

Collateral opportunity for increased faculty collaboration and development through a mentored critical thinking and writing exercise in a dental school curriculum

Terry E. Hoover, DDS¹ and Lucinda J. Lyon, DDS, EdD²

Abstract: This essay examines the collateral benefits to faculty from a guided learning literature review project for students. We describe a 3-year continuum of project creation and refinement designed to foster critical thinking and writing for second year dental students at the University of the Pacific Arthur A. Dugoni School of Dentistry. We discuss how this exercise suggested that a potential for faculty partnerships and increased interest in development could be derived through such a collaborative pedagogy. Finally we consider the value of such a mentored teaching and learning exercise as an intentional strategy for increasing the potential for new teaching, learning, and scholarly productivity beyond original acquaintances and disciplines as well as stimulating individual faculty desire for growth.

Keywords: peer mentoring, faculty development, collaborative learning, critical thinking

I. Introduction.

Pedagogy aimed at increased critical thinking and professional competency has been an element of graduate dental education for generations (Kewalin Thammasitboon, Sukotjo, Howell and Karimbux, 2007). How dental schools have historically attempted to strengthen the level of critical thinking among students and faculty has also been studied and discussed at length (Brunette, 2007; Chambers, 2009; Johnsen, Finkelstein, Marshall and Chalkley, 2009). In 2008, the American Dental Education Association (ADEA) adopted an updated set of *Competencies for the New General Dentist*. Critical thinking was featured prominently as one of the six specific domains around which these competencies were created. These guidelines state the need for dental school graduates to be able to “Evaluate and integrate best research outcomes with clinical expertise and patient values for evidence-based practice” (American Dental Education Association, 2008).

To help achieve these objectives, beginning in academic year 2008-2009, second year dental students at the University of the Pacific were given a critical thinking and writing assignment which extended over three academic quarters. They were to search peer reviewed healthcare literature on a selected topic; read and critically assess the information; identify information gaps, new applications, alternative perspectives or controversies involving the topic; formulate some conclusions; and write a short, original, referenced paper of 1500-2500 words describing their findings.

¹ University of the Pacific, Arthur A. Dugoni School of Dentistry, 2155 Webster Street, San Francisco, CA 94115, thoover@pacific.edu.

² University of the Pacific, Arthur A. Dugoni School of Dentistry, San Francisco, clyon@pacific.edu

One-on-one faculty mentorships were created to enhance this guided learning experience. Each student was matched with a faculty mentor who would support them through the assignment. Mentors provided broad topics in which they had experience or expertise; were currently conducting research; or were interested in exploring. In the spirit of the ADEA President's Commission on Mentoring, faculty mentoring was done on a voluntary basis, outside formal teaching commitments (Friedman, Arena, Atchison, Beemsterboer, Farsai, Giusti, Haden, Martin, Sanders, Sudzina, Tedesco, Williams, Zinser, Valachovic, Mintz and Sandmeyer, 2004).

A diverse group of faculty were recruited to these mentorships. These educators were of varying rank; didactic, clinical, and research focused; from specialty disciplines as well as general dentistry; and novice to very experienced teachers. As word of this exercise spread through our institution, the cohort of participating faculty mentors increased greatly in the next two successive years. Department chairs began to direct new faculty toward these mentorships as an opportunity for early involvement in scholarship and student mentoring. Faculty participants as well began to request additional development in searching for peer-evaluated literature and scholarly writing.

These collateral benefits of faculty collaboration and increased desire for development opportunities led the authors to explore these phenomena further by asking the questions: 1.) can faculty participation in a collaborative guided learning project provide a platform for increased collaboration in additional new teaching, learning, and scholarly projects; and 2.) can skills learned in support of such an experiential exercise be a vehicle for faculty development in a more strategic way?

II. Background.

A. Guided Learning – Literature Review Assignment, and Outcomes.

The following were among the goals for the first year of the literature review exercise (AY 2008-2009): to create a critical thinking assignment for second year dental students; raise students' awareness of scholarship through faculty mentorship and role modeling; and increase participation of faculty from diverse backgrounds in this multi-disciplinary course. Specific student learning objectives were stated in the Literature Review Project Syllabus as follows: "...to demonstrate your ability to do literature research on a selected topic, critically assess the information, and write a short original paper on that topic... you will need to master scientific journal searches as well as develop and use critical thinking skills to synthesize an original paper...[this project] will aid you in your professional career whether that includes engaging in primary research or reading, understanding and critically assessing research by others in your quest as a lifelong learner and oral health care professional" (see Appendix 1).

