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Faculty perceptions of the scholarship of teaching and learning: Definition, activity level and merit considerations at one university

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Abstract: This study investigated the status of the Scholarship of Teaching and Learning (SoTL), the amount and types of pedagogical scholarship, and the merit accorded SoTL within academic units for purposes of faculty assessment (i.e. hiring, promotion, and tenure decisions) at a research/doctoral granting institution. Responding to an electronic survey were 159 tenured and tenure track faculty (30% assistant professor, 31% associate, 31% full professors; 6% collateral/clinical/administrative) from all colleges and schools. The data analyzed showed a disconnect between the perceptions of tenured and non-tenured faculty on what qualifies as SoTL and the place of scholarly works within promotion and tenure. More specially, non-tenured faculty tended to judge teaching activities as SoTL regardless of their likelihood for publication, whereas tenured faculty more often recognized only published works as SoTL. Results also indicated that a limited number of faculty were engaged in SoTL; possible reasons could include lack of external funding and nebulous promotion and tenure guidelines as they concern SoTL.

Keywords: educational research, scholarship of teaching and learning, promotion and tenure, faculty attitudes, faculty perceptions, college faculty

I. Introduction.

Investigating the processes and products of teaching in higher education has emerged as a noteworthy activity across all disciplines in the academy. Increasingly referred to as the scholarship of teaching and learning (SoTL), the importance of this category of scholarship, as well as what counts as the scholarship of teaching and learning, remains unclear and debatable in many universities and colleges. While there are a growing number of SoTL articles in both general education journals and journals specific to disciplinary pedagogy (Bernstein & Bass, 2005; Brew, 2010; Burke, Johnson, & Kemp, 2010; Gurung, Weidert, & Jeske, 2010; Hubball, Clark, & Poole, 2010; Jurkowski & Kerr, 2010; Osborne, et. al., 2009; Persellin & Goodrick, 2010; Sharmaa & McShaneb, 2008), the value of these activities, particularly within the evaluation process for full-time faculty, is often contested. The study reported in this article was undertaken to further develop this literature by investigating faculty perceptions about the types of scholarly or teaching activities that could be categorized as SoTL, the amounts and type of

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pedagogical scholarship conducted by faculty at a research/doctoral granting institution and the merit accorded SoTL within different academic units of this institution for purposes of faculty assessment (i.e., hiring, promotion, and tenure decisions). The significance of this type of scholarship on the enhancement of teaching practices and pedagogy is discussed in the conclusion.

II. Review of the Current Literature.

Traditionally, scholarship has been demonstrated through a peer-reviewed, publicly disseminated product (Fincher & Work, 2006). However, in the early 1990s Boyer (1990) suggested a recognition of scholarship that went beyond discipline specific research to include research that advances knowledge about teaching. And, in an attempt to bring SoTL further in alignment with traditional disciplinary scholarship, the *Journal of the Scholarship of Teaching and Learning* (as cited by Shulman (1999) suggested that knowledge about teaching and learning be considered scholarship if it manifested the following three characteristics: "It should be *public*, susceptible to *critical review and evaluation*, and accessible for *exchange and use* by other members of one's scholarly community" (p. 5).

However, a lack of consensus about what is meant by SoTL persists. McKinney (2006) offers two areas of contention as reasons for the lack of clarity: the confusion between what is scholarly and what is scholarship, and the debate about the overlap or relationship between SoTL and the assessment of student achievement within a course. McKinney suggests that these two areas of contention are barriers to the advancement of SoTL within academia. SoTL, she suggests, is scholarship that overlaps with the more traditional discipline specific scholarship of discovery, integration, and application and further argues that SoTL should be considered to be as important as disciplinary specific research. We integrated McKinney's (2004) approach to SoTL with the characteristics set forth above by the *Journal of Scholarship of Teaching and Learning* and articulated a working definition of SoTL–"the systematic, literature-based study of processes and outcomes involved in teaching and learning intended for peer-reviewed publication and dissemination"–for use as a beginning frame of reference for this study.

How has scholarship of teaching and learning been explored in other studies? Gurung Gurung, Ansburg, Alexander, Lawrence, and Johnson (2008) surveyed members of North American psychology departments regarding SoTL. Participants were asked to rank SoTL products by the product's importance in personnel decision making. Of the 142 participants, over half of the participants endorsed peer-reviewed publications (54.9%) and leading faculty workshops (55.6%) as important to personnel decision making. Over one-third of participants identified attending faculty workshops (44.3%). Professional presentations (40.0%), evidence of teaching impact (45.3%), receipt of a grant (35.5%), and development of a portfolio (32.6%) were also identified as being important. Clearly, not all of these products are comparable to more traditional disciplinary scholarship products, heightening the confusion about what is SoTL and what is not.

A number of articles suggest that while SoTL is acceptable within higher education, it has not yet been acknowledged as equal to discipline specific research (McKinney, 2006; Walker, Baepler, & Cohen, 2008). Gurung, et. al. (2008) posit that although formal policies regarding SoTL in psychology departments were reported by participants, it seemed that these policies had not yet been fully institutionalized; departmental policies encouraged SoTL activities while institutional policies did not include such encouragement. Participants'

perceptions of support for SoTL were higher at the department level than at the institutional level. Shapiro (2006) asserts that SoTL activities are considered "add-ons" (p. 42) to the expectations that faculty will get competitive funding, publish refereed articles, and develop national reputations all within their specific discipline. He states that SoTL contributions do not change or replace the traditional productivity demands.

While the argument has been made that SoTL should be valued and rewarded in the same way as traditional scholarship (Fincher & Work, 2006), many proponents of SoTL are concerned that such productivity is not as positively recognized nor as highly rewarded. McKinney (2006) posits that older faculty members have a narrower view of scholarship and hold stereotypical views of SoTL work. Included in these stereotypes are the beliefs that SoTL work is of lower quality, cannot be generalized, and involves questionable peer review processes. Gurung, et. al. (2006) state that SoTL activities were not perceived as being relevant criteria in the reward structure that includes merit pay and hiring decisions. Although some participants in this study did believe that SoTL had some influence in tenure and promotion decisions, more of them reported that SoTL was not mentioned in evaluation guidelines.

It has been suggested that although the traditional reward structure includes teaching, research, and service equally, good teaching is actually expected but not privileged (Walker, Baepler, & Cohen, 2008). Supporting this position, Terpstra and Honoree (2009) suggest that the emphasis of a university can be assessed by the nature of its reward structure. Their study indicated that the most effective teachers, those with better ratings of student knowledge and competency and student satisfaction, worked in systems that emphasized research and teaching equally. These faculty members were also significantly more satisfied in terms of both their jobs and compensation. University emphasis on research produced more productive faculty, measured in both research quality and quantity, but these faculty members had lower satisfaction ratings as well as lower effective teaching ratings. These findings suggest that though teaching may be identified as an important activity, in actuality, the reward structure is still heavily based on research.

In order to help define SoTL and advance it as legitimate scholarship toward promotion and tenure in our own institution, members of a multidisciplinary faculty learning community (FLC) agreed to pursue a project which would provide some insight about SoTL derived from the faculty at our large urban university. The FLC developed a survey and disseminated it university-wide to investigate 1) the activities and products that faculty considered to be SoTL, 2) the amount and types of pedagogical scholarship, and 3) the merit accorded SoTL within academic units for purposes of faculty assessment (i.e. hiring, promotion, and tenure decisions) within their school or college. We report here the outcomes of this survey and offer implications as to the impact of SoTL on higher education.

III. Methodology.

A. Participants and Data Collection Procedures.

A list of all tenured (n= 737), tenure-track (n=274), and collateral/clinical faculty (n= 913) of this one large Carnegie-designated research/doctoral granting institution in the southeastern United States was obtained from the institution's human resource department. Those on the list received an e-mail request to complete this IRB-approved electronic survey via a secure Internet server. No incentives were given to complete the survey. The survey remained open for three weeks.

Faculty members who did not complete the survey were sent reminders after the first and second weeks. This scheme and time frames were described by Bailey (1991).

Seventeen percent (17%) of 274 tenure track faculty, 13% of 737 tenured faculty, and 2% of 913 collateral/clinical faculty responded to the survey to yield a convenience sample of 159 study participants. Although low, our overall response rate for tenure and tenure-track faculty (15%) was within the range of other university faculty surveys, such as 22% for a National Faculty Survey, APLU Sloan National Commission on Online Learning (Seaman, 2009), and 15.8% (Maurer, et. al., 2009). Further limitations of the study are addressed in the Conclusion section of this article.

B. Instrument.

As noted above, we articulated a definition of SoTL for use as a frame of reference from which to generate lists of scholarly activities and vignettes and other questions for the survey. We included this same definition "the systematic, literature-based study of processes and outcomes involved in teaching and learning intended for peer-reviewed publication and dissemination" at the beginning of the survey to provide a common definition of SoTL for the respondents. The survey was piloted on faculty members recently retired from the university where the survey was administered. Revisions were made based on the suggestions from the survey pilot. The final survey questions generated from our FLC's overall research questions were: (1) What activities and scholarly products are considered as SoTL? (2) What is the amount and type of pedagogical scholarship generated by faculty in the institution? (3) What merit is accorded SoTL for purposes of faculty assessment?

In order to answer the first of our FLC's research questions about the types of activities and scholarly products considered as scholarship of teaching and learning at the university, we developed a list of 16 scholarship related activities that could be interpreted as SoTL according to the McKinney definition (McKinney, 2006). Respondents were asked: "From the following list, indicate the extent to which you would consider each to be part of the Scholarship of Teaching and Learning (SoTL)?" (1 = Definitely a part of SoTL; 2 = Probably a part of SoTL; 3 = Probably NOT a part of SoTL; 4 = Definitely NOT a part of SoTL). Examples of the types of activities were: Data-driven, classroom-based studies; Reviews of the pedagogic literature; Authoring textbook or textbook chapters; and Developing a new course (see Appendix I for complete list of activities). Subsequently at the data analysis stage, the value categories were collapsed into definitely or probably a part of SoTL (1) and probably not or definitely not (3) in order to maximize variation between activities considered or not considered as SoTL for subsequent data analysis.

The second research question concerning the amount and types of SoTL across the various disciplines at the university was answered by asking respondents three questions: 1) How many publications (published or accepted for publication) they authored that met the given definition of SoTL; 2) The nature of their SoTL publications (1 = Mostly empirical; 2 = About evenly divided between empirical and conceptual; 3 = Mostly conceptual; 4 = Other); and 3) Whether they had ever received external funding for SoTL (1 = Yes or 2 = No). The number of publications was subsequently collapsed into none = 0, 1 to 5 = 1, and more than 5 = 2 based on the distribution of the responses generated by the respondents.

For the third research question about the merit accorded the scholarship of teaching and learning for promotion and tenure and other award decisions, we developed five vignettes

describing different types of intellectual property: 1) Publication of a data-driven classroom-based study in a peer-reviewed journal; 2) Publication of an article, conceptual in nature, about academic leadership in a peer-reviewed journal; 3) Presentation of a data-driven classroom-based study in at a prestigious national conference; 4) A series of case studies published in a peer-reviewed online database; and 5) Faculty to Student Social Media. Following from the McKinney definition of SoTL noted above, these vignettes represented the five most commonly noted events recognized for promotion and tenure at this institution (See Appendix 2 for descriptions of the full vignettes). Respondents were asked to indicate if they thought each of the intellectual properties should be used for making decisions about 1) Promotion and tenure; 2) Annual review for merit-based pay raises; and 3) Award consideration, including academic unit, university, or external awards. Response categories for each of these questions were: 1 = Definitely consider; 2 = Probably consider; 3 = Probably not consider; 4 = Definitely not consider .

We developed scales for overall merit consideration for each of the five intellectual property vignettes. A scale for each of the intellectual property items was developed by summing the responses of the three decision items (promotion and tenure, annual merit, and award) for each of intellectual property vignettes. Scaled scores ranged from 3 to 12 for each vignette, with lower scores indicating more overall merit for that particular intellectual property vignette. Univariate statistics for each the scales are shown in Table 1. The intellectual property item "Publication of a data-driven classroom-based study in a peer-reviewed journal" was considered to have the most overall merit ($m = 4.13$) for faculty promotion and tenure, raises, and awards, while social media had the least merit ($m = 8.81$).

Table 1. Merit Consideration for Intellectual Property Vignettes.

Intellectual Property Item	Mean	Median	SD
Publication of a data-driven classroom-based study in a peer-reviewed journal:	4.13	3.00	1.59
Publication of an article, conceptual in nature, about academic leadership in a peer-reviewed journal:	5.00	4.00	2.05
Presentation of a data-driven classroom-based study in at a prestigious national conference:	4.65	4.00	2.04
A series of case studies published in a peer-reviewed online database:	4.88	4.00	2.09
Faculty to Student Social Media:	8.81	9.00	2.62

We also asked if respondents thought that the specific intellectual property belonged in either or all of the sections of faculty dossier or vitae – teaching, research, or service. Response categories for each of these sections were: 1 = Definitely belongs; 2 = Probably belongs; 3 = Probably does not belong; 4 = Definitely does not belong. Respondents also provided

information about their university rank (assistant, associate, full professor, other), department or unit affiliation[6], and number of years of employment as a full-time faculty member at this particular university. However, in order to protect the anonymity of the respondents, additional identifying information such as sex, race, ethnicity or age was not asked.

C. Data Analysis.

Univariate statistics were used for pre-analysis data screening to check for missing data, outliers and keying errors and to explore the distribution and characteristics of the variables (Mertler & Venetta, 2002). Not surprisingly, data from this non-probability sample did not meet the assumptions necessary for parametric tests; thus non-parametric statistical tests were chosen to analyze the data (Mertler & Vannatta, 2005; Moore, McCabe, & Craig, 2009). The Chi square test of independence, the most commonly used non-parametric test statistic (Vogt, 2007) was used to examine the relationship between the nominal variable of SoTL activities and the ordinal variables of faculty rank and discipline. Spearman's rho, a non-parametric measure of rank orderings between two interval level variables, was used to examine the relationship between the interval level variables; Mann-Whitney *U*, a non-parametric test for a difference between two groups and Kruskal-Wallis, a non-parametric test for the difference between three or more groups, were used to examine relationships between nominal and interval level variables (Rosenthal, 2001).

We grouped the respondents by colleges/schools; if there were fewer than five respondents from a particular school/college, we further grouped those respondents with associated colleges/schools in order to ensure anonymity of the respondents. For example, respondents from schools/colleges with fewer than five participants and who were associated with the medical campus were grouped as Allied Health, Dentistry, Pharmacy and Nursing; those associated with professional programs on the academic campus and with fewer than five respondents were grouped with Professional Schools; and, those associated with the undergraduate arts and sciences programs on the academic campus were grouped as Arts and University College. Our final school/college grouping was: Humanities and Science; Arts and University College; Allied Health, Dentistry, Pharmacy and Nursing; Professional Schools (Education, Business, Engineering, and Social Work); and School of Medicine.

IV. Findings.

A. Faculty Characteristics.

Based on the college/school grouping noted above, the distribution of the 159 respondents was: Humanities and Science (n = 50, 33% of respondents); Allied Health, Dentistry, Pharmacy and Nursing (n = 23, 15% of respondents); Arts and General Education (n = 26, 17% of respondents); Professional Schools of Education, Business, Engineering, and Social Work (n = 23, 17% of respondents); and the School of Medicine (n = 28, 18% of respondents). Respondents varied greatly in the number of years as full time faculty at the institution—from less than 1 to 38, with 8 years being the median and a mean of 12 years (SD 10.31). Of the 159 faculty

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[6] The administrative structure of this University is divided into a medical campus and an academic campus and further organized into 12 identifiable colleges/schools across both campuses. The majority of colleges/schools are further divided into various departments or organizational units with some departments having fewer than five faculty members while some have over 100.

members who responded to the survey, 49 (31%) identified as full professors; 50 (31%) identified at the associate level; 46 (29%) identified at the assistant professor level; and 14 (9 %) identified as collateral/clinical or administrative that we labeled "other." Because the small number of faculty in the "other" rank yielded too small a cell size to be usable for the chi-square test analysis, only full, associate, and assistant level professors were included in the bivarate analysis for the faculty rank variable.

B. Question 1: What Activities are Considered as Scholarship Of Teaching And Learning?

We answered this question by examining differences of opinion about SoTL activities based on faculty rank, years as full-time faculty, and disciplinary division.

Figure 1 shows the percentage of faculty, by faculty rank, who reported definitely or probably be considered as SoTL for each of the 16 activities. A great majority of respondents across all ranks considered dissemination of knowledge activities to be SoTL: Data-driven, classroom-based studies (98%) ; Publication of any in peer-reviewed journals (97%); Publication of any in peer-reviewed electronic databases (92%); Case studies of teaching and learning (89%); Presentation of any at regional, or national conferences (95%). On the other hand, the following activities, not generally associated with knowledge dissemination, were considered SoTL by fewer number of faculty: Making changes to your teaching based on those evaluations (23%); Educational blogs and wikis (38%); Using Blackboard in your teaching (17%); Putting your lecture notes on PowerPoint (12%).

A Chi square test of independence was used to examine the relationship between activities considered as SoTL and faculty rank. Statistically significant differences by rank were found for the following five out of 16 activities:

- Developing case studies for use in the classroom ($x^2 = 14.38$; $p = 0.001$)
- Developing a new course ($x^2 = 8.09$; $p = 0.017$)
- Integrating technology into your teaching ($x^2 = 6.71$; $p = 0.035$)
- Making changes to teaching based on student evaluations ($x^2 = 12.77$; $p = 0.002$)
- Using Blackboard ($x^2 = 6.65$; $p = 0.036$)

Interestingly, SoTL activities that were differentiated by rank were those not generally associated with publication or knowledge dissemination. For example, only 40% of tenured full professors believed that "Developing case studies for use in the classroom" was SoTL while 78% of tenure-track assistant professors thought so. Similarly, only 18% of tenured, full professors believed that "Making changes to teaching based on student evaluations" was SoTL while 48% of tenure-track assistant professors thought the same.

Given the differences in what activities were considered to be SoTL based on faculty rankings, it was not surprising that there were differences based on years as a full time faculty at the university. Mann-Whitney *U* test of differences between two groups (1 = activity is considered SoTL; 2 = activity is considered not SoTL) revealed that respondents with fewer years of teaching were more likely to consider the following activities as SoTL: Developing case studies for use in teaching (Mann-Whitney *U* = 1715.500; *p* = 0.007); Putting lectures on PowerPoint (Mann-Whitney *U* = 724.500; *p* = 0.044); and Making changes to teaching based on student evaluations (Mann-Whitney *U* = 1188.500; *p* = 0.000).
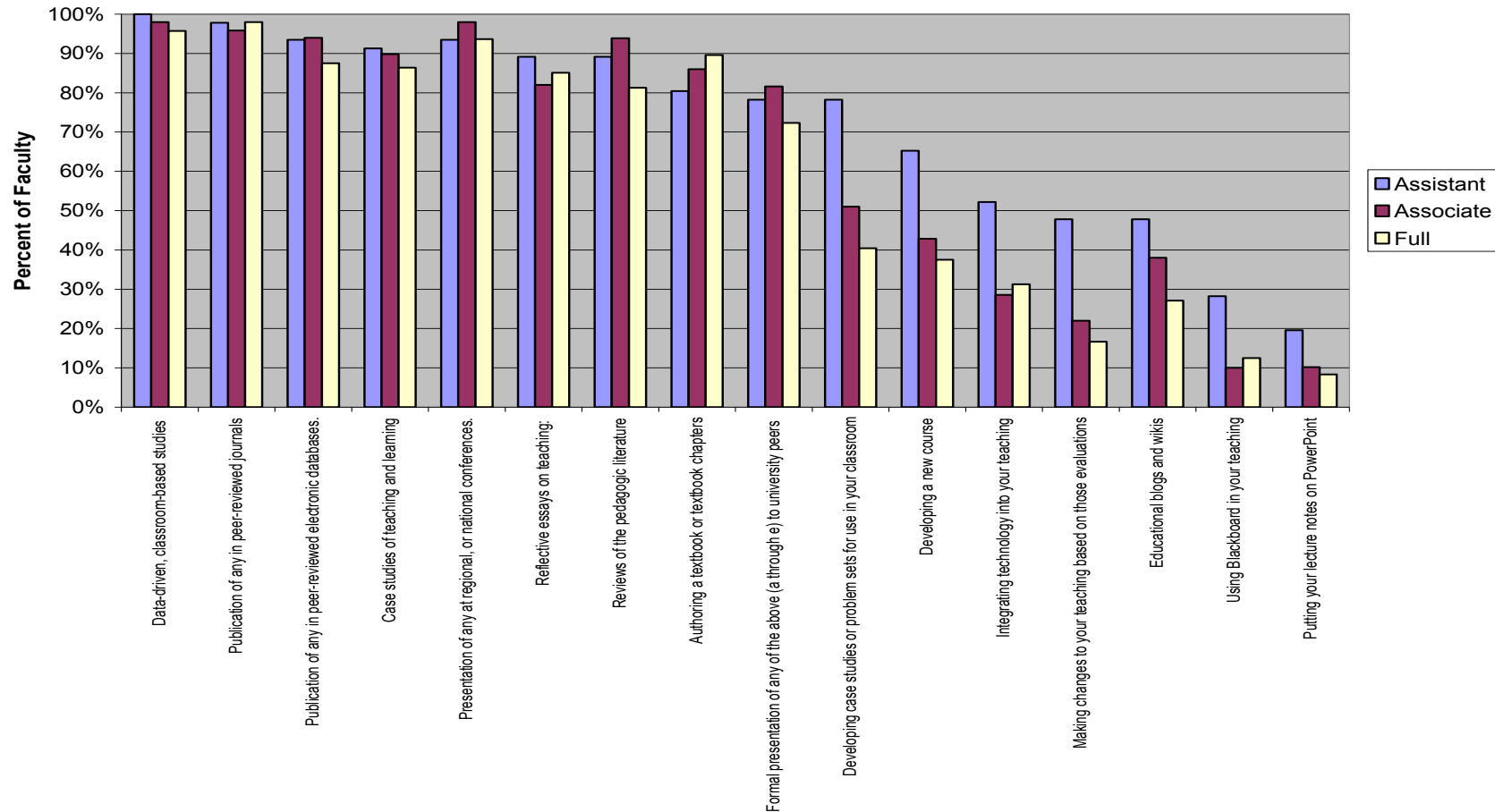
Figure 1. Activities Considered as Scholarship of Teaching and Learning by Rank.

