236</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E4 Tying educational objectives to course evaluations</td>
<td>Between Groups</td>
<td>3.72</td>
<td>2</td>
<td>1.86</td>
<td>3.53</td>
<td>.031</td>
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<tr>
<td></td>
<td>Within Groups</td>
<td>123.63</td>
<td>235</td>
<td>.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>127.35</td>
<td>237</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G6 Using educational activities for promotion and tenure</td>
<td>Between Groups</td>
<td>16.61</td>
<td>2</td>
<td>8.30</td>
<td>15.99</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>122.03</td>
<td>235</td>
<td>.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>138.64</td>
<td>237</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G7 Managing classroom challenges</td>
<td>Between Groups</td>
<td>4.59</td>
<td>2</td>
<td>2.29</td>
<td>4.80</td>
<td>.009</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>111.29</td>
<td>233</td>
<td>.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>115.88</td>
<td>235</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 4A. Survey items with statistically significant ($p\leq .05$) different means across colleges: ANOVA tables

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C9 Constructing quality test questions and evaluating test results</td>
<td>Between Groups</td>
<td>4.26</td>
<td>4</td>
<td>1.06</td>
<td>2.65</td>
<td>.034</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>96.34</td>
<td>240</td>
<td>.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100.60</td>
<td>244</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D1 Lecture presentation skills</td>
<td>Between Groups</td>
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### Table 6A. Index means by academic rank: ANOVA tables

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**APPENDIX (continued)**
Table 7A. Index means across colleges: ANOVA tables

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