Students were given presentations, exercises, or reference material that strengthened the skills required to complete this project. They were introduced to the importance of utilizing scholarly resources. To support this task, a university research librarian led students, and interested faculty, through a workshop on how to locate, access, and appraise information from various peer reviewed data bases. An experienced faculty researcher also offered a seminar on reading and critically assessing scientific literature. Students were provided information on writing, formatting, and referencing their manuscript, including how to present clear positions and arguments to demonstrate their knowledge and understanding of the chosen topic.

Librarians were generously available to provide suggestions and access to resources which students were not initially able to retrieve independently. Students were encouraged to meet often with their faculty mentors. Mentor support was particularly helpful to students in narrowing the focus of their topic and searches. The course director advised and supported both students and faculty mentors with questions and feedback about the assignment.

Completed papers were not given a letter grade, but evaluated for process in literature search, critical thinking, formatting, referencing, and personal conclusions. Each faculty mentor was responsible to evaluate the work of their student(s) and work with them until the paper was complete and met acceptable outcomes.

Faculty and the course director met during, and at the conclusion of each project iteration, to debrief, share feedback, and calibrate on issues such as expected scholarship in final papers and appropriate level of faculty assistance. Formative and summative outcomes for the exercise were assessed. Improvements implemented included: lowering the student to faculty mentor ratio; sharing of exemplary papers; rewarding exceptional scholarship with an opportunity to present findings; and extra credit toward final course grade.

Participating faculty mentors were recognized for their generous volunteer commitment with acknowledgement letters for inclusion in their promotion and tenure dossiers; luncheons where they were asked to share input and ideas to shape and improve the exercise; and public acknowledgement by the course director and academic dean. Additionally, details of this project have been presented to professional organizations as an example of cross-disciplinary collaboration. It should be stressed that recognition of mentor contributions should be a permanent element of this ongoing mentoring experience.

B. Coincidental Faculty Collaboration and Development Opportunities.

A number of less formal collateral benefits related to faculty participation began to emerge in successive project years. The cohort of participating faculty mentors grew from forty-three in the initial year of the assignment, to fifty-nine, then eighty in the next two successive years. Many faculty and students reported that their interaction and collaboration would likely extend beyond the assignment. Three student/mentor teams developed their projects further and published their manuscripts. Several teams are presenting posters, for which their literature search played a role, at national meetings. Three additional teams plan on submittals for publication. Finally, several teams advised that they planned to cooperate on additional scholarship projects.

Faculty who worked in dissimilar disciplines became better acquainted with each other and their respective work through this shared project. Some agreed to opportunities to present material in cross-discipline integrated format. Participants with research and specialty backgrounds shared best practices for scholarly information search and manuscript preparation with less experienced faculty. Most understood and valued the varied expertise present in the school in a greater way.

Department Chairs referred new faculty to participate, citing the opportunity for informal interaction and discussion with a diverse group of peers in a low stakes environment; the chance to increase their personal scholarship; develop mentoring skill; and experience, firsthand, student capabilities in this specific area.

These coincidental outcomes prompted an exploration of the learning theory supporting such results and how a like teaching and learning project might be designed to intentionally support these ends.

III. Theoretical Framework.

In introducing a process for faculty to come together on this common project, it appears that a strong collaborative learning environment was coincidentally created for participants. Among the principles that the ADEA Commission on Change and Innovation (CCI) believes should “characterize the educational environment and inform dental curricula” are critical thinking; life-long and self-directed learning; a humanistic environment; and scientific discovery and the integration of knowledge (Haden, et al., 2006). These tenets appeared to have been engaged in the collective shaping of this literature review teaching and learning experience.