Opinions of faculty in the colleges/schools differed in only one of the 16 activities, "Integrating technology into your classroom" (x^2 = 9.39 p = 0.05) with respondents from the Professional Schools division least likely to report this activity as SoTL.

C. *Question 2: What is the Amount and Type of Pedagogical Scholarship generated by faculty in this institution?*

Faculty members' response to the number of SoTL publications they had produced, the extent to which these publications were empirical or conceptual in nature, and whether or not they received external funding to support their SoTL publications follows. Note that we asked respondents to refer to the definition of SoTL provided in the survey instrument, that the designation of empirical or conceptual was left to the interpretation of the respondent, and that external funding varied by yes or no rather than by amount of funding.

The distribution of the responses to the question about number of SoTL publications ranged from 0 to 130 and was severely skewed (m = 6.18, med = 1.00, mode = 00, sd = 19.43). Thus, we collapsed this variable into the following categories (0 = 0 publications; 1 = 1 - 5 publications; and 2 = more than 6 publications. The majority of respondents (43%) reported having no SoTL activity, 39% reported 1 - 5 publications and 14% reported having more than 6 publications. About a third (37%) of respondents reported that their SoTL publications were about evenly divided between being empirical and conceptual in nature, while 28% reported that their SoTL publications were primarily empirical, and 17% reported their publications being primarily conceptual in nature. Only 23% of respondents reported receiving external funding to support their SoTL work.

Kruskal-Willis tests were used to analyze number of publications by college/unit and by faculty rank, and chi-square tests were used to examine the relationships between external funding, type of SoTL article published, unit/college, and faculty rank. None of these relationships reached statistical significance except for the relationship between external funding and faculty rank (x^2 = 6.187 ; p = 045). Associate and full professors were more likely to receive external funding for their SoTL efforts than were assistant professors.

D. *Question 3: What Merit is Accorded SoTL for Purposes of Faculty Assessment?*

We answered this question in two ways. First, we reported the percentage of faculty who considered each of the vignettes for promotion and tenure, annual raises and for award decisions (Figure 2) and the percentage of faculty who would place the various intellectual properties in the various sections of their vita (Figure 3). The majority of respondents reported that the following intellectual properties probably or definitely should be considered in the faculty assessment for annual review, for promotion and tenure, and for awards; and also that these same intellectual properties belong in the "Research" section of the dossier:
   a) Publication of a data-driven classroom-based study in a peer-reviewed journal: 87% annual review; 95% promotion and tenure; 99% awards
   b) Publication of an article, conceptual in nature, about academic leadership in a peer-reviewed journal: 82% annual review: 93% promotion and tenure; 95% awards
   c) Presentation of a data-driven classroom-based study in at a prestigious national conference: 78% annual review; 91% promotion and tenure; 93% awards

d) A series of case studies published in a peer-reviewed online database: 75% annual review; 90% promotion and tenure; 93% awards.

Faculty to student social media was considered appropriate by the majority of faculty (66%) only for placement in the "Teaching Section" of the vita. The majority of respondents would not place any of the five activities in the "Service" section of the dossier. However, 26% would place the "Publication of an article, conceptual in nature, about academic leadership in a peer-reviewed journal" and 18% would place "A series of case studies published in a peer-reviewed online database" in the Service section of the vita.

The second way we answered this question was to explore differences in the overall merit intellectual property scales (described in methodology section above) across schools/colleges and faculty rank. Kruskhal-Wallis test of difference between means indicated no statistically significant differences across schools/colleges. However, full time faculty considered the intellectual property item 'faculty to student social media' to have less overall merit ($m = 9.74$) than did assistant professors ($m = 8.29$) (K-W chi square = 8.55; p = 0.01).
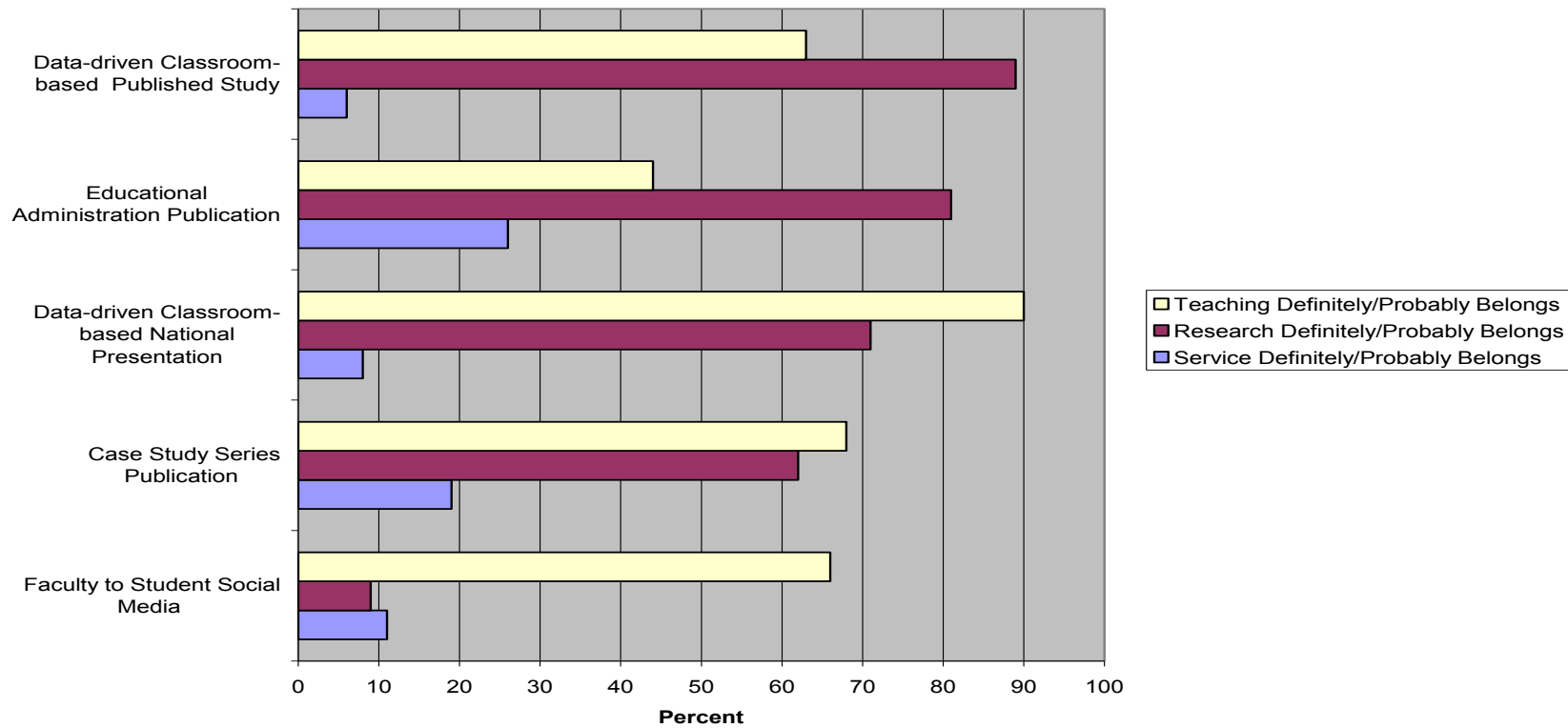
IV. Conclusion.

A. Interpretation of Results.

This investigation was performed to add to the rather limited empirical data on faculty perceptions of SoTL. Our study gathered information about faculty opinions of SoTL, the amount and types of scholarship it represented, and the value given to SoTL within the context of faculty evaluation. Critical to establishing faculty evaluation criteria is defining what constitutes SoTL and the merit accorded to it. Our faculty, regardless of rank, considered the following activities as SoTL: Data-driven classroom-based published study, educational administration publication, data-driven classroom-based national presentation, and case study series publication. These activities were also given merit consideration for promotion and tenure and placed within the research component of the dossier. Thus, these activities help define what our faculty considered SoTL.

A commonality of the activities considered as SoTL by a great majority of faculty across ranks is that they are generally reviewed, evaluated, and made accessible to others. We can say then, at least at this institution, the same characteristics that define traditional discipline-based research also apply to SoTL. However, five of the 16 teaching activities that are less likely to be publishable scholarly products (Developing case studies or problem sets for use in your classroom; Developing a new course; Integrating technology into your teaching; Making changes to your teaching based on those evaluations; Educational blogs and wikis) were considered to be SoTL by approximately half of the junior faculty whereas only a fraction of senior faculty considered these same activities as SoTL. This is an important disconnect found between the perceptions of tenured faculty and their non-tenured colleagues. It appears that our junior faculty do not see a key distinction between good, initiative, or scholarly teaching and SoTL as described by Glassick, Huber and Maeroff (1997) and supported by others (Cambridge, 1999; Hutchings & Shulman, 1999; Shulman, 1999). Glassick and colleagues promoted scholarly teaching as the investigation of teaching and learning by a variety of systematic analytical methods. Results are used to refine teaching methods and improve student learning. The scholarship of teaching and learning contains all of the elements of scholarly teaching but further

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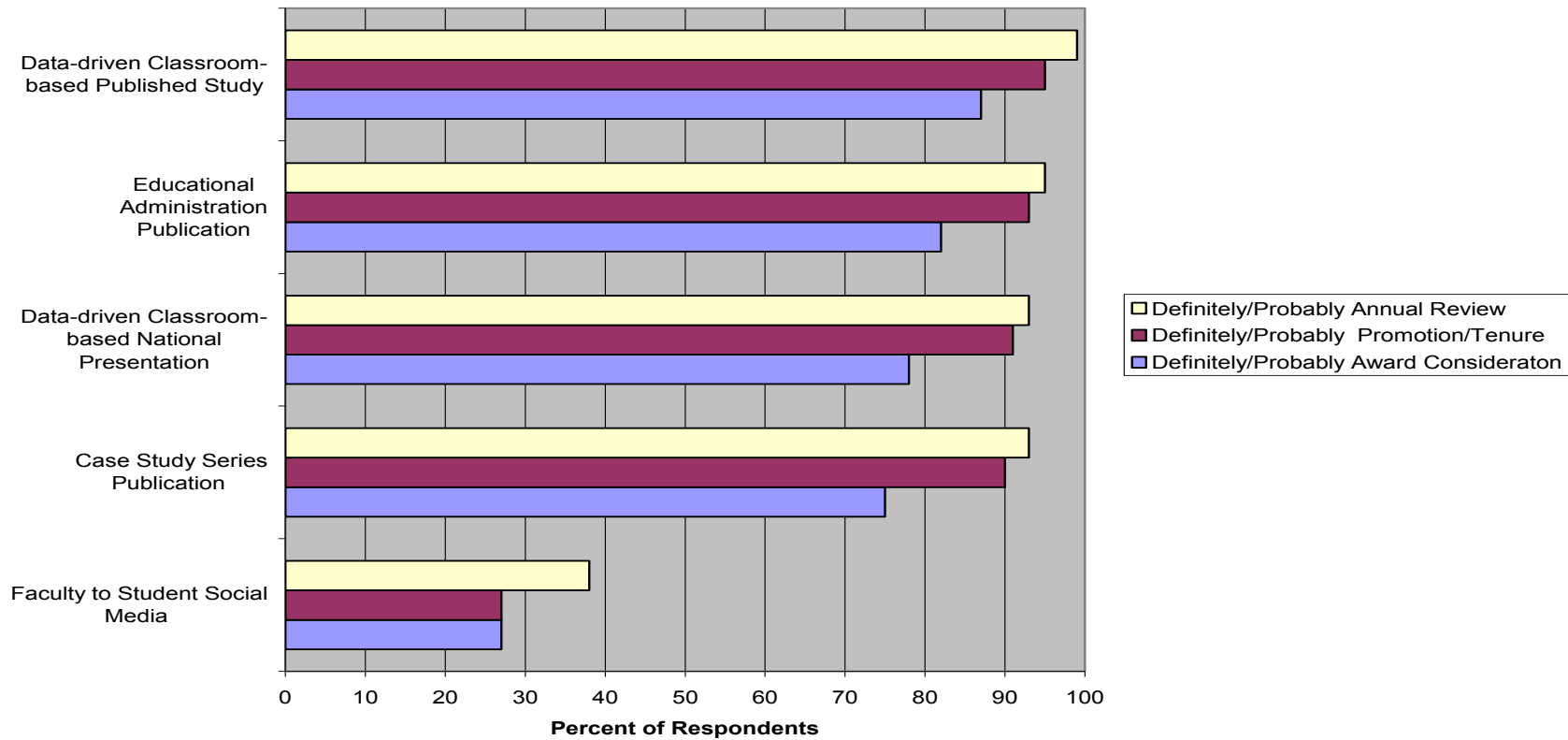
Figure 2. Intellectual Property Merit Considerations.

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Figure 3. Placement of Intellectual Property in Vita.

extends the process by making public the results of the investigation. Our faculty may benefit from having these similarities and distinctions clarified.

Our findings suggest that socialization as described by McKinney (2006) is not the reason for varying perceptions of SoTL activities among tenured and non-tenured faculty. She offered that socialization of new and junior faculty results in scholarship being understood only as traditional disciplinary research; this sends the message that SoTL is a component of teaching and is less important than discovery scholarship in the discipline. It appears that the majority of our faculty do not discount the merit of SoTL as compared to disciplinary-based research, as long as the scholarly product is critically reviewed and made available to others.

Nearly half of faculty (43%) responding to our survey reported no SoTL experience. Even though not completely engaged in SoTL, this faculty population judged sample productivity activities resulting in dissemination of information through peer reviewed journals or online databases appropriate for annual review and/or promotion and tenure consideration. This is consistent with our thoughts above on what is traditionally thought of as scholarship (Fincher & Work, 2006). Gurung, et. al. (2008) reported that the majority of faculty respondents also agreed that any peer reviewed work was worthy of consideration for promotion and tenure. For example, his psychology faculty and ours indicated presentation at professional conference and reflective essay on teaching as SoTL.

Our study investigated faculty experience by the number and types of SoTL publications, (either empirical or conceptual in nature), amount of external funding, and differences with SoTL activity among divisions. Anecdotal evidence at our university suggests that there are varying interpretations of promotion and tenure guidelines among colleges/schools where the amount and type of SoTL publication and obtainment of external funding may be the criteria used to judge whether activities are worthy in the faculty assessment process. We found differences between colleges/schools. Humanities had the least number of publications and Professional schools the most. Professional schools also had the greatest amount of external funding. Healey (2005) states, in regards to divisional or disciplinary approaches towards SoTL, that the "…conduct of research and teaching methods tend to differ between disciplines" because SoTL involves critical reflection of one's own practice, development of subject-based teaching modalities, and discipline specific pedagogic research (Healey, 2000). Thus, our differences among colleges/schools in terms of the number of publications and amount of external funding may reflect varying disciplinary cultures or norms about what is considered valuable and what qualifies as research or scholarship. However, there was only a statistical difference for one of 16 sample SoTL activities among faculty by colleges/schools, which could have been by chance. Our results suggest that faculty perceptions of what constitutes SoTL were similar across colleges/schools, yet faculty within Professional schools appear to be more actively engaged in SoTL as measured by number of publications and external funding.

Overall, only a quarter of surveyed faculty who indicated that they engaged in SoTL reported receiving external funding. Gurung, et. al. (2008) reported that almost 75% of faculty respondents indicated that neither departments nor institutions were providing adequate financial support for SoTL activities. Sixty-two percent of faculty respondents in the study by Pienta (2004) agreed that lack of financial support was a reason for varying rates of publications by chemical education faculty. Funding for academic pursuits offers financial resources for completion of proposed projects and suggests merit as projects are usually peer reviewed and awarded based on their value and potential for new discovery. Funding is generally acknowledged and awarded during faculty assessment. Yet some points for discussion naturally

follow: Does lack of funding preclude the merit of SoTL? It is our impression that there are fewer prestigious and financially rewarding opportunities for SoTL endeavors compared to traditional disciplinary-based research. Would SoTL be looked upon differently if it were highly funded? Is any scholarly pursuit that is not funded highly valued by contemporary institutions? Is this the proverbial "chicken or egg" scenario? That is, are there fewer fundable opportunities because SoTL, in general, is not highly valued, or is SoTL not highly valued because there are fewer fundable opportunities?

The majority of our faculty respondents considered the same examples of SoTL activities for both "research" and "teaching" sections of a promotion and tenure dossier. This again suggests that interpretation of promotion and tenure guidelines at our university are either ill defined, misunderstood, or at the least, open to interpretation. It stands to reason that if our respondents were confused about where SoTL activities best fit, so could department chairs and promotion and tenure committee members. Certainly, there is an historical and negative notion of "double dipping" that is of concern, but we must ask: cannot a work hold more than one facet? For example, developing a new instructional program may fall under the "teaching section," while publishing a peer-reviewed journal article featuring rigorous analysis of the program's qualitative outcomes may be part of the "research section." Terpstra and Honoree (2009) suggest that university outcomes are greater when there is a dual focus on teaching and research. Could it be that academic pursuits such as SoTL are highly complicated and integrated and naturally fall into more than one traditional promotion and tenure section? At the very least, our findings indicate that the faculty members compiling tenure and/or promotion materials should communicate in advance with tenure and promotion decision-makers about the place of said materials in a portfolio. At the same time, faculty would be best served to maintain written reflections on how their teaching informs their research, and vice versa.

B. Limitations.

There were inherent limitations of our study's design. Although low, our overall response rate of 15% was within the range of other university faculty surveys, such as 22% for National Faculty Survey, APLU Sloan National Commission on Online Learning, (Seaman, 2009) and 15.8% (Maurer, et. al., 2009). A particularly small percentage of collateral and clinical faculty responded to our survey. We speculate that this is due to a lack of motivation by these faculty to respond to a survey on promotion and tenure criteria as this is not relevant to their affiliation with the university. The concern with lower response rates in any investigation is that the findings are not universal but based on the attitudes of a few. It stands to reason that potential respondents with a vested interest in a particular topic are the most likely to respond. However, nearly half of our respondents indicated no SoTL experience. It was also interesting that almost 70% of respondents were non-tenured faculty, which suggests that our study's results more heavily reflect this group's opinion than tenured faculty members' opinion. Finally, pooling of faculty data from various colleges/schools may diminish details or nuances from the specialty areas but was done to protect faculty anonymity and provide a global view of faculty opinion.