In the way that this diverse group came together around a common project, the collaborative learning environment is one in which participants of various perspectives and performance levels work together toward a common goal, solution, or product. Rather than being the primary font of information, teachers, using this approach, act as learning facilitators. All members of the community contribute to one another’s learning (Gokhale, 1995; Smith & MacGregor, 1992). Gokhale’s research specifically concludes that, through discussion, clarification of ideas and evaluation of others’ thoughts, critical thinking is developed (1995), as was the case in this exercise.

Another methodology, action-learning, is also representative of the collaboration around this project by “creating a safe environment, encouraging openness, exploration, creativity, mutual respect and shared problem solving” (Kesby, 2008). Action learning has among its attributes the potential to: enhance team work and collaboration; build mutually beneficial and respectful relationships with colleagues; enhance participants’ ability to learn from individual and collective experiences; increase participant capacity to discuss other organizational challenges; and to contribute to development of more novice participants (Kesby, 2008). Coincidentally, the course director facilitated such an environment of practical collaboration.

Learning was active, purposeful, and faculty enjoyed the chance to build on their varying levels of knowledge and skills to refine this specific curricular piece (Dreyfus & Dreyfus, 1986). The shared project produced intellectual synergy ... “and the social stimulation of mutual engagement in a common endeavor” (Gokhale, 1995). Faculty mentors were faced with portions of the assignment that succeeded as planned and others that needed refinement. This modification appeared to be a pleasurable, collegial charge. Those with greater experience contributed not only to the success of the project, but also to the ability of those less experienced.

Similar to the ADEA CCI’s foundational values noted above, North Carolina State University, in their university-wide framework for curricular integration, adopted four overarching intended learning outcomes: critical thinking, habits of independent inquiry, responsibility for one’s own learning, and intellectual growth and maturity (Lee & Ash, 2010). Qualitative outcomes from their initiative confirmed that “being a member of a community of practice enhanced support for engaging in the scholarship of teaching and learning” (Lee & Ash, 2010, p. 44). Participants in this University of the Pacific experience voiced like appreciation for the collaborative environment.

Contributing to this synergy were the important mentoring qualities shared by the course director and senior faculty involved. Enlisting high profile mentors in the first cohort of mentors proved helpful. Among these were the dental school dean emeritus, the academic dean, and ten department chairs. In the spirit of effective mentors, these specific contributors provided resources, nurtured skill development, cultivated decision-making, enhanced self-confidence, and modeled enjoyment of the task for both students and less experienced faculty (Schrubbe,

2004). They additionally shared praise broadly for the resulting success of the exercise. In short, they made it easy and enjoyable to participate and they helped guide the group to effective outcomes. The benefit of such mentorship to perceived satisfaction of academic life are corroborated by Schrubbe (2004) who found the influence of role models and mentors to be both positive and important.

IV. Methodology.

A. Participants.

This reflective essay describes the experience of three cohorts of faculty participating in a guided literature review project for 2nd year dental students. This teaching and learning exercise has been offered twice to completion and is currently in-progress for its third implementation cycle.

Forty-three faculty volunteered to participate as mentors in the 2008-09 cycle; fifty-nine in the 2009-10 cycle and eighty in the 2010-11 cycle. The faculty included full-time, part-time, salaried, and adjunct faculty, all in varying stages of their teaching careers. Participants hailed from a number of disciplines with varied primary focus in research, didactic and clinical teaching. All teach or research in a graduate, professional school setting and, in this case, worked with graduate dental students (see Table 1).

Table 1. Faculty Mentor Demographic Data by Year of Student Lit Review Assignment.

Year	# Mentors	Prof	Assoc Prof	< Assoc Prof	Clinical Appt Component	Gen Dentist	Dental Spec	<10 Yrs Teaching
Year 1 (08-09)	43	14	8	21	30	19	13	16
Year 2 (09-10)	59	18	10	31	42	24	21	26
Year 3 (10-11)	80	20	15	45	61	38	26	39

B. Instruments.

Upon completion of the first year of this exercise, the course director sought feedback from participating faculty and students. Feedback was anecdotal and unstructured in the form of personal conversation or e-mail, which was logged by an administrative assistant. Comments reflected both positive outcomes and areas in need of improvement.