C. Implications.

This investigation provides empirical evidence regarding faculty perceptions of the status of SoTL at one large urban university where the workload of many faculty centers on teaching. Our

findings further define SoTL and may serve as an impetus for revising promotion and tenure policies and procedures. Our results suggest that the majority of faculty agreed that scholarly works such as educational administration and case study series publications constituted SoTL. Discouragingly, though, our data indicated a disconnect between tenured and non-tenured faculty where non-tenured faculty more often judged teaching activates that are less likely to be published as SoTL. Our results also show that the majority of faculty considered the same examples of SoTL activities for both "research" and "teaching" sections of a promotion and tenure dossier. With the type and magnitude of variation found with our faculty's interpretation of promotion and tenure guidelines, it is logical to call for the revision of these criteria so that faculty have consistent and equal opportunity for advancement. In accordance with many of our tenured faculty opinion and other authors (Cambridge, 1999; Glassick, Huber, & Maeroff, 1997; Hutchings & Shulman, 1999; Shulman, 1999) scholarship may only be recognized once a work is critically reviewed and disseminated to others. Guidelines may also offer acceptable venues for making scholarly work public. This could include electronic or paper journals and databases and presentation at a national conference where submissions have been peer reviewed prior to acceptance. Even so, presentation of course outcomes at department meetings or self reflection on one's teaching practices that remains relatively private may be considered scholarly teaching and included under the "teaching" section of promotion and tenure dossier. Revising evaluation guidelines and making distinctions between what constitutes "teaching" and "research" could give faculty clearer direction and motivation. That is, if teaching faculty know they need to publish in order for their work to be recognized as "research" they may be more motivated towards developing systematic analyses for validating their teaching outcomes and making their work public.

There are many potential benefits to making one's scholarly work public within higher education. The faculty member engaging in SoTL may enhance his or her own teaching through critical reflection and external review. Raising awareness of an area of study within the academy can stimulate collaborative relationships and growth by bringing people together with like interests and expertise. Making scholarly work public through written assays and oral presentations, for example, can bring notoriety to university programs. Finally, sharing of teaching materials and determining, through systematic analysis, what teaching methodologies are most effective can decrease faculty workload, make curricula more efficient, advance pedagogy, and enhance student learning.

It must be said that in order for faculty at this institution and others to fully engage in SoTL, policy and procedures may need to be modified. At the institutional level, for example, policies and procedures regarding sabbatical leave eligibility, faculty release time, internal grant funding and Institutional Review Boards' approvals may need revision to support faculty engaged in this type of scholarship ("Policies and Procedures," retrieved 2011). External accrediting agencies and disciplinary societies can also foster faculty work in this area by writing policies acknowledging and rewarding SoTL and the advancement of pedagogical research ("Policies and Procedures," retrieved 2011).

Time will tell what impact this investigation has locally and beyond. A logical first step, however, is to revise evaluation criteria to decrease the chance for varied interpretation across all faculty ranks. The point that seems to need the most clarification centers on what constitutes "research." If faculty understand that "research" is a public event requiring rigorous review, they may be more motivated to design methodical approaches to analyzing their teaching effectiveness and student learning. From there, as described above, there are many potential

benefits within higher education. The focus of future research recognizing SoTL may include increases in the quantity and quantity of SoTL publications explicitly documenting advancement of student learning; faculty collaboration within and across disciplines at the local, regional and national level; and educational research with internal and external grant support. Finally, we propose that knowing the attitudes of one faculty toward SoTL might initiate momentum towards institutional reform here and elsewhere, providing equal opportunities for faculty promotion and evidence of pedagogical advancement.

Appendix 1. Faculty Related Activities for Consideration in Promotion and/or Tenure.

(List of scholarship related activities that could be interpreted as SoTL according to the McKinney definition, used in the faculty survey; from section IIIb):

a) Data-driven, classroom-based studies: i.e., formal research projects with appropriate statistical analysis, formal hypotheses and their testing, etc., employing either quantitative or qualitative methodologies

b) Reflective essays on teaching: integrative evaluations of other work, essays that challenge current teaching and learning principles and practices, as well as encourage experimentation in the classroom

c) Reviews of the pedagogic literature

d) Case studies of teaching and learning

e) Developing case studies or problem sets

f) Publication of any of the above (a through e) in peer-reviewed journals

g) Publication of any of the above (a thorough e) in peer-reviewed electronic databases

h) Formal presentation of any of the above (a through e) to peers within your academic unit or institution

i) Presentation of any of the above (a through e) at disciplinary, multi-disciplinary, regional, or national conferences

j) Developing a new course

k) Integrating technology into your teaching

l) Reflecting on course evaluations and making changes to your teaching based on those evaluations

m) Authoring a textbook or textbook chapters

n) Putting your lecture notes on Powerpoint

o) Using Blackboard

Appendix 2. Description of Vignettes.

Vignette Title	Description of Vignette as it appeared in survey
p) Publication of a data-driven classroom-based study in a peer-reviewed journal	An article published in *Advances in Physiology Education* describes the results of a study of undergraduate students in 12 courses at 8 different institutions. The students were surveyed to determine the prevalence of 13 different misconceptions (conceptual difficulties) about cardiovascular function. *Advances in Physiology Education* is an online, peer-reviewed journal published by the American Physiological Society.
q) Publication of an article, conceptual in nature, about academic leadership in a peer-reviewed journal	A paper published in Academic Leadership provides historical perspective, definition, and implications for intellectual property, copyright, and fair use in education legislation. Academic Leadership is an on-line peer-reviewed journal that published articles by faculty and administrators from all disciplines and units in the academy.
r) Presentation of a data-driven classroom-based study in at a prestigious national conference	A study compared two general chemistry courses taught in the same semester by the same instructor. One section was taught using standard lecture format, while the second section was taught by substituting one lecture with a break-out session involving peer led group work. Student progress in the two sections was compared based on test results. The results of the study were presented at the most prestigious nation chemistry conference.
s) A series of case studies published in a peer-reviewed online database	A series of virtual case studies that focus on obtaining informed consent and patient motivation relative to managing patients with depression. The case studies were published on MedEdPORTAL, a peer-reviewed online inventory of educational materials.
t) Faculty to Student Social Media	Over the course of the semester, a faculty member blogs about their experience using wikis for student collaboration and Facebook to communicate with students.

References

Bailey, D. M. (1991). *Research for the health professional: A practical guide*. Philadelphia, PA: FA Davis.

Bernstein, D., & Bass, R. (2005). The scholarship of teaching and learning. *Academe, 91*(4), 37-43.

Braxton, J. M., Luckey, W., & Helland, P. (2002). Institutionalizing a broader view of scholarship through Boyer's four domains. *ASHE-ERIC Higher Education Reports, 29*(2), 1-154.

Brew, A. (2010). Transforming academic practice through scholarship. *International Journal for Academic Development, 15*(2), 105-116. doi: 10.1080/13601441003737618.

Boyer, E. (1990). *Scholarship reconsidered: Priorities of the professoriate*. Princeton, NJ: Carnegie Foundation for the Advancement of Teaching.

Burke, D., Johnson, R., & Kemp, D. (2010). The twenty-first century and legal studies in business: Preparing students to perform in a globally competitive environment. *Journal of Legal Studies Education, 27*(1), 1-33. doi: 10.1111/j.1744-1722.2010.01066.x.

Cambridge, B. L. (2000). The scholarship of teaching and learning: A national initiative. In M. Kaplan and D. Leiberman (Eds.), *To Improve the Academy* (Vol 18) (pp. 55-68). San Francisco: Jossey-Bass.

Fincher, R.E., & Work, J.A. (2006). Perspectives on the scholarship of teaching. *Medical Education*, *40*(4), 293-295. doi: 10.1111/j.1365-2929.2006.02404.x.

Glassick, C.E., Huber, M.T., & Maeroff, G.I. (1997). *Scholarship Assessed: Evaluation of the Professoriate*. San Francisco: Jossey-Bass.

Gurung, R.A., Ansburg P. I., Alexander, P.A., Lawrence, N.K., & Johnson, D.E., (2008). State of the scholarship of teaching and learning in psychology. *Teaching of Psychology*, 35, 249-261. doi:10.1080/00986280802374203.

Gurung, R.A., Weidert, J., & Jeske, A. (2010). Focusing on how students study. *Journal of the Scholarship of Teaching and Learning, 10*(1), 28-35.

Healey, M.M. (2000). Developing the scholarship of teaching in higher education: A discipline-based approach. *Higher Education Research and Development, 19* (2),169-189.

Healey, M.M. (2005). Linking research and teaching: exploring disciplinary spaces and the role of inquiry-based learning. In Barnett, R. (Ed.) *Reshaping the University: New Relationships between Research, Scholarship and Teaching*. McGraw-Hill / Open University Press.

Henderson, B.B., & Buchanan, H.E. (2006). The scholarship of teaching and learning: A special niche for faculty at comprehensive universities? *Research in Higher Education, 48*(5), 523-543. doi: 10.1007/s11162-006-9035-2.

Hubball, H., Clarke, A., & Poole, G. (2010). Ten-year reflections on mentoring SoTL research in a research-intensive university. *International Journal for Academic Development, 15*(2), 117-129. doi:10.1080/13601441003737758.

Hutchings, P., & Shulman, L. S. (1999).The scholarship of teaching: New elaborations, new

developments. *Change, 31*(5), 11–15.

JoSoTL Resources. (2008, July). Retrieved January 30, 2011, from https://www.iupi.edu/~josotl/resources.php

Jurkowski, O., & Kerr, S. (2010). Development of an educational innovation incubator. *TechTrends: Linking Research & Practice to Improve Learning, 54*(2), 72-76.

Kreber, C. (2003). Challenging the dogma: Towards a more inclusive view of the scholarship of teaching. *Journal on Excellence in College Teaching, 14*(2/3), 27-43.

Maurer, T., Frost, L., Sturges, D., Charles, S., Allen, D., Cawthorn, M., & Brewton, C. (2009). Faculty and student perceptions of post-exam attendance. *Journal of the Scholarship of Teaching and Learning, 9*(3), 38-55.

McKinney, K. (2004). The scholarship of teaching and learning: Past lessons, current challenges, and future visions. *To Improve the Academy,* 22, 3-19.

McKinney, K. (2006). Attitudinal and structural factors contributing to challenges in the work of the scholarship of teaching and learning. In J.M. Braxton (Ed.), *Analyzing Faculty Work and Rewards: Using Boyer's Four Domains of Scholarship- New Directions in Institutional Research.* San Francisco: Jossey Bass.

Mertler, C.A., & Vannatta, R.A. (2005). *Advanced and Multivariate Statistical Methods* (Third Edition). Los Angeles: Pyrczak Publishing.

Moore, D.S., McCabe, G.P., & Craig, B.A. (2009). *Introduction to the Practice of Statistics*. New York: W. H. Freeman.

Osborne, R., Kriese, P., Tobey, H., & Johnson, E. (2009). Putting it all together: Incorporating "SoTL Practices" for teaching interpersonal and critical thinking skills in an online course. *InSight: A Journal of Scholarly Teaching*, *4,* 45-55.

Persellin, D., & Goodrick, T. (2010). Faculty development in higher education: Long-term impact of a summer teaching and learning workshop. *Journal of the Scholarship of Teaching and Learning, 10*(1), 1-13.

Pienta, N.J. (2004). Measuring productivity in college-level chemistry education scholarship. *Journal of Chemical Education, 81*(4), 579-583.

Policies and procedures supporting the scholarship of teaching and learning in the research university executive summary Research Universities Consortium for the Advancement of the Scholarship of Teaching and Learning (RUCASTL), Indiana University. Retrieved January 30, 2011, from http://www.indiana.edu/~sotl/rucastl_keep/Policies-SoTL10-10-05.pdf

Rosenthal, J.A. (2001). *Statistics and data interpretation for the helping professionals*. Belmont, CA: Wadsworth.

Shulman, L. S. (1999). Course anatomy: The dissection and analysis of knowledge through teaching. In P. Hutchings (Ed.), *The course portfolio: How faculty can examine their teaching to advance practice and improve student learning*. (p.5). Washington, DC: AAHE

Seaman, J. (2009). *Online Learning as a Strategic Asset. Volume II: The Paradox of Faculty Voices: Views and Experiences with Online Learning: Results of a National Faculty Survey, Part of the Online Education Benchmarking Study Conducted by the APLU-Sloan National Commission on Online Learning*. Washington, D.C.: Association of Public and Land-grant Universities.

Shapiro, H.N. (2006). Promotion and tenure and the scholarship of teaching and learning. *Change*, *3*(2), 39-43.

Sharmaa, M.D., & McShaneb, K. (2008). A methodological framework for understanding and describing discipline-based scholarship of teaching in higher education through design-based research. *Higher Education Research & Development, 27*(3), 257-270.

Terpstra, D.E., & Honoree, A.L. (2009). The effects of different teaching, research, and service emphases on individual and organizational outcomes in higher education institutions. *Journal of Education for Business*, *84*(3), 169-176.

Vogt, W.P. (2007). *Quantitative research methods for professionals*. Boston: Pearson.

Walker, J.D., Baepler, P., & Cohen, B. (2008). The scholarship of teaching and learning paradox: Results without rewards. *College Teaching, 56*(3), 183-189.

Listening to the voices of today's undergraduates: Implications for teaching and learning

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Abstract: The landscape of higher education has changed with the presence of a new generation of college students. Current studies do not carry the voices of the new generation known as the Millennials. This article presents the findings of a qualitative study that explored the learning experiences of Millennial-generation undergraduates at a public comprehensive university. The researchers organized a series of focus groups designed primarily to determine how the undergraduates characterize their learning experiences. Five thematic categories of data emerged from the study, providing insights into students' perceptions and motivations. The implications of the findings for teaching and learning are highlighted.

Keywords: active learning, focus groups, integrative learning, involvement theory, Millennial generation, student engagement

Beneath the broad umbrella of the scholarship of teaching and learning (SoTL) is a growing body of publications reflecting varied methodological techniques. The techniques include quantitative assessments of student learning (e.g., Bernardes & Hanna, 2009; Breedlove, Burkett, & Winfield, 2007); case studies of what works in course development (Dole & Bloom, 2009); and reflective essays about the connection between SoTL and actual practice (Bowen, 2010; Willox & Lackeyram, 2009). Despite the breadth and quality of existing SoTL work, surprisingly little is known about how students themselves characterize their learning experiences. The few studies that have prominently carried the "voices" of college students date back to the 1980s and therefore do not incorporate the insights of an entirely new generation – the "Millennials." If teaching is to become more learner-centered and collaborative, as a new paradigm requires (Barr & Tagg, 1995; Weimer, 2002), then it is particularly important to take into account what students themselves have to say.

I. Literature Review.

The literature we review in this section focuses on the Millennials and on current pedagogical approaches or strategies employed in today's institutions of higher education. The strategies we have identified in the literature are categorized as *active and integrative learning*.

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A. Millennial Generation.

Higher-education administrators and faculty now face a dramatically changed demographic landscape. Labeled *Millennials*, the generation born after 1982 is described in stark contrast to previous youth generations – Generation X (born 1961-1981) and the Baby Boomers (born 1943-1960) Howe & Strauss, 2000). According to Howe and Strauss (2000, 2003), the new generational cohort displays positive social habits, such as a focus on teamwork, achievement, civic-spiritedness, and good conduct. Unlike their predecessors, Millennials are not self-absorbed, distrustful pessimists and rule-breakers. Rather, they are optimistic, high-achieving rule-followers, who rely on structure in their daily lives (Howe & Strauss, 2000, 2003; see also DeBard, 2004).

Although Howe and Strauss (2003) made several generalized claims about changing expectations and learning styles of this new generation, they did not discuss how (or even whether) these expectations should be accommodated. They seemingly have left that matter to experts engaged in SoTL. If the general characterization of Millennials is to be believed, this new generation is undoubtedly defying conventional wisdom regarding youth. Still, educators have to be mindful of the danger of stereotyping students, ignoring individual differences, and treating them in a manner designed to reinforce behavior that is part of normative generational expectations. It is important that educators understand how generational characteristics influence the expectations and motivations of their students. Such an understanding can sensitize them to the needs of their students and facilitate the teaching-learning process in today's classrooms.

B. Active and Integrative Learning.

Under the broad heading of SoTL, a number of important studies have examined the educational experiences of undergraduates in recent years (e.g., Gardner, 2006; Pintrich, 2004). These studies reflect a larger movement in higher education that emphasizes new and different teaching methodologies, such as the use of multiple instructional technologies, a refocus on active and integrative learning (Association of American Colleges and Universities, 2002; Huber, 2007), and increased opportunities for experiential learning (Bringle & Hatcher, 2000).

Active learning is generally defined as any instructional method that engages students in the learning process. It calls for students to do meaningful learning tasks and to think about what they are doing (Bonwell & Eison, 1991; Prince, 2004). Active learning implies student participation and engagement in the learning process. It is often contrasted to the traditional lecture, where students passively receive information from the course instructor. In addition, active learning is often tied to high-impact, community-based educational practices such as service learning, undergraduate research, and internships (Kuh, 2008), which involve out-of-classroom projects. In active learning, students engage in higher-order cognitive activities, such as the analysis, synthesis, and evaluation of information. While we note the importance of fostering active learning, we are aware that several obstacles are associated with it. Obstacles include limited class time, a possible increase in preparation time, the potential difficulty of using active learning in large classes, and a lack of the necessary material, equipment, or resources (Bonwell & Eison, 1991). Additional drawbacks include the risk that students will not participate and the possibility that they will not use higher-order thinking or learn sufficient content.

Much work still needed to be done regarding integrative learning. As Derek Bok (2006) argues, despite some positive gains, the structure of the modern university does not allow students to see connections across disciplines or between curricular and co-curricular activities. Still, there is enduring interest in integrative learning, which is typically demonstrated through the application of knowledge and skills to new settings and complex problems (Association of American Colleges and Universities, 2007). Active-learning practices facilitate the "enriching educational experiences" associated with student engagement (National Survey of Student Engagement, 2000, p. 4). Further, student engagement is manifested in the amount of time and effort students put into their studies and other educationally purposeful activities. Engagement is demonstrated also in how institutions organize the curriculum and other opportunities for student learning, and in the deployment of resources as well.

It stands to reason that students learn more when they are engaged, or involved intensely, in their education, and when they think about and apply what they learn in different settings. For faculty, the challenge is to implement strategies that foster the much-touted integrative learning. Clearly, implementing such strategies requires thoughtful planning and the creative use of resources.

II. Research Purpose and Theoretical Perspective.

Prompted by the recent generational shift and the adoption of new approaches to pedagogy, we decided to conduct a qualitative study through which we would elicit the views and voices of Millennial-generation students. We were interested particularly in hearing from undergraduates about how they viewed their learning experiences. Our formative research plan was complemented by a theoretical perspective that encompassed the concepts of *active learning* (Bonwell & Eison, 1991), as defined above, and *student involvement* (Astin, 1984).

Astin's theory of student involvement posits that the amount of student learning and personal development associated with any educational program is directly proportional to the quality and quantity of student involvement in that program. Astin defines *involvement* as "the amount of physical and psychological energy that the student devotes to the academic experience" (p. 297). The involvement theory is concerned with the behavioral mechanisms or processes that facilitate student development. The theory highlights student-faculty interaction and suggests that frequent interaction with faculty is more strongly related to satisfaction with college than any other type of involvement. Of course the "academic experience" to which Astin refers is not limited to activities and outcomes in the classroom but also to those occurring outside the classroom walls (Kuh, 2008; National Survey of Student Engagement, 2000). We were therefore interested in determining how Millennial-generation students characterize their learning experiences, both inside and outside the classroom.

III. Method.

Our research project took place at a mid-sized, public comprehensive university in the Southeast. We used a qualitative, exploratory design, employing the focus group method. A focus group is a small-group, moderated discussion that follows a predetermined protocol; discussion is used to elicit insights and understandings that simple questionnaire items may not be able to do. Whereas one-on-one interviews may reveal an individual's thinking about a specific topic, the interaction of focus group participants, as they share their perspectives, opinions, and experiences, provides

researchers with a broader view than that obtained through individual interviews (Morgan, 1998). Focus groups are well suited for producing information on college students' attitudes and experiences about particular programs, services, or relevant issues (Jacobi, 1991; Kaase & Harshbarger, 1993).

A. Participants and Procedure.

We organized a series of six focus groups and purposively recruited Millennial-generation undergraduates (n = 33; 19 female, 14 male; ages 19-24) with varied levels of campus involvement so as to capture diverse perspectives based on a range of student experiences. In terms of campus involvement, the sample included at least one Greek-letter organization president, two board members of student clubs, one philanthropic service project coordinator, and three students who indicated that they had not yet become involved in campus activities. Each group was composed of three to eight members, male and female, including students from all undergraduate classes (Table 1). Among focus group members were students on "learning contract" – that is, students who had earned less than a 2.0 GPA during their first semester at the university – and students who were enrolled in the summer Academic Success Program. Some group members were recruited randomly at the University Center.

Table 1. Focus group composition.

Focus Group Population	Sample (n = 33)	Gender		Class			
		M	F	F	S	J	Sr
Honors College	7	2	5	1	3	2	1
Student-athletes	5	2	3	1	4		
Learning Contract	3	2	1		1	1	1
Academic Success Program	5	3	2	1	1	2	1
Greek-letter Organizations	8	3	5	1	5	2	
Random	5	2	3		1	1	3

F = freshman, S = sophomore, J = junior, Sr = senior

The university's Institutional Review Board approved this research project, and each of the participating students signed a consent form, signifying their willingness to participate in the project, and their understanding of the confidential nature of the data. In an attempt to control for the influence of the moderator, the same moderator was assigned to all focus group sessions. The moderator asked open-ended, semi-structured questions that served as prompts for the discussion. Four sets of questions were included in the protocol (Table 2). Throughout the focus group sessions, the moderator stimulated discussion among the participants by asking probing, follow-up questions. Such "probes" also served to expand and clarify participant responses. The moderator recorded her observations after each session.

Table 2. Focus group prompts (questions).

1   Think about all the things that you have learned since coming to [the university]. What has been the most valuable or important thing you have learned? How did you learn it? How did you contribute to that learning experience?

2   Tell me about a time when a class meeting went very well. What was that like? How did you contribute to that learning experience? Tell me about a time when a class meeting did not go very well. What was that like?

3   Tell me about an especially good assignment that you've had while at [the university]. How did you contribute to that learning experience? Tell me about an especially bad assignment.

4   Tell me about an especially good learning experience you have had outside the classroom while at [the university]. How did learning occur? How did you contribute to that learning experience?

The open-ended nature of the questions allowed the participants to contribute to shaping the discussion (Bogdan & Biklen, 1998). Moreover, the focus groups were conducted in an environment that was conducive to conversation and non-threatening to the respondents. Such an interactive environment prompted participants' self-disclosure and the sharing of ideas, experiences, and attitudes about the topic (Krueger & Casey, 2000). With the participants' permission, the conversations were recorded on audiotape. Each focus group session lasted approximately 60 minutes. The tapes were subsequently transcribed verbatim by a transcription service agency and coded for analysis by the researchers.

B. Data Analysis.

Using an inductive approach (Lincoln & Guba, 1985), we coded the data by identifying categories suggested by key words and phrases from the transcripts. We conducted the first round of coding individually and the second round as a team, discussing the categories, noting points of agreement and disagreement, and eventually reaching a consensus about the coding categories. The theoretical perspective that guided the study helped us interpret the categories. Together we identified recurring themes and patterns across the six focus groups. We did not disaggregate the data by group, because our aim was not to compare the experiences and perspectives of one group with another.

The focus group moderator did not participate in analyzing the data but, instead, provided clarification of some respondent comments, or at least the context of the comments. A member of the university's Qualitative Research Group (QRG) who was not involved in the analysis served as an auditor. The QRG member reviewed the data, the coding scheme, and the themes for clarity and consistency (Lincoln & Guba, 1985) and eventually confirmed the trustworthiness of the findings.

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IV. Findings.

In this section, we present the main findings derived largely from focus group participants' responses. First, we summarize learning experiences that were significant for students; then we examine the themes generated by the qualitative analysis.

A. Significant Learning Experiences.

Responding to questions posed by the moderator of the focus group sessions, students shared collegiate experiences that were significant to them. Some students described classroom experiences while others focused on co-curricular activities; some dwelled on their interactions with faculty; others discussed their community-based learning experiences. "Valuable" or "important" things learned at this university were related as much to personal attributes and life skills as they were to academic content and civic involvement.

For example, a student-athlete said she "learned a lot about [the consequences of] procrastination, and my grades have gotten a lot better because I don't do that very much anymore." A sophomore talked about his favorite classes "with teachers that fully understand the subject they're talking about and are passionate about that subject." For her part, a fraternity member learned how to "take responsibility for yourself"; and, likewise, a freshman learned to "set priorities and become more responsible." Also, a senior learned "how to better handle the reality of life … and how to be independent"; and in the words of another upper-division student, "the biggest thing I've learned since I've been at college is to appreciate people's differences."

In one of the sessions, a focus group member stated that he learned "how to interact with people not only on campus but [also] in the community." Similarly, what was significant for another member was "becoming involved in the community that we're in, because … the more you put in, the more you're going to get out of it."

Students reported that they liked projects that had explicit parameters and clear criteria for grading, a notable departure from their Gen-X predecessors. However, they also wanted faculty to assign projects that "allow us to have guided choices," rather than projects based on strictly imposed topics. By and large, students did not like group work as part of their courses, because most group members tend to not pull their weight, a finding which contradicts many of the social learning aspects often ascribed to this generation. In general, students had negative reactions to faculty members who showed a "lack of passion for teaching" and "don't seem to care." Significant learning experiences, in sum, depended on all those involved, from the individual student to other students in the classroom, community members, and faculty.

B. Themes.

Five thematic categories of data emerged through the coding process: (1) *Involvement in co-curricular activities*, (2) *Preference for experiential learning*, (3) *Seeking support from peers*, (4) *Valuing faculty-student interaction*, and (5) *Learning and taking responsibility*. We will consider each in turn.

Involvement in co-curricular activities. Focus group participants discussed their involvement in student organizations (registered clubs and fraternities/sororities) and events (e.g. community service and fundraising projects). Greek (fraternity and sorority) life was "apparently a powerful experience" for some students, according to the focus group moderator. In this

regard, a respondent noted: "One thing I've learned is realizing that the community you're a part of – for me, I guess it'd be Greek life at [the university] – has given me so much that I … feel obligated to give something back." Giving back meant taking part in philanthropic activities and recruiting fraternity members.

Focus group participants specified the "positive experiences" provided by learning communities (which are typically groups of students taking two or more classes together). One student observed:

> When I first came in, I was with one of the living-learning communities here on campus, the Freshman Leadership Institute. … That [has] motivated us to go out and become leaders, become involved on campus; and I would say that that living-learning community probably was one of the biggest steps in becoming involved.

Co-curricular activities also helped students to become better socialized. Two focus group members reflected on their co-curricular involvement:

> I went with an alternative spring break group to provide hurricane relief after Katrina … and it was amazing. I didn't know people [in the group]; we all went for different reasons. Some people were required to go for community service hours; some people went because their friends were going; others went because volunteering was the good, Christian thing to do … and I met a lot of cool people.

> I've definitely learned that you have to open up; meet new people. My two best friends right now I would never have hung out with in high school. So, [my advice is to] just open up and meet new people; experience the experience that college is.

Preference for experiential learning. Students expressed a strong preference for "hands-on experience" and project-based experiential learning. Emphasizing that they would rather "do activities [than] just sit in class," students explained that they "get so much more out of a class if there's a discussion and if it's hands-on." Such was the case for students who were required to conduct interviews for a short documentary.

Role-playing was popular with students. In that regard, a business student shared this information:

> We did management scenarios, which was completely different from anything we had done in there before, and it was really hands-on. We got involved. [Our professor] wrote out skits for us to participate in. It was … really great because we could all relate to what we were pretending to be, in some way or another. And it was just really cool, because it was just a completely different approach than just sitting in there for an hour or whatever, listening to somebody else talk about something that may go over your head.

In the same vein, another student recalled:

> I played a role in one of the scenarios, and I think what made it so great for me was the fact that it was a role that's completely opposite of my personality. So, I really had to step out of my box or my comfort zone to do something to get a point of view that was different than my own.

Some respondents said they valued the experience that came from peer-to-peer tutoring and discussion. One of them described a course in which she and her classmates voluntarily tutored one another, explaining the course material and clarifying the subject matter. Students taking a food sanitation course went into the community to practice conducting food inspections. As a respondent observed, such a "real-world" experience showed the professor's creativity and was "a big draw for us as students."

For a student learning TV production, "going off campus to film was an opportunity to understand what goes on in the business." And for a theatre student, "meaningful" experience resulted from a service-learning project that engaged her class in producing a play and assisting public-school pupils learning English as a Second Language. "It was awesome," the theatre student said of the experience. "You can't get a better project than that."

Seeking support from peers. Focus group members underscored the importance of peer support to both personal development and academic success. The Academic Success Program was cited as facilitating peer-mentor support, which, in the view of one student, was "probably the best part about coming to [the university]."

Regarding support from peers, other students commented:

I need people around me to help me kind of push myself, and I do the same for them. Like if I have to get something done, somebody is going to say something to me, or if they have to get something done, I'm going to say something to them and make sure that they do it.

I would say [what's important is] networking and having relationships with other people, and not just learning course material, because aside from the schoolwork, having relationships with [fellow students] and teachers has actually made me grow and develop and learn more as a person than necessarily the classes that I took.

[It's important to] surround yourself with people that you know will make you successful. … You are away from your family … and it's [necessary] to find a group of people here that will support you and hold you accountable for what you want to do. … You've got self-motivation … but it's nice to know that you have some kind of support coming from other students.

While Gen-X students showed strong preference for self-reliance, these millennial students seemed to appreciate the importance of peers both socially and academically.

Valuing faculty-student interaction. Focus group members said they welcomed opportunities to meet with their professors after class, whether in the classroom, in the professor's office, or elsewhere on campus. However, it was the informal, outside-the-classroom interaction that made many students truly admire their professors. One student said:

I've actually been able to make pretty good friends with some of my professors. … I'm a transfer student, and one of the things I'm able to do at this school is I could talk to any professor like equals or comrades … and it is really cool. I didn't think [that] at a state school you would be able to do that kind of thing. I thought they would be more aloof –more like, oh, you're just a number in the classroom, but … it's not necessarily the case.

Another student, who said she once enjoyed regular conversations with a faculty member, reported: "I could always talk to her, even [though] she isn't my advisor. … I just like having a

teacher that's always caring for you." A third student declared that she "responded better to professors who interacted with me outside of class." Their responses suggest that these students perceive learning as taking both inside and outside of the classroom.

Learning and taking responsibility. Students participating in the focus group sessions indicated that their experiences on campus and in the wider community engendered a sense of responsibility. They discussed the importance of time management, independence, taking responsibility for their own learning, and learning from mistakes. With regard to time management, students talked about the challenges involved and the necessity to "resist the party temptation." One student, who initially first spent as much time in the ball park as he did in the classroom, admitted:

> I ended up failing a lot of my classes my first semester. So, after I realized what
> I'm doing wrong [in terms of] the whole time management thing, I decided to
> organize scheduling. It helps out a whole lot.

Regarding independence, several students described moving from being "taken care of" while in high school to being on their own as college students. Acknowledging the difficulty of learning to be responsible, a freshman confessed:

> I thought I knew how to handle reality, and how to be independent, and how to be
> on my own. [Becoming responsible] was probably the biggest lesson that I
> learned; it's probably been the hardest one I had to learn in the time I've been
> here.

The theme of *learning and taking responsibility* is illustrated also by these comments from four students:

> I've learned a lot … not just through [formal] education. … I had to get my own
> apartment; I had to feed my own self [because] mom wasn't there to feed me; and
> just little things like that.

> I've learned a lot more responsibility. … You just have to do it and be motivated
> when you get into the real world, as opposed to high school.

> I've had some ups and downs at [the university] and had to leave. ... [Now I am]
> learning that it's my responsibility to take initiative; it's my responsibility to get
> to class and make the grades. … The common goal is to get out of here with a
> degree and move on and be productive in the world; so I just feel like it has taught
> me a lot more responsibility in how to do things myself.

> I made some pretty big mistakes. I fell on my face a couple of times, but I believe
> they were necessary lessons that I had to learn. I had to learn how to … be a more
> mature adult.

Respondents described their learning experiences variously. For some students, the experiences were "difficult" or "challenging"; for others, the experiences were "interesting" or "great." A few students pointed to the "awesome" experiences that they had when they engaged actively in course projects.

V. Discussion.

This study has found that undergraduates enjoyed involvement in co-curricular activities, including community service, preferred to be immersed in active-learning situations, sought support from fellow students, valued interaction with faculty members outside the classroom, and learned the importance of taking responsible action. Although students in this study regularly sought peer support, they did not like course-based group work. This particular finding is viewed in contrast to the team-oriented characteristic of Millennials described in the literature (Howe & Strauss, 2000, 2003). We also did not find evidence in our sample of Millennials that they necessarily exhibited optimism or the "can-do" attitude that Howe and Strauss attributed to this generation. However, the focus group members' interest in community service corroborates the civic-mindedness that characterizes Millennials.

Moreover, focus group members' keen interest in co-curricular and active-learning opportunities is consistent with Astin's (1984) theory of student involvement. The findings also confirm that community-based work has a positive impact on students (Kuh, 2008). However, students' obvious inability to synthesize their collegiate experiences into profound statements about learning was noticeable in the focus group responses. Respondents gave little indication of coherent critical thinking about the connections between their academic and co-curricular activities. It may very well be that the university structure still does not allow students to see connections between curricular and co-curricular activities, as Bok (2006) pointed out. Faculty nonetheless can facilitate the kind of reflective activities that help students integrate learning from different experiences and settings.

Although the focus group data allowed for considerable depth of analysis, we caution against generalizing the findings. After all, the findings are based on the experiences and viewpoints of a particular set of undergraduates – a small, non-representative sample – at one institution. More research is needed to determine how generational characteristics influence the expectations and motivations of college students. Nevertheless, while we acknowledge that the data analyzed in this study were derived from the subjective perceptions of students, we believe the findings have much to offer. They are significant to higher-education administrators and faculty because they provide useful insights into undergraduates' perceptions and motivations, and into how Millennials make meaning of their experiences. Such insights can positively influence approaches to teaching and learning.

The attendant challenges for faculty and student development professionals are both exciting and daunting. They are exciting because today's undergraduates want to be engaged and active. Few would doubt that this creates a more interesting and rewarding work environment for higher-education professionals. The challenges also are quite daunting because undergraduates now seem to look more critically at educational strategies and classroom practices that affect them.

The findings of this study have implications for teaching and learning. If colleges and universities are to become more learner-centered (Barr & Tagg, 1995; Weimer, 2002), then the curriculum should be designed in a way that will foster student engagement in the learning process, both inside and outside the classroom. Furthermore, students should be supported in applying knowledge and skills intentionally in various settings, including local communities. Providing such support requires collaboration across the institution's divisional lines, involving student development professionals, academic administrators, and faculty members.

What, then, are the implications for teaching and learning?

1. Curricula should include clear, interrelated goals for courses, academic programs, and student learning
2. Pedagogical practices should promote opportunities for meaningful collaboration between students and with other stakeholders such as faculty, staff, and community members
3. Providing and creating knowledge should be complemented by opportunities for students to apply that knowledge
4. The teaching process should encourage students to relate academic material to their lives outside the classroom through critical reflection
5. The teaching process also should engage students in higher-order thinking tasks that will prepare them for workplace and societal challenges

VI. Conclusion.

Our research reflects how members of a new generational cohort think about their experiences as college students. Today's Millennial-generation undergraduates do not want to be passive repositories of knowledge but active participants in shaping their own learning experiences. They desire practical experiences that allow them to use their knowledge and practice their skills effectively.

Different generations of students undoubtedly will bring different perspectives to higher education. Educators should listen to the voices of their students and consider the distinctive attitudes and worldviews that their students convey. Further, educators should be prepared to establish institutional and pedagogical practices that are responsive to their students' needs and interests. By doing so, they can help students realize their full potential.

References

Association of American Colleges and Universities. (2002). *Greater expectations: A new vision for learning as a nation goes to college.* Washington, DC: Author.

Association of American Colleges and Universities. (2007). *College learning for the new global century: A report from the National Leadership Council for Liberal Education & America's Promise.* Washington, DC: Author.

Astin, A. W. (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel*, *25*(4), 297-308.

Barr, R. B., & Tagg, J. (1995, Nov./Dec.). From teaching to learning: A new paradigm for undergraduate education. *Change*, 13-25.

Bernardes, E., & Hanna, M. (2009). How do management students prefer to learn? Why should we care? *International Journal for the Scholarship of Teaching and Learning*, *3*(1), Article 16. Retrieved January 26, 2010, from
http://academics.georgiasouthern.edu/ijsotl/v3n1/articles/PDFs/Article_BernardesHanna.pdf

Bowen, G., Burton, C., Cooper, C., Cruz, L., McFadden, A., Reich, C., and Wargo, M.

Bogdan, R. C., & Biklen, S. K. (1998). *Qualitative research in education.* Needham Heights, MA: Allyn & Bacon.

Bok, D. (2006). *Our underachieving colleges: A candid look at how much our students learn and why they should be learning more.* Princeton, NJ: Princeton University Press.

Bonwell, C. C., & Eison, J. A. (1991). *Active learning: Creating excitement in the classroom* (ASHE-ERIC Higher Education Report No. 1). Washington, DC: George Washington University, School of Education and Human Development.

Bowen, G. (2010). Service learning in the scholarship of teaching and learning: Effective practices. *International Journal for the Scholarship of Teaching & Learning*, 4(2). Retrieved January 20, 2011, from http://academics.georgiasouthern.edu/ijsotl/v4n2/essays_about_sotl/PDFs/_Bowen.pdf

Breedlove, W., Burkett, T., & Winfield , I. (2007). Collaborative testing, gender, learning styles, and test performance. *MountainRise*, 4(1), Article 3. Retrieved January 26, 2010, from http://mountainrise.wcu.edu/archive/vol4no1/html/breedlove.pdf

Bringle, R. G., & Hatcher, J. A. (2000). Institutionalization of service learning in higher education. *The Journal of Higher Education*, 71(3), 273-290.

DeBard, R. (2004). Millennials coming to college. *New Directions for Student Services*, 106 (Special issue: Serving the Millennial Generation), 33-45.

Dole, S., & Bloom, L. (2009). Online course design: A case study. *International Journal for the Scholarship of Teaching and Learning*, 3(1), Article 6. Retrieved January 27, 2010, from http://academics.georgiasouthern.edu/ijsotl/v3n1/articles/PDFs/Article_DoleBloom.pdf

Gardner, H. (2006). *Multiple intelligences: New horizons.* New York: Basic Books.

Howe, N., & Strauss, W. (2000). *Millennials rising: The next generation.* New York: Vintage Books.

Howe, N., & Strauss, W. (2003). *Millennials go to college: Strategies for a new generation on campus*. Washington, DC: American Association of Collegiate Registrars and Admissions Officers.

Huber, M. T. (2007). *Fostering integrative learning through the curriculum.* (Public report of the Integrative Learning Project.) Washington, DC: Association of American College and Universities and Carnegie Foundation for the Advancement of Teaching.

Jacobi, M. (1991). Focus group research: A tool for the student affairs professional. *NASPA Journal*, *28*(3), 195-201.

Kaase, K. J., & Harshbarger, D. B. (1993). Applying focus groups in student affairs assessment. *NASPA Journal*, 30(4), 284-289.

Krueger, R. A., & Casey, M. A. (2000). *Focus groups: A practical guide for applied research* (3rd ed.). Thousand Oaks, CA: Sage.

Kuh, G. D. (2008). *High-impact educational practices: What they are, who has access to them, and why they matter.* Washington, DC: Association of American Colleges and Universities.

Lincoln, Y. S. & Guba, E. G. (1985). *Naturalistic inquiry.* Beverly Hills, CA: Sage.

Morgan, D. L. (1998). *The focus group guidebook.* Thousand Oaks, CA: Sage.

National Survey of Student Engagement. (2000). *National benchmarks of effective practice* (The NSSE 2000 report). Bloomington, IN: Author.

Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review*, 16(4), 385-407.

Prince. M. (2004). Does active learning work? A review of the research. *Journal of Engineering Education*, 93(3), 223-231.

Weimer, M. (2002). *Learner-centered teaching: Five key changes to practice.* San Francisco: Jossey-Bass.

Willox, A. C., & Lackreyman, D. (2009). (Re)Considering the scholarship of learning: Inviting the elephant in the room to tea. *International Journal for the Scholarship of Teaching and Learning*, 3(1). Retrieved January 26, 2010, from http://academics.georgiasouthern.edu/ijsotl/v3n1/essays_about_sotl/PDFs/Essay_WilloxLackeyram.pdf

Enhancing integrative experiences: Evidence of student perceptions of learning gains from cross-course interactions

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Abstract: This article offers food for thought on a strategy used by seven faculty to enhance students' integrative learning by offering cross-course, cross-disciplinary projects and shared activities focused on food. The faculty teach a cluster of ten courses in natural sciences, health sciences, social sciences and humanities that address food themes. Assessment data illustrate the learning gains by students enrolled in the clustered courses and points to limitations of the strategy as well. The evaluation of the strategy includes a discussion of the costs and benefits of the effort from the perspective of the teaching faculty.

Keywords: integrative learning, liberal arts, general education, food, interdisciplinary, cross-course projects

A hallmark of liberal arts learning and general education is the commitment to the breadth of students' education that goes beyond any particular discipline. Traditional curricula have asked students to choose from a menu of courses in a range of disciplines to fulfill graduation requirements. The assumption has usually been that students themselves will integrate ideas and practices into their lives as learners. Colleges and faculty have made a variety of attempts to provide contexts for that integration during a student's education, including interdisciplinary colloquia, humanities and arts programs, interdisciplinary majors, and more recently, course clusters or learning communities. More than 500 colleges and universities now incorporate course clusters or learning communities into their curricula (Dodge & Kendall, 2004).