The second iteration of the literature review exercise was completed June, 2010. A more robust collection of feedback was sought. Along with a log of direct e-mail and anecdotal comments from faculty and students, an in-person group conference of mentors was held to debrief, solicit feedback, and discuss outcomes. In addition to transcribing oral feedback from this discussion, faculty shared additional information via a written survey (see Appendix 2).

C. Evaluation Procedures.

Qualitative data gathered from logged information and written surveys was coded to identify and categorize segments of data. Data was analyzed for identification of common themes. A summary of findings was created.

V. Findings.

We are now in the third iteration of this mentored literature review exercise. For each of the first two years the course director sought feedback from faculty and students on perceptions of this exercise and its outcomes. Findings are described below.

Qualitative data was coded by categories that expressed positive support or recommended changes. Subcategories, listed to the right, are in descending order from most mentioned to least mentioned (see Table 2).

Table 2. Qualitative Feedback by Year by Year of Student Lit Review Assignment

Year 1	Comments
<u>Positive Support</u>	<ul style="list-style-type: none"> a. provides one-on-one interaction between student and faculty b. valuable exercise for student and mentor c. stresses importance of critical thinking and life-long learning for a professional d. opportunity to role model critical thinking, scientific method /scholarly writing e. humanistic, collegial atmosphere of school reinforced f. faculty willingness to volunteer time/expertise demonstrated
<u>Recommended Changes</u>	<ul style="list-style-type: none"> a. fewer students per mentor b. more frequent interaction between students and mentors c. more choice of topics by students d. incentives to improve level of scholarship e. better understanding by students of goals of assignment
Year 2	Comments
<u>Positive Support</u>	<ul style="list-style-type: none"> a. possibility of more publications b. more interaction & collaboration between faculty of different disciplines c. forces faculty to strengthen research and scholarship skills d. builds self confidence/self esteem/communication skills within students e. stresses importance of critical thinking and scholarship for a professional
<u>Recommended Changes</u>	<ul style="list-style-type: none"> a. more frequent interaction between students and mentors b. provide workshop on library searches, review of scientific writing c. experienced mentors guiding new mentors (peer mentoring) d. increase scholarly submissions for publication, thus raising the bar for students e. development of critical thinking assessment tools to be used school wide f. public discourse/student defense of their topics based on the evidence g. provide students training in presentation skills to display/present work

Faculty feedback was generally positive regarding the interaction between students and faculty mentors, as a valuable learning exercise for both. There was positive support

demonstrated for the process and spirit of the mentorships as well as the learning objectives achieved.

Identified shortcomings took the form of suggestions for mechanical and technical improvements in the assignment such as fewer students per mentor, more consistent frequency of student/mentor interaction, more choice of topics by students, incentives for excellent work to improve level of scholarship, and better understanding by the students of the goal of the assignment (i.e. improving their critical thinking and writing skills).

The positive level of support for this assignment was strong enough to justify its continuation. Through a collaborative process of reflection; formative and summative outcomes assessment; and suggestions for refinements; important modifications were made.

Following year two of this exercise, the authors' noted an interesting change in the focus of the feedback in these responses. Suggestions changed from a focus on the technical details of the assignment itself to comments on the value of this exercise for faculty mentors, as well as ways to enhance it as a faculty development tool. They included such things as: requests for workshops on library searches; review of scientific writing; and request for experienced faculty mentors to guide newer mentors through the process (peer mentoring).

There were comments that this literature exercise encouraged faculty to strengthen their own personal skills in the scientific method in order to properly mentor students. Faculty expressed that interaction with colleagues from different disciplines during feedback sessions, workshops, and presentations provided potential for increased collaborations. There was also a focus on improving the quality of scholarship produced by this exercise with several faculty suggesting that the goal of the assignment should be scholarly publication. A number of faculty noted that collaboration with their students would likely extend beyond the assignment with plans to cooperate on additional scholarship projects.

The year two written survey also asked mentor respondents to rate the overall value of this assignment. Mentors were asked the value of this assignment to students on a 1 to 5 scale with "1" being of little value and "5" being very valuable. This rating averaged "4.4". Mentors rated the value of the assignment to faculty mentors using the same scale. The rating averaged "4.2". The responses are displayed in Table 3. The authors were aware of the general appreciation of the value of this exercise to students but the value to mentors rated high as well. The constructive suggestions previously mentioned illustrated the interest in strengthening the value of the exercise to mentors.