In this paper we describe and assess a set of strategies for helping students integrate their learning in a liberal arts/general education context. We call these strategies *cross-course projects* and *cross-course activities*. In a cluster of courses called Food for Thought, we offer a set of courses from disciplines in the natural sciences, health and wellness, the social sciences, and the humanities. During each semester, courses share cross-course projects where students collaborate on joint endeavors. These projects provide a means to enhance knowledge of the subject matter and of learning skills. Students also participate in cross-course activities where, for example, students from different courses attend seminars or tour local farms and food production facilities. We describe our efforts and evaluate their effectiveness using student survey data from three semesters of courses.

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I. Background.

Interdisciplinary learning develops four cognitive abilities: 1) the application and development of perspective-taking techniques; 2) the development of structural knowledge of problems appropriate to interdisciplinary inquiry; 3) the integration of conflicting insights from two or more disciplines; and 4) the production of cognitive advancement or interdisciplinary understanding of a problem. This learning may be assessed through entrance and exit surveys at the beginning and end of the course and can be used in tandem with rubrics developed from course learning outcomes (Repko, 2008).

At the University of North Carolina Asheville (UNCA), interdisciplinary education is effected through clusters of courses that fulfill breadth requirements in the natural and social sciences and also offer depth surrounding a topical theme or issue. This unique approach to general education is most similar to the more inclusive category of learning communities as manifested at other colleges and universities. Learning communities are formed in a variety of ways, but commonly aim to create an enhanced learning environment involving greater intellectual interaction between students and with faculty. This typically involves connecting small groups of students together through co-enrollment in a set of (sometimes thematically-linked) courses or as part of a first year experience (Tinto, 2000b; Hurd, 2004)). Learning communities differ from UNCA's cluster component of Integrative Liberal Studies in that learning communities offer courses that are more rigidly linked to each other's schedules and co-requisites (Tinto 2000b; Hurd, 2004). The UNCA model aims to achieve the demonstrated benefits of learning communities, such as student groups that are move involved in and out of the classroom and an increased sense of responsibility to participate in the learning experience (Tinto, 1997; Landis, 1998; Tinto, 2000a; Driscoll, Gelabert, & Richardson, 2010), without the logistical scheduling restraints that often plague the implementation of successful learning communities (Hurd, 2004).

Regardless of the subtle differences, course clusters, learning communities, and other curricular enhancements that emphasize both interdisciplinary learning and interactions of students and faculty beyond the confines of the classroom are all collaborative learning opportunities. Ample evidence exists for the beneficial effects of collaborative learning opportunities on student learning. All of these curricular innovations are in accordance with a shift in higher education from a paradigm based on instruction to one based on learning (Barr & Tagg, 1995). Gray (2000) cites several examples: 1) Students at University of Northern Colorado enrolled in learning communities had noticeably higher retention into sophomore year and higher first term grade point averages. 2) At Queens College, City University of New York, qualitative and quantitative assessment produced a longitudinal, ethnographic study of the impact of their learning community (Freshman Year Initiative-FYI) on student learning. Students in the FYI progress toward a degree more rapidly than non-FYI students and report more intellectual and personal satisfaction. 3) At the University of Hartford, following implementation of first year interest groups students in first year interest group courses responded favorably compared to students not in first year interest group courses. At other schools, including the University of Washington, LaGuardia Community College in New York City, and Seattle Central Community College, students in learning communities spent more time together outside of class than did students enrolled in traditional courses. Retention increased by 25% at Seattle Central Community College. Students reported an increased sense of responsibility for their own learning as well as that of the other students (Tinto, 2000). Collaboration and team-building

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resulted in higher retention at North Seattle Community College (97 percent compared to 70 percent for students not in learning communities; Byrne, 2002). At the University of California at Los Angeles, a cohort of nearly 500 freshmen enrolled in team-taught, interdisciplinary courses termed cluster courses had their experience assessed in comparison with students enrolled in a traditional curriculum (University of California at Los Angeles, 2000). Students, faculty, and teaching assistants all reported enhanced acquisition of skills and satisfaction in cluster classes, but also reported an increased workload in comparison to traditional courses. While the interdisciplinary learning communities cited above generally focus on a well-defined cohort of students (e.g. freshmen or students in a given major), UNCA's interdisciplinary clusters offer the opportunity of bringing together students from different academic levels and majors in a defined set of courses and cross-course activities. This fosters opportunities for mentoring between majors and non-majors, upper level and lower level students, and natural science, humanities, and social science majors.

II. Our Context.

A. Integrative Liberal Studies.

In 2004 UNCA adopted a revised general education curriculum called the Integrative Liberal Studies (ILS) program. In ILS, students take their general education distribution in natural science, social science, and humanities or arts in topical clusters centered on a common theme. Students participate in the cluster by completing three courses from three different disciplines, of which there is at least one science and at least one social science. There are currently 15 topical clusters for students to choose from including Technology, Society, and Culture; The Science and Politics of Human Health and Illness; Latin American Studies; Globalization and Environmental Issues, among others. This paper focuses on one of those clusters, Food for Thought: Engaging the Citizen in the Science and Politics of Food Information, Food Consumerism, Nutrition and Health (Food for Thought). Table 1 describes the 10 courses in this cluster.

B. Food for Thought Cluster and Activities.

The Food for Thought cluster was initiated in 2007, on the impetus of a course development grant received in 2006 through Science Education for New Civic Engagements and Responsibilities (SENCER), an NSF-funded program for "improving undergraduate STEM (science, technology, engineering and mathematics) education by connecting learning to critical civic questions" (SENCER 2010, http://www.sencer.net/About/projectoverview.cfm). The cluster focuses on developing the student as an informed consumer of food by providing a platform for discussion of what we eat, why we eat, where our food comes from and its journey from production to consumption, and how food affects our bodies and health. Students gain insight into the often hidden ways that food consumption impacts us on both the individual and collective levels. As human beings, our bodies and our societies are interlinked by numerous processes, many of which can be understood by investigating the dynamics of food in chemical, biological, cultural and social systems. Our primary goal for students is an enhanced, interdisciplinary understanding of the interplay of these systems and a more attuned sense of how food is a civic issue. More information is available at (http://www.unca.edu/foodforthought/).

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Table 1. Food for Thought Cluster Courses.

Discipline Course Title (and Number)	Prerequisites	Requirement Satisfied[a]	Number of students enrolled (semester)
Biology			
Plants and Humans (110)	none	ILSN, ILSE	21 (Spring 2009) 19 (Spring 2010)
Biology of the Seed Plants (335)	8 hours of Chemistry; Intro. Botany; Intro. Ecology	ISLN, ILSE, Biology major	17 (Spring 2009)
Chemistry			
The Food of Chemistry (174)	none	ILSN, ILSE, lab science	19 (Fall 2008)
Economics			
Land Economics (245)	Intro. Macro or Micro Economics	ILSS, ILSE, option in Economics & Environmental Studies majors	20 (Fall 2008) 20 (Fall 2009)
Health and Wellness			
Nutrition and Lifestyle (225)	Intro. Wellness	ILSS, ILSE, Health and Wellness major	30 (Fall 2008) 35 (Spring 2009) 30 (Fall 2009) 57 (Spring 2010)
Pathophysiology of Chronic Conditions and Illnesses (325)	Anatomy or Mammalian Physiology	ILSS, ILSE, Health and Wellness major	38 (Spring 2009) 22 (Fall 2009) 21 (Spring 2010)
Food Politics and Nutrition Policy: How Government and Industry Impact Health (333)	Intro. Wellness	ILSS, ILSE	19 (Fall 2009)
Sociology			
Sociology of Gender (280)	none	ILSS, ILSE, option in Sociology major, Women, Gender and Sexuality Studies major	26 (Spring 2009) 26 (Fall 2009) 19 (Spring 2010)
Science and Technology (385)	none	ILSS, ILSE, option in Sociology major	13 (Fall 2008)
Spanish			
Elementary Spanish for Health Professionals (110/120)	none	ILSE, foreign language	20 (Fall 2009) 21 (Spring 2010)

Together, the faculty teaching in the cluster developed a set of shared learning outcomes that inform not only individual courses in the cluster, but shared learning opportunities among the courses. Each semester faculty teaching in the Food for Thought cluster convene regularly to plan and implement an appropriate set of cluster activities for the courses that are being offered that term. Students engage with the cluster themes by participating in course-specific projects and activities, such as measuring the content of sodium in vending machine foods (chemistry) or studying local food distribution systems (economics, health and wellness); *cross-course cluster projects* that engage students across cluster courses (such as creating a shared meal or devising a social marketing campaign for a nonprofit health promotion organization) and *cross-course cluster activities* that are available to one or more courses in a given semester (such as farm tours and seminar series). This paper focuses on the novel dimensions of our cluster of courses in a general education program – those that involve engagement outside of traditional classroom configurations.

Cross-Course Cluster Projects are integrated, multidisciplinary projects that engage students from multiple cluster courses simultaneously. Table 2 below provides a list of projects. The students must learn how the knowledge from one discipline relates to others in order to successfully complete the project. Through this process, students in a variety of disciplines in the natural sciences, social sciences and humanities interact with one another and benefit from a range of perspectives for addressing a single issue.

One example is the Harvest Bounty Shared Meal. Teams of seven to nine students (from at least three different cluster courses) work together to plan, prepare, consume, and analyze a meal. Teams are required to work within specific constraints (all local, all organic, or all whole foods, or a reduced budget) with the goal of producing a delicious and sustainable meal. The assignment requires teams to analyze cost, energy utilization, nutrients and nutritional balance, social factors, and in some cases cultural appropriateness. To complete the assignments, students in different courses must teach one another nutrition, science, sociology, Latino food culture, and economics. The meals from each group are eaten together, family style, in a university ballroom as a large cluster-wide shared meal.

A second cluster project is the Food & Nutrition Guidelines Project. Students in the Food Politics and Nutrition Policy course oversee the development of a set of food and nutrition guidelines for UNCA. Students become experts in a specific food or nutrition topic then draft and discuss in small committees a recommendation in their expert area. The food policy committees then receive oral or written suggestions from students in the other Food for Thought cluster courses, discuss the guidelines as a class and then produce a set of proposed guidelines that is presented to campus decision-makers.

In order to better understand the complexities of food information, a third cluster project required teams of students from four different cluster courses to research a food source or nutrition-related health issue and to produce a professional poster conveying their information to a consumer audience. These posters and interactive displays are exhibited at UNCA's Symposium of Undergraduate Research and, once judged by a panel of local experts, displayed at the North Asheville Tailgate Market. Through researching plants as food sources, nutritional information and food labeling practices, students learn about the science and policy that shapes food that reaches them in the marketplace. Through constructing a poster and display for a lay audience, students develop skills in conveying information that is research-based in an accessible way.

In one of the semesters studied (spring 2010), there was no cluster-wide project offered due to the impact of the state budget crisis on faculty time and resources.

Cross-Course Cluster Activities vary by semester depending on the courses offered and resources available. See Table 2 below for a list of activities. During two semesters, cluster students went on one or more farm tours, while in two other semesters cluster students toured and/or worked in a campus garden maintained by students, a community garden, and the urban farm of a faculty member. Each semester the cluster also sponsors a "Lunch and Learn" Seminar series. Past seminars have included topics such as soil science, greening the environment with your fork, an introduction to the slow food movement, and chronic disease prevention.

Table 2. Food for Thought Cluster Projects and Activities.

Term	Cross-Course Cluster Projects	Cross-Course Cluster Activities
Fall 2008	Harvest Bounty Shared Meal	Farm Tours
	Food and Nutrition Guidelines	Seminar Series
Spring 2009	Poster Presentations at Undergraduate Research Symposium and North Asheville Tailgate Market	Seminar Series
Fall 2009	Harvest Bounty Shared Meal	Seminar Series
	Social Marketing Campaign Development	Farm Tours
	Food and Nutrition Guidelines	Community Garden Tours
Spring 2010	None	Seminar Series
		Community Garden Tours

We hypothesize that the various interactions of the students in the cluster have a positive impact on integrative student learning in the areas of academic attitudes, becoming an informed consumer of food, civic engagement, food literacy, research literacy, information and communication skills, and understanding food systems. The purpose of this paper is to report on our process for and findings on whether participation in the Food for Thought cluster enhances integrative student learning.

II. Methodology.

Since the first semester of Food for Thought cluster offerings, we have assessed student learning. The first semester of the cluster, Fall 2008, we used and adapted the SENCER's Student Assessment of Learning Gains (SALG) instrument (http://www.sencer.net/Assessment/assessmenttools.cfm). SENCER developed its adaptable assessment tool to guide educators adopting SENCER philosophy in doing assessment of their individual "SENCERIZED" courses or programs. However, because that instrument is designed for STEM courses, rather than a cluster of courses across disciplines we found it was not adequate for measuring many of the items that we wish to assess. To understand whether the

cross-course projects and cluster activities were having an impact, we needed to develop an instrument designed to measure the cluster (rather than individual course) learning outcomes.

We thus constructed our own entrance and exit survey instrument. The team of cluster faculty met to identify core learning outcomes for the cluster (and therefore, all the courses in the cluster). We then grouped related ones together and constructed questions to address each of the learning outcomes. See Table 3 for general categories of the Food for Thought cluster learning outcomes.

Table 3. Food for Thought Cluster Learning Outcomes.

Learning Outcome	Sample Elements Included in the Outcome
Academic Attitudes	Develop interest in natural and social science fields; develop appreciation for interdisciplinary learning; develop commitment to a major.
Civic Engagement	Develop appreciation of how food consumption and production is a civic issue; identify connection between science and ethics
Informed Consumer	Acquire and use knowledge to make informed food choices; Acquire knowledge about the links between food production and consumption and its relationship to consumers
Interdisciplinary and Disciplinary Skills (Food and Research Literacy	Develop research skills; Develop interdisciplinary understanding of social and biological systems; Understand the scientific method
Information & Communication Skills	Ability to communicate expert knowledge to a lay audience (in a range of fields); Work to solve problems and present information in teams
Food Systems (relationship between) and Social Processes	Understand the science and technology of food production and the development of food policy related to production and distribution
Food Systems (relationship between) and Environmental Systems	Understand the impacts of food production on the environment; Understand the ecological relationship between plants and humans
Food Systems (relationship between) and Individual Health and Wellbeing	Understand where food comes from and how it impacts humans; Plan and prepare a nutritionally balanced meal; Understand the biology of human nutrition

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The entrance and exit surveys have 61 items, including: 8 demographic questions, one open-ended question, and 52 questions addressing learning outcomes and course mechanics using a 5-point Likert scale. The learning outcomes questions are organized into four parts: academic attitudes; civic engagement and informed consumer; interdisciplinary and disciplinary skills; and food, food systems, food choices and social and biological relationships. At the end of each survey students were also asked to answer the following open-ended question: "Please list three food issues that interest you most." Students were required by the computer to list three entries in order to complete the survey.

Students in all the cluster courses in each semester were asked to take the entrance survey during the 2nd week of classes (after the add/drop date) and the exit survey in the last week of classes. The survey is offered electronically using quiz form in an internet-based course system (Moodle). Informed consent was provided by all participants following guidelines approved by the Institutional Review Board of UNC Asheville.

Data Analysis

The data analyzed for this report is aggregated data from 3 semesters between fall 2008 and spring 2010. The data for fall 2009 was excluded because the data file from the internet-based survey tool was corrupted.

One-tailed paired Student's t-tests examined differences between entrance and exit survey responses and were conducted using GraphPad Prism 5.0 software (GraphPad Software, Inc.; La Jolla, CA). Only data from students who completed both entrance and exit surveys were included in the analyses. Prior to analysis, the responses to the questions were grouped according to learning objectives listed in Table 3. Grouping reduced the number of statistical tests, and therefore the magnitude of correction for multiple comparisons. The last learning objective, Food Systems, was analyzed both as a group and by each question within the group. Differences were significant when $p \leq 0.0028$ (Bonferroni corrected for multiple comparisons, based on 18 statistical tests). Responses to the open-ended question were coded by assigning each answer to a broad thematic category, and to a corresponding subcategory when the answers were more specific. Responses were assigned to a single category except in cases where multiple categories were implied. A secondary analysis of coded responses indicating an interest in social or individual changes was also conducted.

III. Findings.

A. Sample.

Assessment results were collected from voluntary entrance and exit surveys. One hundred and eighty-six students completed the entrance survey and 153 completed the exit survey over the 3 semesters evaluated (fall 2008, spring 2009, spring 2010). Of those, 106 students completed both surveys, corresponding to 20.7% of enrolled students. Demographic data about the 106 responders is given in Table 4. The composition of respondents is quite similar to the composition of students enrolled in our cluster courses: they are at least sophomore level, of traditional student age, and most frequently social or health science majors. Ninety-one usable responses to the open-ended question were available for analysis (fall 2008, n=37; spring 2009, n=16; spring 2010, n=38).

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Table 4. Demographic information of the 106 students who completed both entrance and exit surveys.

	% of survey responses
Female	69.8
College Level	
Freshman	9.4
Sophomore	24.5
Junior	35.9
Senior	30.2
Age (years)	
18 or younger	5.7
19-21	60.4
22-30	30.2
31-40	2.8
41-49	0.9
Over 50	0
Area of college major	
Natural science	14.2
Social science	34.0
Health science	34.0
Humanities	13.2
Undecided	4.6
Grade Point Average (4.0 scale)	
3.60-4.00	34.2
3.01-3.59	44.3
2.51-3.00	16.0
2.01-2.50	4.7

B. Quantitative Results.

The complete list of questions in the entrance and exit survey is included in Appendix A. Mean entrance and exit (open and filled bars, respectively) are given in Figure 1 for six sets of grouped questions from the survey: Academic Attitudes, Civic Engagement, Food Literacy, Research Literacy, Information & Communication Skills, and Food Systems & Choices. Statistically significant differences between entrance and exit survey responses, calculated on a 5-point Likert, are indicated with an asterisk with p-value and mean difference (Δ); *ns* represents no statistical difference in Figure 1.
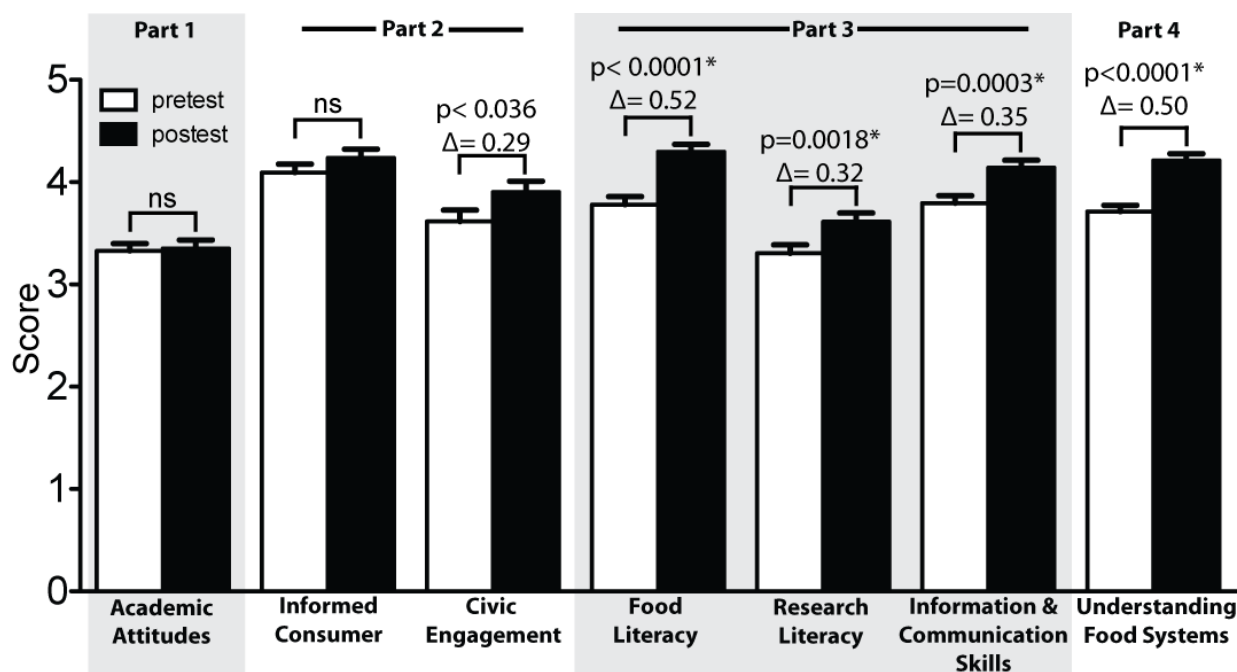
Figure 1. Mean Likert scale responses (with standard error of the mean, positive only) for the major categories in the Food for Thought Assessment Survey. Open bars are entrance survey responses; filled bars are exit survey responses. Statistically significant differences between entrance and exit survey responses are indicated with an asterisk, with p-value and mean difference (Δ); *ns* represents no statistical difference.

Part One of the survey assesses academic attitudes and solicits responses about student interest in being involved in interdisciplinary activities, such as "I am interested in learning in disciplines outside my major" and "I am interested in participating in interdisciplinary projects and activities". Four questions (#10-14 in Part 1, see Appendix A) were grouped to generate the Academic Attitudes result in Figure 1. However, there were no statistically significant changes in the Academic Attitudes.

Part Two of the survey assesses student interest in making deliberate choices as an informed consumer and being involved in civic engagement. The first 6 and last 3 questions focus on whether students are informed consumers and care about making food choices that are, for example, healthy, environmentally sustainable, or emphasize less processing. Analysis of this group of questions yielded an upward trend between entrance and exit surveys, but without statistical significance (shown as Informed Consumer in Figure 1). However, there was a statistically significant increase between entrance and exit on questions related to Civic Engagement, with a mean increase of 0.29 (see Figure 1). The Civic Engagement questions ask students if they cared about participating in collective actions to change food policies, helping others become informed consumers and volunteering for a non-profit working with food.

Part Three of the survey evaluates students' academic skills in the categories of A) Food Literacy, B) Research Literacy, and C) Information & Communication Skills pertaining to food topics. Food Literacy grouped questions such as "understanding labeling on food packaging" and "evaluate the trade-offs involved in purchasing organic, local, unprocessed or fair-trade foods".

Change in Research Literacy was assessed by grouping questions such as "understand how natural/social/health sciences plan and conduct research" and "evaluate the merits of research reported in the media". The third section of Part Three, Communication & Information Skills, grouped responses assessing if students are confident in communicating research and theories to a member of the general public and asking an intelligent question of an expert in the field. The student's response mean increased in all three sections and were statistically significant (see Figure 1).

Part Four, Food Systems & Choices in Figure 1, surveys students' understanding of food issues related to food systems, food choices, and sociological and biological relationships with food. Mean responses were significantly higher on the exit compared to the entrance survey. Upon grouping all survey items in Part Four, there was a significant increase in students' overall understanding of food issues by the end of the semester. Table 5 summarizes post-hoc analyses of individual survey items, which reveal statistically significant increases for each item in Part 4.

Table 5. Food System & Choices.

Survey item	P-value	Δ
How science & technology shape food production	<0.0001*	0.63
How government laws & policies impact food production & distribution	<0.0001*	0.59
How food production & consumption patterns affect social inequality	<0.0001*	0.50
How food production & consumption impacts the environment	0.0002*	0.39
How humans, plants, & animals are ecologically connected	<0.0001*	0.46
Where food comes from	<0.0001*	0.55
How food affects human health	<0.0001*	0.50
How the human body processes and uses nutrients	0.001*	0.42

C. Qualitative Results.

We were able to use qualitative data from the survey to develop a more substantive view of who our students are by analyzing entrance and exit responses to an open-ended question asking students to list three food issues that interested them. These findings are listed by thematic category and summarized in the Table 6 below.

Table 6. Responses to "Please list three food issues that interest you most," by thematic category, entrance and exit responses.

Thematic Category	Total Responses, Entrance	Total Responses, Exit	Totals
Food Production and Distribution, Laws and Policies	14	16	30
Food Production and Consumption, Social Inequality	22	15	37
Food Production and Consumption, the American Diet	125	131	256
Plants, Animals, Humans, Ecological Connections	11	14	25
Food and Human Health	105	87	192
All other responses	11	15	26
Totals[1]	288	278	566

Discrepancies between entrance and exit totals derive from double counting of some answers.

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An examination of responses as coded by broad thematic categories show that student interest centers around two sets of themes, 1) Food Production and Consumption and 2) the American Diet and Food and Human Health. An examination of the subcategories in each of these thematic areas further illuminates where student interests lie. In the area of Food Production and Consumption and the American Diet, student responses that were most frequent included organic foods and methods and issues related to growing organic food; local food and how to increase its presence in consumer markets; sustainability and methods for creating sustainability; processed foods and their abundance in the American food system; corn's omnipresence in the American diet; GMOs; interests in learning to grow own food or in community gardens; concern about food in public schools and foods available to children; concerns about the meat industry and the preponderance of meat in the American diet. In the category of Food and Human Health, the most popular subcategories named by respondents included healthy food choices and preparation; how food works in the body; chronic disease and diet; and interest in vegan diets. (See tables 2.1 and 2.2 in Appendix 2 for the numerical distribution of these responses.) A striking feature of responses to our survey was that students' interests as a whole did not shift in a significant way between entrance and exit surveys. This suggests that the Food For Thought cluster supported or reinforced student interests rather than changed their interests. It also gives us important insights into the motivations of our students as learners.

We re-coded student response for indicators that students were particularly interested in bringing about change in a particular arena. Again, we find that the students who responded to our survey are fairly engaged in their interest to effect change (27% of all responses reflected an interest in change); examples of this include responses such as "government's role in the food industry and how it can be changed"; "helping those who do not have access to healthy food"; and "school lunch reform". (See Appendix 2, Table 2.3 for details.) The Food for Thought cluster appears to have some impact on student interest in this kind of engagement with food issues, again these issues are most concentrated in the area of changing the food production and consumption systems related to the American diet.

IV. Discussion.

A. Interpretation of key findings.

As a whole, the Food for Thought cluster had a positive impact on student learning. This is demonstrated by a statistically-significant positive change in nearly all categories of assessment questions in Figure 1. We attribute much of the positive changes in students' evaluation of their learning to the cluster projects and activities. For example, the questions in the Food Literacy section of the survey (see Part 3, Figure 1) addresses issues and problems tackled in the cluster projects and activities (such as the Harvest Bounty Shared Meal and the Poster Presentations), and are only covered as class content in a few cluster courses (see Nutrition and Lifestyle and Land Economics, Table 1). The survey responses are for all cluster students. Therefore, we interpret that Food Literacy, which had the largest mean change between entrance and exit survey response (0.52 increase on a 5-point Likert, see Figure 1), increased for all cluster students from learning in cross-course interactions.

Evidence of this interpretation is also seen in a marked increase between entrance and exit surveys in Understanding Food Systems (see Part 4, Figure 1). Table 2 reports changes in

mean survey responses for the questions about Understanding Food Systems. Again, some of these individual questions focused on class material in individual courses (e.g., "How government laws & policies impact food production & distribution" is part of how class material is presented in Food Politics and Nutrition Policy and Land Economics courses; and "How humans, plants, & animals are ecologically connected" is a focus of the Plants and Humans course). But, we measure a positive change in every question for the entire cluster because understanding food systems is essential to successfully complete and participate in all cluster projects and activities (see Table 2).

A third example of how cross-course projects and activities impact students is in their interest in Civic Engagement (see Part 2, Figure 1). Service Learning is incorporated into only one cluster course (see Nutrition and Lifestyle, Table 1), but survey responses show a 0.30 increase in Civic Engagement across the cluster. In addition to the quantitative analysis of attitudes toward civic engagement, we cull from the open-ended question at the end of our survey a code for student responses indicating an interest in change across all thematic categories. We find that in entrance and exit survey responses combined, 27% of all responses indicated an interest in engagement with change (social or educational); in addition, there was a 7% increase between entrance and exit surveys, suggesting some impact of the Food for Thought courses on students' interest in engagement as citizens that impact their communities.

Taken together, the quantitative and qualitative data suggest that an augmented sense of investment in civic engagement occurred in students during their participation in the Food for Thought cluster of courses. We interpret this increase because students are engaged with the campus and Asheville community as part of many of the cluster projects and activities. For example, a local or campus community member was a guest for each student group at the Harvest Bounty Shared Meal, Poster Presentations are created to be displayed at the North Asheville Tailgate market, and the Food and Nutrition Guidelines are written to change food policies on our campus.

In addition to impacting student evaluation of their learning course content in the areas of food, assessment results show increases in student growth as a general learner. For example, student perceptions increased 0.32 and 0.35 in areas of Research Literacy and Information & Communication Skills, respectively (see Part 3, Figure 1). Even though all of cross-course projects (see Table 2) require research literacy skills and involved communication and presentations to their class, to other classes and/or to community members, several of the cluster courses are upper level and/or for students in their major (see Table 4) and involve significant student research and class presentations. Therefore it is difficult to separate the increase in students' evaluation of their research and communication skills due to cluster projects from those learned in the individual courses. However, we believe that these skills are enhanced in the cluster experience because students are more engaged in learning through the topic of food and in participating in the cross-course projects.

We expect that some of our survey questions, such as those on Academic Attitudes (see Part 1, Figure 1), are not likely to change during a single semester. We include these items because we intend to track students from the beginning of their first cluster course to the end of their final (third) cluster course to determine whether attitudes change over the entire cluster experience. As a result, we did not expect significant changes in all of our survey items over the course of just one semester. This expectation is confirmed by the results in Figure 1; Academic Attitudes showed no statistically significant change.

Furthermore, there was no statistically significant change in questions focusing on assessing students as Informed Consumers (see Part 2, Figure 1). Even though topics addressing why specific food choices are made (questions asked in the grouping of Informed Consumer), the mean student response in the entrance survey already ranked this grouping as 4 ("highly") out of 5 on the Likert scale. Students who responded to the entrance and exit surveys entered their cluster course feeling as "highly" informed consumers. Therefore, we would not expect that course content and cluster projects and activities would make an additional impact.

B. Limitations.

There are several limitations to this study. Because participation in the entrance and exit surveys is voluntary per approved institutional review board protocol and we limit our data analysis to only those students who completed both surveys, we have an effective response rate of 20.7%. As a result, most students who completed cluster courses in the semesters studied were not included in our analysis. We have experimented with various methods for improving response rate, including providing class time to complete the survey, which may improve response rates in future studies.

A second limitation to the study is the use of Likert scale responses. In some items, we had entrance survey responses that were near the top of the scale (e.g., mean score 4 out of 5); as a result, it is more difficult to show statistically significant gains in the course of one semester. It may be that the students who had entrance responses at the lower end of the range did not complete the exit survey, thus biasing these results toward non-significant changes for those items. It is also possible that students who selected this cluster, were interested and somewhat knowledgeable on its topic *a priori*, and therefore began the semester with high scores on the entrance survey.

A third limitation is the short study duration of a single semester. Although statistically significant changes occurred on most survey items within one semester, the full pedagogical effects of the cluster courses would possibly be even more apparent with an analysis over three or more semesters. Our findings are further complicated by the fact that students may have taken more than one course in the cluster in a single semester or across the 3 semesters studied. Future studies will assess whether the cluster courses affect academic attitudes (Part 1) and food consumption choices (Part 2) over a longer period and whether the number of cluster courses a student participates in impacts the findings.

Another possible limitation is the lack of a control group for comparison with these results. Given the nature of the assessment and the project, it was not feasible at the time to construct a reasonable control. In the future, we hope to design a control by giving the survey to students in courses that previously were in the cluster or in courses that are in the cluster, but not currently engaged in the cluster activities for one or more reasons. Could the changes documented in this study be the result of taking a course in college that strikes a student's fancy? While we can't say for sure, we do know that in many areas related to our cluster outcomes, student perceptions of learning gains are significantly impacted by taking one of the Food for Thought cluster courses. In addition, we suggest that student perceptions of learning are enhanced through supporting and reinforcing student interest rather than somehow being wholly responsible for it.

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C. Implications.

The benefits of using cross-course projects and activities for students engaged in courses that share a set of common learning outcomes around the theme of "becoming an informed consumer of food" are described by our findings. Students report that they are learning in these courses and due to the nature of the individual courses and the cross-course projects and activities it is possible to see that some of that learning is happening because of this interdisciplinary structure. In speaking about this course collaboration in conference settings and in interactions with our students, it has been made clear that there may also be some philosophical benefit to students as they try to make sense of interconnections between material in various courses required in their programs. The cluster model with clearly articulated shared learning outcomes and the experiential nature of the cross-course projects and activities offers students an opportunity to have an "aha" moment about the importance of a liberal arts education early in their career.

In addition, some less tangible benefits have been noted by the faculty involved. We see ourselves as a more engaged faculty who teach differently because of that engagement with each other, the students in the cluster and the material in our colleagues' courses. Course planning and materials development happen differently and more critically because of our collaboration. For some of us, our community connections have been strengthened. These collaborations have provided opportunities for community-based research and programming through the development and implementation of the food cluster projects. Cross-course projects and cluster activities provide opportunities for faculty to learn from each other and from the students in other courses as well as our own. Together we have engaged in faculty development opportunities to learn and also to share our experiences with other faculty. Also for some of us, it has been an introduction to participation in the scholarship of teaching and we have learned from our colleagues about the importance of doing this type of research.

Just as there are clear benefits to the cluster activities, there are also costs. One significant cost is faculty and student time. The Food Cluster faculty meets at least monthly to plan, manage and attend activities; evaluate assignments; and deal with logistical issues. In addition, students must use out of class time to meet with other cluster students to complete cross-course projects and to attend activities.

In addition, there is an opportunity cost in our individual courses. We work our individual syllabi around cluster projects and activities, modifying the course assignments and projects that we require of students to accommodate the time, energy and knowledge that students have gained from the cluster activities and projects. We often find ourselves spending time in class on cluster matters such as helping to coordinate student projects and answering logistical questions. This class time would have otherwise been spent on the course content or some other course activity. We sometimes coordinate course schedules to allow for groups to work on cluster activities leaving less time flexibility to accommodate other activities. And, when there are several courses working together on a cluster project, the process and outcomes are less predictable for students and faculty alike, which brings uncertainty.

There are financial costs associated with the Food for Thought cluster as well. While some activities require no money (Food and Dietary Guidelines project), others cost a few hundred dollars (farm tours, poster sessions). Our most expensive activity is the Harvest Bounty Shared Meal. We reimburse students for appropriate food costs; as a result, this activity costs about one thousand dollars each semester we offer it. We made the decision to avoid burdening students with the costs of cluster activities whenever possible; as a result, we have sought

internal and external funding to support our activities. In the three semesters analyzed here, we spent a total of $2600 from internal grants and donations from local restaurants. In previous semesters, we also received funding from our department budgets and dean. While this funding has allowed us to engage ourselves and our students in very meaningful ways, we could complete our cluster activities without any funding by restructuring activities, not reimbursing students for food costs, requiring students to drive themselves to activities, etc. Another option for covering activity costs that might work well on some campuses is a lab fee that could be charged to each student.

Realizing the value of this cross-course approach depends upon some situational factors. Our faculty team has benefited from an administration that is very supportive of our efforts. We receive financial support from our departments, dean, and campus grant opportunities. Most particularly, we benefit from administrative support in that the work of developing, implementing and assessing these cross-course projects has been seen positively in faculty evaluation. From our experience, however, we believe the minimum conditions for making this cross-course approach happen is an idea for a cross-course project or activity that will offer support for student learning outcomes and at least two teachers willing to work together to implement the idea.

For this team of faculty the mutual reinforcement of our passion for creative engaged teaching and the intangibles make participating in this collaborative interdisciplinary teaching and learning project worth it. For example, when a grumbling student's attitude about healthy eating or doing a team project is transformed after participating in the Harvest Bounty Shared Meal the value comes into focus. Other encouragement comes when a student's enthusiasm for growing food in plastic buckets on her porch is sparked by visiting a community garden and weeding a row of potatoes for the first time. When chemistry students present proximate analysis of minerals in foods served on campus to social science students, we are inspired by observing a fire starting in these students to make a difference to the campus food environment. Or finally, when a graduate starts a Slow Food chapter or sends passionate pleas to write congressional representatives to support changes in school lunch, the extra time and energy needed to make these projects happen *feels* worth it.

V. Conclusion.

The cross-course projects and activities described in this paper are strategies that offer opportunity for students to integrate learning from diverse fields and to develop as holistic thinkers. These strategies, in contrast with learning communities, are more loosely and flexibly structured and create less of a close-knit bond typical of learning communities. While there are disadvantages to the integrative strategies proposed here, there are also advantages: lower amounts of necessary coordination between faculty; integrative opportunities that occur over multiple semesters of a student's time in college; the involvement of students at different levels; the opportunity for more experienced students to mentor junior students; and project-based contexts for students in different disciplines to learn from one another. Our data suggest that these strategies have positive effects on students' perception of their learning, a finding that encourages us to continue developing curricula that provide and enhance opportunities for integration.

Acknowledgements

Appendix 1. Questions from entrance and exit surveys.

Enter your Student ID Number. The Student ID Number is the first 9 digits on your UNCA ONE-CARD. Remember that this is a confidential survey: student ID numbers are used to track surveys only.

Check the CL9: Food for Thought courses you are taking **in Fall 2010**. If you are enrolled in more than one Food for Thought course this semester, select one course here. For questions in PART THREE that refer to "this course", answer with regard to the course you selected here.
- ○ BIOL 110 - Plants and Humans
- ○ HWP 225 - Nutrition and Lifestyle
- ○ HWP 325 - Chronic Conditions and Illness
- ○ SOC 280 - Sociology of Gender
- ○ SPAN 110/120 - Elementary Spanish I & II

PART ONE Academic Attitudes:
In the following questions, please use the following classifications of natural, social and health sciences: Natural Sciences include fields such as biology, chemistry and physics. Social Sciences include fields such as economics, sociology, and psychology. Health Sciences include fields such as medical and health and wellness fields.

I am interested in...
    1 = Not at all interested
    2 = A little interested
    3 = Somewhat interested
    4 = Highly interested
    5 = Extremely interested
    N/A = Not Applicable

	1	2	3	4	5	N/A
Taking more undergraduate or graduate classes in the natural	○	○	○	○	○	○

sciences

Taking more undergraduate or graduate classes in the social sciences	○	○	○	○	○	○
Taking more undergraduate or graduate classes in the health sciences	○	○	○	○	○	○
Exploring a minor, major, or career in the natural sciences	○	○	○	○	○	○
Exploring a minor, major, or career in the social sciences	○	○	○	○	○	○
Exploring a minor, major, or career in the health sciences	○	○	○	○	○	○
Completing a minor or major in the natural sciences	○	○	○	○	○	○
Completing a minor or major in the social sciences	○	○	○	○	○	○
Completing a minor or major in the health sciences	○	○	○	○	○	○
Learning in disciplines outside my major or intended major	○	○	○	○	○	○
Developing as an interdisciplinary thinker	○	○	○	○	○	○
Participating in interdisciplinary projects and activities	○	○	○	○	○	○
Working in a career with people from other disciplines	○	○	○	○	○	○
Volunteering or working for a non-profit organization focusing on food, health, farming, or environmental issues	○	○	○	○	○	○

PART TWO Civic Engagement and the Informed Consumer:

I care about...
     1 = Not at all
     2 = A little
     3 = Somewhat
     4 = Highly
     5 = Extremely
     N/A = Not Applicable

	1	2	3	4	5	N/A
Making food choices that are sustainable for the environment	○	○	○	○	○	○
Making food choices that are healthy	○	○	○	○	○	○
Making food choices that emphasize local food sources	○	○	○	○	○	○
Making food choices that are organic	○	○	○	○	○	○
Experimenting with new food choices or preparations (e.g., world cuisines, unfamiliar vegetables)	○	○	○	○	○	○
Making food choices that emphasize less processing	○	○	○	○	○	○
Participating in collective actions to change food policies at the local, national or global level	○	○	○	○	○	○
Helping others become more informed about their own food choices	○	○	○	○	○	○
Volunteering for a non-profit working with food, health, farming or environmental issues	○	○	○	○	○	○
Learning more about growing food Learning more about preparing food Learning more about the food I buy	○	○	○	○	○	○

PART THREE Interdisciplinary and Disciplinary Skills (Including Communication):

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A) Food Literacy

I am confident I can...
> 1 = Not confident
> 2 = A little confident
> 3 = Somewhat confident
> 4 = Highly confident
> 5 = Extremely confident
> N/A = Not Applicable

	1	2	3	4	5	N/A
Read and interpret a nutrition facts label on foods	O	O	O	O	O	O
Distinguish between food ingredients that are healthy and less healthy	O	O	O	O	O	O
Understand labeling on food packaging	O	O	O	O	O	O
Understand the nutritional benefits of the foods I eat	O	O	O	O	O	O
Evaluate the trade-offs involved in purchasing organic, local, unprocessed, or fair-trade foods	O	O	O	O	O	O

B) Research Literacy

I am confident I can...
> 1 = Not confident
> 2 = A little confident
> 3 = Somewhat confident
> 4 = Highly confident
> 5 = Extremely confident
> N/A = Not Applicable

	1	2	3	4	5	N/A
Understand how natural scientists plan and conduct research	O	O	O	O	O	O
Understand how social scientists plan and conduct research	O	O	O	O	O	O
Understand how health scientists plan and conduct research	O	O	O	O	O	O
Evaluate the merits of research reported in the media	O	O	O	O	O	O
Understand how the material in this course is linked to the material in other Food for Thought Cluster courses	O	O	O	O	O	O

C) Information and Communication Skills

I am confident I can...
> 1 = Not confident
> 2 = A little confident
> 3 = Somewhat confident
> 4 = Highly confident
> 5 = Extremely confident
> N/A = Not Applicable

	1	2	3	4	5	N/A
Communicate research and theories from this course to a member of the general public	○	○	○	○	○	○
Ask an intelligent question of an expert in the field of this course	○	○	○	○	○	○
Participate in a successful team project with my peers	○	○	○	○	○	○
Work with students in other courses to present research findings to the general public	○	○	○	○	○	○
Be an effective project team member	○	○	○	○	○	○
Work with people who have different perspectives or skills than I have	○	○	○	○	○	○
Articulate ideas relevant to this course in written form	○	○	○	○	○	○

PART FOUR Understanding of Food, Food Systems, Food Choices, Social Relationships and Biological Relationships

Presently, I have a good understanding of...
    1 = Strongly Disagree
    2 = Disagree
    3 = Somewhat Disagree and Somewhat Agree
    4 = Agree
    5 = Strongly Agree
    N/A = Not Applicable

	1	2	3	4	5	N/A
How science and technology shape food production	○	○	○	○	○	○
How government laws and policies impact food production and distribution	○	○	○	○	○	○
How food production and consumption patterns affect social inequality	○	○	○	○	○	○
How food production and consumption impacts the environment	○	○	○	○	○	○
How humans, plants and animals are ecologically connected	○	○	○	○	○	○
Where food comes from	○	○	○	○	○	○
How food affects human health	○	○	○	○	○	○
How the human body processes and uses nutrients	○	○	○	○	○	○

PART FIVE

Please list three food issues that interest you most:
Issue 1:
Issue 2:
Issue 3

PART SIX Demographic Information

What is your gender?