Table 3. Value Rating of Lit Review Project from Faculty Mentor Surveys.

Mentor Rating as Value to Student	1	2	3	4	4.5	5	Avg.
Number of Mentor Responses	0	2	1	6	1	15	4.4
Mentor Rating as Value to Mentor	1	2	3	4	4.5	5	Avg.
Number of Mentor Responses	0	2	1	10	1	10	4.2

As we begin year three of the Literature Review Project, a gradual demographic change to the faculty mentor ranks has been noted as the number of volunteer mentors has grown. As additional mentors have volunteered each year (43 mentors first year, 59 mentors second year, 80 this current year), the most recent mentors tend to be newer educators and more junior in rank. Five department chairs have actually referred new faculty as mentors, citing this as an opportunity to increase their involvement in scholarship, to mentor students, and to experience firsthand the level of student capability. This increased percentage of newer, less experienced faculty joining our mentor ranks may be contributing to the interest in faculty development resources (see Table 4).

Table 4. Faculty Mentor Demographic Analysis by Year of Student Lit Review Assignment.

Year	Year 1 (2008-2009)	Year 2 (2009-2010)	Year 3 (2010-2011)
Percentage Mentors with Clinical Teaching Component to Appointment	70%	71%	76%
Percentage Mentors with Less than 10 Years Teaching Experience	37%	44%	49%
Percentage Mentors with Academic Rank below Associate Professor	49%	53%	56%
Percentage Mentors with Academic Rank below Full Professor	67%	71%	75%
Percentage Dentist Mentors Who Are Non-Specialists	59%	53%	59%

VI. Conclusion.

Participants agreed that the critical thinking skills students practiced in this assignment will be valuable in their careers as lifelong learners and dental professionals. The student/faculty mentorship described provided learners an introductory scholarship experience in which some might not otherwise have participated. The exercise described demonstrates how a dental school, or any educational institution, can leverage the expertise of a diverse faculty to support student learning.

A brief discussion of the course director’s approach to attracting committed faculty mentor volunteers may be valuable to educators wishing to create a similar teaching and learning experience. Virtually all faculty in higher education juggle a full schedule of teaching, scholarship, and service commitments. Therefore, enlisting volunteer mentors required a strong plan including project preparation; individual faculty engagement; demonstration of the teaching and learning value of the exercise; and participant recognition. Although personal invitation and

recruiting was a necessity in developing the first mentor cohort, attracting additional mentors occurred much more easily in succeeding years as a result of increased project visibility, mentor recognition, and participant enthusiasm.

As mentioned previously, critical thinking and writing exercises such as this are not unique to dental education. Perhaps the project outcomes of most interest and significance were the resulting faculty experiences, specifically in the areas of increased collaboration and desire for development. In this case, the process of working collectively enhanced collegial relationships and the potential for new teaching, learning, and scholarly productivity beyond original acquaintances and disciplines.

Mentor feedback seems to confirm the ADEA President's Commission on Mentoring benefits of mentoring for the mentor: increased personal satisfaction; opportunity for intellectual engagement and stimulation; opportunity to stay abreast of new knowledge and techniques; opportunity to "give back" by sharing expertise and knowledge; increased ability to attract collaborators for current and future projects; and an opportunity to "create a legacy" by helping to prepare the next generation (Friedman, et al., 2004).

Faculty seized on the opportunity to improve their skills in the scientific method. There was a collective desire to improve the ability to guide student learning through one on one mentorships. In addition to senior, more experienced faculty, generously mentoring less experienced peers, faculty requested additional, more formal support. This motivation provided a positive springboard for faculty development.

Finally, this experience demonstrates that a teaching innovation requires regular feedback and reflection to grow and thrive. In addition to planned student learning outcomes, coincidental, collateral faculty dynamics and opportunities may arise. To that end this faculty mentored critical thinking and writing exercise at the University of the Pacific Arthur A. Dugoni School of Dentistry will continue to evolve and might correctly be designated "a work in progress."