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What is your age group (in years)?
- ○ 18 or younger
- ○ 19-21
- ○ 22-30
- ○ 31-40
- ○ 41-49
- ○ over 50

What best characterizes you discipline-based major in college (check all that apply if you are doing or considering a double major).
- ○ Natural Sciences and Mathematics majors (e.g., biology, chemistry, engineering, computer sciences)
- ○ Social Sciences majors (e.g., business, sociology, economics, education, psychology, mass. com.)
- ○ Health Sciences majors (e.g., pre-med, health and wellness)
- ○ Humanities majors (e.g., history, foreign languages, literature, multimedia arts & sciences, and interdisciplinary studies)
- ○ Undecided at this time

What is your level in college?
- ○ Freshman
- ○ Sophomore
- ○ Junior
- ○ Senior
- ○ Post-graduate
- ○ Not a degree seeking student at this time

Are you in a teacher preparation program?
- ○ Yes
- ○ No
- ○ Undecided at this time

What is your current GPA in a system that assumes a 4.00 is an A (highest score possible)?
- ○ 4.00-3.60
- ○ 3.01-3.59
- ○ 2.51-3.00
- ○ 2.01-2.50
- ○ 2.0 or lower

Appendix 2. Additional Tables from Open-ended questions.

Table 2.1. Food Production and Consumption, the American Diet, selected subcategories.

	Total Responses, Entrance	Total Responses, Exit	Totals
Local Food	18	27	45
Organic food/methods of farming or cultivating	24	18	42
Sustainability/methods of	9	12	21
Processed Foods	7	10	17
Gardening/growing own food/community gardens	8	7	15
GMOs	4	9	13
Proportion of corn/ corn syrup in US Food/corn industry/fructose	8	4	12
Food in Public Schools/children	5	5	10
Proportion of meat in American production/ Meat industry	6	1	7
All other categories combined	36	38	74
Totals	125	131	256

Table 2.2. Food and Human Health, selected subcategories.

	Total Responses, Entrance	Total Responses, Exit	Totals
Healthy Food options/ Healthy Eating/ Balanced Diets/ Healthy Preparation of Food	23	19	42
How body processes nutrients/food (F2 + F6)	9	10	19
Chronic disease and diet	7	7	14
Vegan Diets	6	5	11
Other categories combined	60	46	80
Totals	105	87	160

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Table 2.3. Student interest in change.

Interest in social change in the area of…	Entrance	Exit	Totals
Food Production and Distribution, Laws and Policies	2	2	4
Protection of farmland		2	2
Food Production and Consumption, Social Inequality	1	3	4
Food Production and Consumption, Environment, The American Diet	5	5	10
Combined responses from categories: Interest in Organic foods, Local foods, Sustainability, Helping the Environment, Growing own food or community gardening,	59	65	124
Plants, Animals, Humans, Ecological Connections	1	3	4
Food and Human Health	1	1	2
General Interest in impacting change	1	6	7
Totals	70	87	157
	(288 responses, or 24%)	(278 responses, or 31%)	(566 responses, or 27%)

References

Barr, R. B., & Tagg, J. (1995). From teaching to learning—A new paradigm for undergraduate education. *Change, 27*(6), 12-25.

Byrne, C. (2002). Simple approaches to assessing collaborative learning environments. In Washington Center for Improving the Quality of Undergraduate Education Evaluation (Eds.) *Committee Assessment in and of Collaborative Learning: A Handbook of Strategies*. Retrieved from http://www.evergreen.edu/washcenter/lcfaq.htm

Dodge, L., & Kendall, M. E. (2004). Learning communities. *College Teaching, 52*(4), 150-155. doi: 10.3200/CTCH.52.4.150-155.

Driscoll, W., Gelabert, M., & Richardson, N. (2010). Efficacy of using learning communities to improve core chemistry education and increase interest and retention in chemistry. *J. Chem. Educ.*, *87*, 49-53.

Gray, P. J. (2000). Campus Profiles. Assessment and learning communities: Three examples. *Assessment Update, 12*(2), 10-11.

Hurd, S. N., & Stein R. F. (2004). Building and Sustaining Learning Communities, The Syracuse University Experience. Bolton, MA: Anker Publishing Company, Inc.

Landis, C.R., Peace, G.E., Scharberg, M.A., Branz, S., Spencer, J.N., Ricci, R.W., Zumdahl, S.A., & Shaw, D. (1998). The new traditions consortium: Shifting from a faculty-centered paradigm to a student-centered paradigm. *J. Chem. Educ.*, *75*, 741-744.

Wingert, J. R., Wasileski, S. A., Peterson, K., Mathews, L. G., Lanou, A. J., and Clarke, D.

Repko, A. F. (2008). Assessing interdisciplinary learning outcomes. *Academic Exchange Quarterly, 12*(3), 171-180.

Tinto, V. (1997). Classrooms as communities: Exploring the educational character of student persistence. *Journal of Higher Education*, *68*, 599-623.

Tinto, V. (2000a). Learning better together: The impact of learning communities on learning success. *Journal of Institutional Research, 9*, 48-53.

Tinto, V. (2000b). What have we learned about the impact of learning communities on students? *Assessment Update, 12*(2), 1-3.

University of California-Los Angeles. (2000). *Assessment of the general education cluster course experience: A pilot program of the college of letters and science. Year one of a five year study: The student perspective, the graduate student instructor perspective, the faculty perspective.* Retrieved from http://www.eric.ed.gov/PDFS/ED449750.pdf

Online reflective group discussion – connecting first year undergraduate students with their third year peers

Annetta K. L. Tsang[1]

University professional programs seek to develop students as reflective practitioners. The ability to critically reflect is often assumed to occur along the way. The explicit development of critical reflective skills among students is challenging. This study describes the utilization of online group discussion for critical reflection and provides insights into students' perception of the learning experience obtained via an experience evaluation questionnaire. Results suggest that online reflective group discussion may be relevant for the development of critical reflective skills through peer mentoring and collaborative meaning making.

Keywords: reflective learning, group reflection, online reflection, peer mentoring, professional education

I. Introduction & Background.

It is often expected that students undertaking professional training programs develop as reflective practitioners and have the skills to interact collaboratively with others upon graduation. Despite this, the development of professional attributes such as critical reflective skills are often left to chance and assumed to happen over time (Masella, 2007; Trathen & Gallagher, 2009; Tsang, 2010). However, evidence suggests that these skills must be explicitly developed (Masella, 2007; Tsang, 2010) and clearly understood in order for other learning to make sense (Trathan & Gallagher, 2009). This is especially relevant to the Generation Y students of today, whose preferred learning style are said to be collaborative and whose personal focus centres upon social networking and digital connectivity and yet, fail to demonstrate basic academic skills, such as the ability to critique, analyze and evaluate information obtained (Sheahan, 2005; Prensky, 2006). Educators therefore, have the responsibility to facilitate reflective learning in students.

Educators and universities are conscious of the need to provide positive learning experiences and accommodate students' preferences, in order to engage and retain learners of today. Online reflective group discussion satisfies a number of these student engagement determinants for learning but as yet, evidence supporting its effectiveness appears limited in the literature (Lammy & Godfellow, 1999; Farmer, et. al., 2008).

To satisfy students, one must understand the students' perceptions and perspectives. The way students perceive a learning experience greatly influences their engagement and motivation, which in turn, affects the effectiveness of the learning experience in facilitating deep learning, the type that brings about transformation and generative learning (McInnes, et. al., 2000; ACER, 2008).

This study attempts to begin to assess the usefulness of online reflective group discussion in developing critically reflective skills among students (for the development of students as evolving professionals), by exploring students' perceptions of the experience.

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A. Social Constructivist Theory of Learning.

Current education theory supports the social constructivist perspective of learning, which focuses on learner-centred generative learning, whereby the construction of knowledge and meaning occurs through deliberate actions and interactions among learners (Vygotsky, 1978; Mason & Rennie, 2006). The particular emphasis on social interaction in the process of knowing and the resultant shared meanings separates the social-constructivist perspective from constructivist theory. In this context, teachers become facilitators rather than sources of knowledge, students take on the active role of learner-investigators and discussion is viewed as a social environment which enables constructive collaborations. Applied to online reflective group discussion, this approach encourages the selective use of appropriate online learning tools to stimulate students' cognition and metacognition, in the context of social interactions and authentic interactive experiences, in order to construct their own knowledge and meanings (Mann, 2004; Mason & Rennie, 2006).

B. Critical Reflection and the Gen Y Learners.

Critical reflection forms the basis of personal and professional development, self-awareness (Schon, 1983; 1991), self-appraisal (Zimmerman, 2000), mindful decision making and reasoning (Dewey, 1933; Donaghy, 1999), self-directed learning and lifelong learning (Carr & Kemmis, 1986; Miller & Miller, 1999). The impact is said to be the highest if the process incorporates collaborative learning and collective construction of knowledge and meaning (Vygotsky, 1978; Mason & Rennie, 2006; Parkison & Bartek, 2010).

Despite of a common consensus that critical reflection is relevant, the concept of critical reflection itself is contentious. Evidence from the literature indicates that critical reflection is ill-defined and open to interpretation. In this study, critical reflection refers to a focused and structured cognitive-metacognitive process of deep examination, evaluation, analysis and query of a learning experience or critical incident which results in conscious application of theory to practice, transformation of the mind and translational actions, thereby impacting and challenging themselves and others (Kolb, 1984; Boud, et. al., 1985; Schon, 1991; Mezirow, 1998; Mann, et. al., 2009; Tsang & Walsh, 2010).

Facilitating critical reflection among today's learners is a challenge. Today's university students are technologically dependent and digitally savvy. They are the Generation Y (Gen Y) or Millennials, born between the years 1981 and 2001. Gen Y are recognized as the "digital natives" (Prensky, 2001). Growing up taking internet and other technology for granted, the digital experiences of Gen Y have fundamentally changed the way these students approach learning (Prensky, 2006).

Research indicates that these learners are assertive, confident, critical and demanding but deficient in attention span, possess insufficient depth of learning and are lacking in basic academic skills (Sheahan, 2005; McCrindle & Wolfinger, 2009). They multitask continuously, engage and connect creatively, expect instant gratification, are assessment-oriented, opt to work collaboratively yet prefer physical isolation, express themselves online openly and yet are seemingly unable to express themselves when asked to write in the traditional sense, to analyse and to make evidence-based judgements (Skiba, 2005).

Educators and universities have attempted to engage the Gen Y learners using blended learning and online learning approaches. Nevertheless, non-discretely using technology or overuse of any Web 2.0 tools without rationalized pedagogically grounded reasons have been shown to disengage rather than engage the learners of today (Kennedy, et. al., 2008).

C. Web 2.0 and Reflective Learning.

Mindful of the learning style preferences of today's learners and armed with the belief that the likelihood of deep learning and critical reflection is more likely in engaged students, educators are utilizing Web 2.0 tools, e.g. blogs, in place of traditional reflective journals to facilitate critical reflection (Lammy & Godfellow, 1999; Farmer, et. al., 2008).

Those who support online reflection via blogs, highlight the advantages of versatility and accessibility "transcending the limits of time and space" (Zeiger & Pulichino, 2004), compatibility with the learning styles of Gen Y learners, availability of collaborative opportunities to enhance reflective learning and diversify perspectives through interactive conversations, increase student engagement and peer interactions, enhance students' ownership in learning, increased online learning skills, as well as being more mindful of their thought processes and improving reflective skills (Bronack, et. al., 1999; Williams & Jacobs, 2004; Farmer, et. al., 2008). Reflective entries in blogs are stored and retrieved easily, which facilitates the "looking back" aspect of reflective learning (Ellison & Wu, 2008). Online blogging also has the capacity to reach a wide public audience which some authors claim could be "*an uplifting and sometimes cathartic experience*" for the blogger (Williams & Jacobs, 2004). In exposing personal reflections to others, one also learns to confront critical conversations and differing perspectives, which encourages critical analysis of one's own views in the context of others' interpretations (Oravec, 2002) and opens up opportunities for collaborative negotiation and construction of meaning (Richardson, 2006).

Those in opposition argue that online reflection via blogs are just as time consuming as traditional reflective journaling and suggest that the benefits of online reflective learning are outweighed by issues with privacy and confidentiality (Jones & Cookson, 2001). Strampel and Oliver (2008), in their study on the reflective content in student blogs, found that the quality of online reflection among their students were low, being largely descriptive rather than transformative.

D. Students in Professional Training and Critical Reflection.

Society has expectations of those they view as professionals. Students in professional undergraduate programs have the expectations that they will become a professional with expertise in their chosen field of study upon completion. Traditionally, this transition from student to professional is assumed to occur along the way. Professional identity and professional development are seen as "natural-by-products" of tertiary education (Jayne, et. al., 2005; Masella, 2005; 2007; Kinsella, 2007).

Many professional programs, especially the traditional professions like dentistry, put little effort in guiding students "to become" (Barnett & Hallam, 1999). Rather, the emphasis of these professional programs centres upon technical rationality and the acquisition / transmission of abundant theoretical knowledge and skills i.e. programs are primarily epistemologically-focussed. Whether students integrate and internalize what they know and what they practice, into how they practice, who they become and "their ways of being a professional" i.e. the ontological aspects of learning (Dall'Alba, 2005; 2009) are often overlooked. Contemporary philosophies in higher education suggest that both epistemology and ontology are essential for authentic learning and teaching (Cunsolo, Willox, & Lackeyram, 2009). Reflective learning and critical reflection individually and in groups, in particular, has been advocated the means to develop the ontological aspects of learning (Dall'Alba, 2005; 2009; Jayne, et. al., 2005; Masella, 2005; 2007; Kinsella, 2007). For example, in the allied health education literature, reflection is viewed as essential for optimizing practice-based and problem-based experiential learning (Wong, et. al., 1995;

Wetherell & Mullins, 1996). Ironically, reflective learning and reflective practices such as reflective journaling, are often perceived by students in professional programs as irrelevant, difficult and unengaging (Strauss, et. al., 2003; Bush & Bissell, 2008).

In view of the above, the aim of this study was to elicit students' perceptions of online reflective group discussion. In particular, the perceptions of first year and third year undergraduate students in professional training programs were investigated.

II. Context.

The study involved Bachelor of Oral Health (BOralH) and Bachelor of Dentistry (BDSc) students from the School of Dentistry, the University of Queensland.

Student feedback clearly articulated that they feel opportunities to interact with peers in other years would be of benefit to their engagement and professional development. As a result, BOralH and BDSc first year curricula became integrated. The Evolving Professional concept (Tsang, 2010), previously a philosophy of the BOralH program, extended to include the first year BDSc students. Recognizing that professional identity has the power to motivate and influence learning, the EP concept refers to a culture of team-oriented professionalism, a learning context for specialised knowledge, and a platform for professional socialization and the development of professional core skills (Tsang, 2010). EP teams were formed to enable collaborative learning within communities of practice. However, with over 100 students across three year levels and two programs, the logistics of scheduling in-class reflective group discussions were problematic. I needed a solution that enabled reflective interactions among students unrestricted by logistics, online reflective group discussion via Blackboard seemed like a good alternative.

III. Methods.

Ethical approval for this study was gained from the University of Queensland Human Ethics Committee. Students in all years of the BOralH program and the first year of the BDSc program were invited to participate. Signed consent was obtained from 100% of the students. The study was exploratory in nature and supports an enquiry approach in which the learners' experience and perceptions are central.

The study originally included second year BOralH students. They were excluded from the learning activity as the relevant course coordinator failed to update the students' electronic course profile and therefore, implementation was blocked. Students in second year BOralH were still invited to participate voluntarily, but the number of students who participated was few and therefore their data was not included.

An EP Blackboard site was made available to students from the start of the academic year and an EP blog was set up for each team for semester two. Students have access to view all blogs but could only write and respond in the EP blog designated to their EP team. Each EP team consisted of 6-7 first year students, 1-2 second year students and 1-2 third year students.

Online reflective group discussion required students to reflect on aspects of their clinical and professional learning and upload four critical incident-based reflective pieces onto their EP blog within the EP Blackboard site and respond (a minimum of 4 times) to others' reflection. A critical incident was defined as one which holds significance for the learner. Students were encouraged to consider Boud et al. (1985)'s 4Rs (revisit, react, relate, respond) to assist with their online reflection. Students also commented on the reflections of their EP team members. Students were asked to maintain professional standards in their

expression. Final year BOralH students in each EP team were required to facilitate the reflective discussions.

The learning activity was compulsory. Reflective learning was assessed both summatively and formatively. The task was weighted 20% of the semester's mark in first year and 5% of the semester's mark in final year. The discrepancy between first year and third year weighting was deliberate. Online group reflective discussion was only one component of reflective learning for third years whereas it constitutes the entire reflective learning aspect of first year. Marks were awarded for fulfilling the participation requirements, engagement in group reflection, evidence of reflection, appropriateness of communication. The online reflective learning activity was evaluated via a student perception questionnaire at the end of the semester. The questionnaire consists of two parts: the first part comprises of a list of statements which the students respond to using 5-point Likert scales (strongly agree, agree, uncertain, disagree, strongly disagree) and the second part comprises of four open-ended questions. Independent samples t-tests were used to determine the statistical difference between first and final year students' perceptions for each statement posed.

IV. Results.

A. Benefits of online reflective group discussion.

Over 60% of students in this study perceived online reflective discussion as being valuable (see Table 1, Statement 1-3). In particular, significantly more students in their third year than first year perceived that reflective blogging was helpful for networking with peers in the same year as well as in other years, contributed to professional development, and clinical learning (see Table 1).

Students were asked: "What are the positives of online reflective group discussion (if any)?" Sixty-eight first year students and nineteen third year students provided a response to this open-ended question.

The main benefits as articulated by first year students were: learning from and with others, connecting with third year students, being mentored by them and having them as a source of information (see Table 2).

- *"Interaction with others, gain insights from peers, chance to see what others think, Get experiences from others, knowledge also. Kind of forces us to think deeply about our own assumptions and understanding and think differently."*
- *"Good to reflect and read older students experiences. Gain insights into what we have not been exposed to in our own experience– a good form of foresight and preparation for the unknown."*
- *"Networking and the social aspects of mentoring. Interesting learning from others. Able to get tips for learning. Access to the info repeatedly whenever I wanted to was good as well."*

All of the responses from third year students described being the mentor to and influencing the less experienced students in some way, as the primary benefit of the online reflective group discussion experience:

- *"Influencing the professionalism of 1st and 2nd year, feeling like I am passing on my knowledge and being a part of EP for others, I found it very rewarding!!"*
- *"Good for first years to ask questions and seek guidance (wished we had that when we are in first year), being able to communicate with younger less experienced peers, sharing insights and hopefully being an EP model to my peers… "*

This correlated well with the third years' Likert responses to the statements on mentoring and leadership skills development (see Table 1, Statement 15 & 16).