Appendices

Appendix 1. Literature Review Project Syllabus (Revised 3.21.2011)

http://www.dental.pacific.edu/Documents/microsites/acad_affairs/LiteratureReviewProjectSyllabus.pdf

Appendix 2. Faculty Mentor Survey (July 2010)

The purpose of this survey is to get feedback on the value of this student assignment and seek faculty suggestions on ways to improve student learning and the level of scholarship students produce.

1. Have you mentored a student(s) previously for this assignment?

Yes

No—this is my first year as a mentor

2. Rate the value of this project as a learning experience for students:

(Of little value) 1-----2-----3-----4-----5 (Very valuable)

(circle choice)

3. Please make suggestions as to how the student learning experience could be improved:

4. Rate the value of this experience for faculty mentors:

(Of little value) 1-----2-----3-----4-----5 (Very valuable)

(circle choice)

5. How could this experience be improved for the mentors?

6. Please list any benefits to any of the stakeholders (students, mentors, the school itself) beyond the learning event itself:

7. If you are an experienced mentor or have mentored students previously, would you be willing to coach or support faculty new to this student assignment?

If **YES**, give your name _____

8. Are there additional resources that the course director and administrators could offer to students and mentors to facilitate this project?

9. Other comments about this assignment:

References

- American Dental Education Association (2008). Competencies for the new general dentist. Retrieved September 4, 2010 from: http://www.adea.org/about_adea/governance/Pages/CompetencesfortheNewGeneralDentist.aspx
- Brunette, D. (2007). *Critical thinking: Understanding and evaluating dental research (2nd ed.)*, Hanover Park, IL: Quintessence Publishing Co., Inc.
- Chambers, D. (2009). Lessons from students in a critical thinking course: A case for the third pedagogy. *Journal of Dental Education*, 73, 65-82.
- Dreyfus, H., & Dreyfus S. (1986). *Mind over machine, the power of human intuition and expertise in the era of the computer*. New York, NY: Blackwell Publishers.
- Friedman, P., Arena, C., Atchison, K., Beemsterboer, P., Farsai, P., Giusti, J., Haden, N., Martin, M., Sanders, C., Sudzina, M., Tedesco, L., Williams, J., Zinser, N., Valachovic, R., Mintz, J., & Sandmeyer, M. (2004). Report of the ADEA president's commission on mentoring. *Journal of Dental Education*, 68, 390-396.
- Gokhale, A. (1995). Collaborative learning enhances critical thinking. *Journal of Technology Education*, 7(1), 22-30.
- Haden, N., Andrieu, S., Chadwick, D., Chmar, J., Cole, J., George, M., Glickman, G., Glover, J., Goldberg, J., Hendricson, W., Meyerowitz, C., Neumann, L., Pyle, M., Tedesco, L., Valachovic, R., Weaver, R., Winder, R., Young, S., & Kalkwarf, K (2006). The dental education environment. *Journal of Dental Education*, 70(12), 12165-70.
- Johnsen, D., Finkelstein, M., Marshall T., & Chalkley, Y. (2009). A model for critical thinking measurement of dental student performance. *Journal of Dental Education*, 73, 177-183.
- Kesby, D. (2008). Exploring the power of action learning. *Knowledge Management Review*, 11(5), 26-29.
- Lee, V., & Ash, S. (2010). Unifying the undergraduate curriculum through inquiry-guided learning. *New Directions for Teaching and Learning*. 121, 35-46. Article first published online : 17 MAR 2010, DOI: 10.1002/tl.386
- Schrubbe, K., (2004). Mentorship: A critical component for professional growth and academic success. *Journal of Dental Education*, 68(3), 324-328.
- Smith, B., & MacGregor, J. (1992). What is collaborative learning? in A. Goodsell, M. Mahler, V. Tinto, B. Smith, & J. MacGreger (Eds), *Collaborative learning: A sourcebook for higher education*. University Park, PA, National Center on Postsecondary Teaching, Learning and Assessment.

Hoover, T.E., and Lyon, L.J.

Thammasitboon, K., Sukotjo, C., Howell, H., & Karimbux, N. (2007) Problem-based learning at the Harvard School of Dental Medicine: Self-assessment of performance in postdoctoral training. *Journal of Dental Education*, 71, 1080-1089.