Table 1. Students' perceptions of online reflective discussion.[2]

Statement	TOTAL N=119	Year 1 N=97	Year 3 N=22	F	Sig. (2-tailed)
	N(%)			*Yr 1 vs. Yr 3*	
	Strongly agree / Agree				
1. The online reflective discussion helped me in networking with peers in my own year as well as in other years.	63(52.9)	49(50.5)	14(63.6)	5.442	**0.035**
2. The online reflective discussion contributed to my professional development.	61(51.2)	43(44.3)	18(81.8)	13.826	**0.050**
3. The online reflective discussion contributed to my clinical and professional learning.	66(55.5)	51(52.6)	15(68.2)	4.642	**0.043**
4. I enjoyed the online reflective discussion.	47(39.5)	34(35.1)	13(59.1)	6.383	**0.026**
5. I contributed well to my EP team during online reflective discussion and put in the effort to be engaged.	82(68.9)	62(63.9)	20(90.9)	2.758	0.084
6. Peers in my EP team contributed well to the online reflective discussion	82(68.9)	69(71.1)	13(59.1)	4.170	0.172
7. The online reflective discussion approach worked better for me than in-class reflective group discussion.	59(49.6)	44(45.4)	15(68.2)	4.123	**0.007**
8. Online reflective discussion was time consuming.	85(71.4)	71(73.2)	14(63.6)	6.552	0.087
9. Reflective learning is a waste of time.	7(5.9)	7(7.2)	0	1.549	0.135
10. I prefer in-class reflective group discussion.	28(23.6)	21(21.7)	7(31.8)	3.489	0.157
11. I prefer personal reflective journaling.	19(16.0)	15(15.5)	4(18.2)	3.989	0.209
12. I prefer online reflective group discussion over in-class reflective group discussion.	66(55.5)	47(48.5)	19(86.4)	0.752	**0.017**
13. I think online reflective group discussion should be continued.	63(53.1)	48(49.5)	15(69.1)	9.373	**0.007**
14. I think online reflective group discussion should involve other years of the BOralH / BDSc programs (i.e. BOralH II, BDSc II, III, IV, V).	59(49.6)	42(43.3)	17(77.3)	1.560	**0.006**
15. I enjoyed mentoring my first year peers.	-	-	19(86.4)	-	-
16. I developed leadership and mentoring skills through facilitating the online reflective discussion and mentoring my first year peers.	-	-	15(68.2)	-	-

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[2] Alpha value = 0.05; significance = $p<0.05$; Independent samples *t*-test was used to determine the statistical difference between final year students' perceptions of online reflective discussion and from first year students for each statements posed

Table 2. Major themes identified from students' perceptions.

Online reflective blogging was beneficial for:	-Networking with peers -Obtaining information & insights -Professional development -Clinical learning
Online reflective blogging was less beneficial because:	-Time consuming -Increased workload
Online reflective blogging was least beneficial when:	-Entries repetitive -Group interactions limited or unidirectional -Limited experience hindered contribution

B. Challenges of online reflective group discussion.

Students were asked: "*What are the negatives of online reflective group discussion (if any)?*" Seventy-seven first year students and eighteen third year students provided a response to this open-ended question.

First year students' negative perceptions fell broadly into three categories. These were related to time, workload, and difficulty making contributions due to limited experience (see Table 2). In particular, first year students thought that online reflective group discussion was time consuming and that the workload was too great for the weighting attributed to this learning activity:

- "*Time consuming!!! Time constraints of uni, hard to find time to write reflection or respond to one and it is so hard to talk on blogs.*"
- "*Time is a problem and having to remember to log on and blog. Convenient – like I didn't have to get up early to get to the sessions but no face to face interaction was a negative in hindsight.*"
- "*Doing 4 reflections and responding to 4 others is just too much for the 20% we get for it! All in all, making things readable for others was time consuming, thinking up what to write to be interesting was time consuming, it was just time consuming!!!*"

The third year students unanimously indicated that the main issue with the online reflective group discussions was the limited interactions and repetitive points of reflection from their less experienced peers, which the third year studentss attributed to first year students' lack of experience with reflective learning and with clinical practice (Table 2):

- "*Peers reflecting on very similar critical incidents and highlighting very similar points make responding to them a little challenging. It is probably better if the first years have had more clinical experiences.*"
- "*I'm not entirely convinced that my first year buddies gained understanding from my reflective discussion. Tips yes, theoretical knowledge probably, but understanding and application, I doubt it. They just soaked up what I said – no questions asked*"

This correlated well with the responses to the Likert statements on engagement (see Table 1, Statement 5 & 6). Twenty out of twenty-two (90.9%) third year students felt that they made an effort to engage in reflective blogging compared to only sixty-two out of ninety-seven (63.9%) first year students. On the contrary, only thirteen third year students (59.1%) felt that peers in their EP team contributed well.

C. Preference for online reflective group discussion.

Perceptions of online reflective group discussion among both first and third year students were positive. None of the third year students and less than 10% of first year students felt that reflective learning is a waste of time (see Table 1, Statement 12).

Significantly more third year students indicated that reflective blogging enhanced their learning. Similarly, a significantly greater number of third year students enjoyed online reflective discussion, felt that online reflection worked better than in-class reflective discussion, preferred reflective discussion over reflective journaling, felt that online reflection should be continued, and should include other years of the BDSc and BOralH programs (see Table 1, Statement 7-11, 13 &14). In contrast, significantly more first year students preferred in-class reflective group discussion than online reflective group discussion.

Preference for online reflective group discussion was rationalized in terms of logistics and practicalities, as well as providing more opportunities for critical reflection, and being more interactive:
- *"Online group discussion is better, more information gotten from them than in-class discussion, everyone who wants to can contribute whereas in-class is too rushed and the quiet ones don't get a say."*
- *"Not in-class! Gets very disorganised and uncomfortable, we have to sit in cramped up spaces and we can't hear everyone properly and the loud ones always dominated the discussions."*
- *"Online discussions are less time consuming - I don't have to travel and I can do it whenever I want to."*
- *"Online is my preference, I can edit and delete things. I can also look back to what I wrote before I add to it. I can save suggestions obtained from others."*

Those who supported in-class reflective group discussion reasoned that in-class reflective group discussion provides immediate feedback, does not take up personal study time, and offers a less formal style of discussion:
- *"The opportunity for immediate discussion in class is better than online, get to bounce ideas off each other – immediacy is important for learning".*
- *"I think in-class group discussion is better than online. Everyone is there, forced to contribute and it doesn't take time out of home study."*
- *"In-class discussion is more personal and spontaneous - the casual chat style is better for group dynamics and for talking over professional and clinical points."*

D. Differences in perception: first year students vs. third year students.

The third year students' apparent preference for online reflective discussion may be attributed to the third year students being enthused about influencing their less experienced peers and being more experienced in reflective learning, therefore having a clearer idea of what constitutes reflection and the potential benefits of reflection. In addition, third year students tended to be more confident in sharing their thoughts online, have more critical incidents to share, as well as being more appreciative of multi-perspectives, options, and alternatives for managing clinical and professional issues:
- *"Opportunity to discuss and reflect on both positive and negative clinical incidents has been terrific. Being able to respond to and answer questions first and second years had and hopefully gaining something from our reflection made it worthwhile."*
- *"Influencing the professionalism of 1st and 2nd year, feeling like I am passing on my knowledge and being a part of EP for others, I found it very rewarding!!"*

> – *"Way better than reflective journals…not faster but more interesting, being interactive and offering different perspectives and options."*

On the other hand, first year students may have gained less from online reflective discussions due to being more assessment-oriented and concerned with meeting course requirements rather than being mentored by the third year students and sharing critical reflections. Moreover, first year students' preference for instant feedback, self-perception of being inexperienced and therefore less able to contribute, as well as perception of online reflection being too deliberate and lacking in spontaneity may also have attributed to less positive experiences. Comments from first year students illustrate these:

> – *"In-class discussion may be better - more spontaneous and honest, online are more fabricated and written with intention to obtain higher marks"*

> – *"Takes time this reflection blog, and not as useful for our learning compared to lectures and pracs."*

> – *"I didn't have much to reflect on, I didn't have any helpful hints for my peers, I felt stupid sharing trivial things with the third years and it's hard to reflect on someone else's reflection and respond."*

V. Discussion.

Group blogging in the educational context, where the ownership of the blog is a collective one, is still a relatively new practice with limited literature supporting its relevance in higher education. Overall, students in this study were largely in favour of online reflective group discussion for the development of students as evolving professionals, with third year students being significantly more supportive of the initiative than the first year students.

Students perceived online reflective group discussions using collective blogs as being helpful for networking with peers, learning with and from others, and peer mentoring. Whilst the primary focus of the learning activity was on critical reflection, first year students benefited from connecting with third year peer mentors and having them as a source of information for matters relating to clinical practice and professional development and as role models for critical reflection. Complementarily, third year students enjoyed and benefited from mentoring the less experienced students and, in doing so, developed leadership skills and gained confidence as evolving professionals. Peer mentoring as "*a complex process that supports mutual enhancement of independent and critically reflective thinking*" (Galbraith, 2003) was apparent in this study. Studies evaluating peer mentoring as a means of assisting first year students in their transition to university life also indicate that peer mentoring enhances skills development, reduces stress and the negative effects of stress, facilitates professional socialization and identity development, and provides a blend of idealism and pragmatism that enhances student engagement (Jacobi, 1991; Hall, 2000; Watson, et. al., 2004; Glaser, et. al., 2006). The potential in promoting multi-perspective reflective learning, collaborative learning and reciprocal learning is particularly relevant for evolving professionals (Eisen, 2001; Austin, 2002). Not only is peer mentoring found to be beneficial to the mentees, but also to the mentors including a sense of self-satisfaction, enjoyment in sharing expertise, gaining new personal insights and enhancing professional confidence (Gilles & Wilson, 2004). From this, it could be inferred that online reflective group discussion may be an appropriate approach for peer mentoring.

Benefits perceived by students in this study support a constructivist approach to learning (Mason & Rennie, 2006). Online reflective group discussion enabled the incorporation and integration of collaborative learning and peer mentoring. It provides a positive means of knowing within communities of practice that empowers students as evolving professionals. Furthermore, adapting to online reflective group discussion during

undergraduate training may facilitate the continuation of online reflective group discussion with mentors and peers or within communities of practice post graduation, thereby assisting graduates in the transition between learning and work, and in sustaining lifelong learning (Parkison & Bartek, 2010).

In addition to learning benefits, students who prefer reflective blogging also highlighted the practical benefits of using an online platform. Online reflective group discussion was deemed less time consuming by some students because participation does not involve travelling and can occur anywhere, anytime. Similarly, Skorga (2002) and Juntunen and Heikkinen (2004), indicated overcoming logistic difficulties, e.g., of bringing learners together physically, as being a reason for implementing online interprofessional learning activities. Students also noted that asynchronous online reflective group discussion overcomes the need to respond immediately, offers opportunities for editing, and expressing oneself more clearly. The ability to reflect at a time chosen by students themselves, without time pressure, may motivate students to spend greater amounts of time reflecting (Morgan, 2002). Students also noted greater participation among group members online compared to in-class reflective group discussion. Ng and Cheung (2007) also suggested that online discussion *"empowers reticent learners to contribute as equally as those who tend to dominate conversations face-to-face."* The opportunity for students to return again and again to read theirs and others' reflective entries engage students in an iterative process of critical reflection, validation, reconsideration, reconstruction and revalidation (Vygotsky, 1978). Moreover, virtual environments may be easier than face-to-face interactions for today's Gen Y learners who generally prefer online socializing to physical interactions, as long as internet access is freely available (Prensky, 2001; Connor, 2003). It is worth noting that some students found online discussions too structured and lacking in spontaneity. Student engagement and a conversational approach to reflective discussion are important for optimizing learning outcomes (Phillips & Nichols, 2009).

Both first and third year students highlighted the lack of clinical and professional experience among first year students as an impediment to engagement and interaction. Miers (2007) noted that students' lack of experience may limit learning as learning stagnates at the "sharing knowledge" stage and fails to move towards "recognizing understanding and self-analysis." In hindsight, involving first year students in online reflective group discussion with third year students when students have only been exposed to clinical observations and clinical practices on peers may have been too soon. On the contrary, early immersion into an online reflective discussion environment may facilitate the development of critical reflective and metacognitive skills, while peer mentoring by senior students may enable the less experienced students to learn by modelling and to gain support and feedback to enable improvement.

Ferdig and Trammell (2004) suggested that the blog is suitable for the construction of knowledge through discourse as blogging encourages reflection and feedback. From an experiential learning perspective, reflection and discussion within a community of practice can promote reasoning and analytical skills, as individual's views and arguments are brought into the open, discussed, debated, and transformed during the interaction, and this in turn, fosters the development of critical reflection and metacognition (Boud & Edwards, 1999). Nevertheless, it may have been a more positive learning experience for the first year students had they been first exposed to personal online blogging before participating in online reflective group discussion with more experienced students. The assumption that first year students, being mostly Gen Y would be familiar and comfortable with expressing themselves reflectively and analytically online may have been inaccurate. This concurs with current literature which now questions whether digital natives really learn better when digital technology is incorporated, especially in the light of many digital natives having lower

technological skills than expected (McPherson, 2008; Lei, 2009). Moreover, the literature acknowledges that whilst Gen Y are proficient in accessing information online, their ability to critically evaluate, analyze and understand the information they obtain may be limited (McPherson, 2008; Lei, 2009). In utilizing digital technology for critical reflection, educators need to take into consideration not only the technological abilities of the students but the students' reflective ability and their level of confidence in articulating themselves in online academic discourses within "communities of practice."

The discrepancy in weightings between first and third year students may also have contributed to a less favourable outcome for first year students. Yielder and Thompson (2007) suggested that students need to believe that participation is worth their efforts in order for engagement and commitment to be maintained. Being highly assessment-orientated, innately competitive high achievers, the substantial weighting attributed to reflective learning was perhaps threatening to some first year students who perceived reflective learning as unpredictable. Moreover, student perception that eight reflective pieces in a semester was excessive for an assessment component weighted at 20% highlight the naivety of first year students in relation to program expectations and standards at the university level. McInnes, et. al. (2000) reported that first year university students often expect the university to fit in with their expectations. In contrast, third year students found the same requirements to be quite acceptable for a weighting of 5%.

Despite student perceptions of reflective blogging as being more convenient, most students still perceived online reflective discussion to be time consuming. However, the time spent was not perceived by students as a waste of time, indicating that most students understand the benefit of online reflective group discussion. Reflective learning and critical reflection take time (Kember, et. al., 2000; Tsang & Walsh, 2010) and therefore, educators wishing to implement reflective components into their curricula and optimize learning outcomes need to factor in adequate time for reflection to occur and for reflective skills to develop.

Third year students expressed significantly greater support for online reflective discussions. Convenience and accessibility were major reasons. Moreover, third year students enjoyed the benefits of collaborative learning and multi-perspective discussions offered by online reflection, which may be characteristics of their readiness to transform from an evolving professional to a professional (Masella, 2007). In contrast, significantly more first year students supported in-class reflective discussion. Some students noted that in-class reflective discussion freed up personal time for studying, suggesting that online blogging done in students' own time competed with study time. This is conflicting to the belief that younger learners prefer and are more likely to learn using online and digital approaches (Prensky, 2001; 2006). Studies into the first year experience have suggested that first year students are prone to feelings of isolation and disengagement and that the transition to university life may be enhanced by greater interactions among peers for combating common challenges and enhancing trust and belonging (Mann, 2004; Krause, 2005; Krause & Coates, 2008).

In both groups, less than 20% preferred personal reflective journaling. Other studies have also found that students generally perceive reflective journals negatively (Mann, et. al., 2009). Reflective journals are usually completed in isolation and this may minimize its utilization with the Gen Y learners who thrive on social networking and prefer collaborative approaches to learning. In addition, reflective journaling does not facilitate peer mentoring, generative learning and collaborative meaning making which are important for today's learners from a socio-constructivist perspective.

Although this study was implemented in a group of oral health and dentistry students, the outcomes of this finding are applicable in part, to other professional training programs.

For example, the benefits of experience-based online reflective discussion for the development of the ontological aspects of learning would be relevant to Gen Y learners in all professional fields of studies. However, it is important to keep in mind that the specificity of the sample population included in this study may render some details less applicable to other groups.

Moreover, the scope of this study is limited by its use of a student feedback questionnaire alone. According to Kirkpatrick's outcome hierarchy, evaluation focusing on student perceptions represents a low level outcome (Kirkpatrick, 1996). Generalisations from the findings of this study may be restricted due to the utilization of convenience sampling and the lack of a control group for comparison. The study set out to examine student perceptions of an online reflective learning experience and found that aside from developing critical reflection among students, it provided a positive environment for peer mentoring. Future studies should be designed longitudinally to determine the effectiveness of online reflective group discussion as a collaborative learning and peer mentoring approach in terms of learning outcomes and systemic impact.

VI. Conclusion

Online reflective group discussion has demonstrated potential for enhancing the development of students as evolving professionals. Through online reflective group discussion among students of different year levels, the less experienced students were provided with guidance and support for understanding tacit knowledge associated with their profession, whilst the more experienced students benefited from taking on the mentor role and developing their professional attributes, e.g., leadership skills. Experiential learning coupled with critical reflection and peer mentoring using group blogs engaged students and demonstrated clear benefits for developing "the ways of being a professional" in this study. The collaborative approach to critical reflection facilitated the integration of theory and experiences, multi-perspective learning and collective construction of knowledge and meaning making. Peer interactions further facilitated professional socialization and early professional identity development, which in turn, provided a specific context for and empowered student learning and ongoing professional transformation.

References

Australian Council for Educational Research (ACER). (2008). *Attracting, Engaging and Retaining: New Conversations About Learning. Australasian Survey of Student Engagement Report.* Retrieved July 2010, from
http://www.acer.edu.au/documents/AUSSE_ASER-Report.pdf.

Austin, Z. (2002). What is learnworthy? Lessons from group socialization theory for professional education and continuing professional development. *Pharmacy Education, 2*(4), 161-166.

Barnett, R., & Hallam, S. (1999). Teaching for supercomplexity: A pedagogy for higher education. In P. Mortimore (Ed). *Understanding Pedagogy and its Impact on Learning*. London: Paul Chapman.

Boud, D., Keogh, R., & Walker, D. (Eds). (1985). *Reflection: Turning Experience into Learning.* (pp.18-40). London: Kogan Page.

Boud, D., & Edwards, H. (1999). Learning for practice: Promoting learning in clinical and community settings. In J. Higgs & H. Edwards (Eds). *Educating Beginning Practitioners: Challenges for Health Professional Education.* Oxford: Butterworth-Heinemann.

Bronack, S., Kilbane, C., Herbert, J., & McNergney, R. (1999). In-service and pre-service teachers' perceptions of a web based, case-based learning environment. *Journal of Information Technology for Teacher Education, 8,* 304-320.

Bush, H., & Bissell, V. (2008). The evaluation of an approach to reflective learning in the undergraduate dental curriculum. *European Journal of Dental Education, 12,* 103-110.

Carr, W., & Kemmis, S. (1986). *Becoming Critical: Education, Knowledge and Action Research*. London: Falmer Press.

Connor, C. (2003). Virtual learning and inter-professional education: Developing computer-mediated communication for learning about collaboration. *Innovations in Education and Teaching International, 40,* 341-347.

Cunsolo, W.A., & Lackeyram, D (2009). (Re)Considering the scholarship of learning: Inviting the elephant in the room to tea. *International Journal for the Scholarship of Teaching and Learning, 1(1).* Accessed online 14 July 2009. URL: http://www.georgiasouthern.edu/ijsotl

Dall'Alba, G. (2005). Improving teaching: Enhancing ways of being university teachers. *Higher Education Research & Development*, *24*(4), 361-372.

Dall'Alba, G., & Barnacle, R. (2007). An ontological turn for higher education. *Studies in Higher Education*, *32*(6), 679-691.

Dall'Alba, G. (2009). Learning professional ways of being: Ambiguities of becoming. *Educational Philosophy and Theory, 41*(1), 10.1111/j.1469_5812.2008.00475.x.

Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the education process.* Boston: Heath.

Donaghy, M. (1999). Reflections on clinical effectiveness in therapy. A practical approach. *British Journal of Therapy and Rehabilitation 6*(6), 270-274.

Eisen, M. J. (2001). Peer-based professional development viewed through the lens of transformative learning. *Holistic Nursing Practice, 16(1)*, 30-42.

Ellison, N., & Wu, Y. (2008). Blogging in the classroom: A preliminary exploration of student attitudes and impact on comprehension. *Journal of Educational Multimedia and Hypermedia, 17*(1), 99–122.

Farmer, B., Yue, A., & Brooks, C. (2008). Using blogging for higher order learning in large cohort university teaching: A case study. *Australiasian Journal of Educational Techonlogy, 24*(2), 123-136.

Ferdig, R. E., & Trammell, K. D. (2004). Content delivery in the "Blogosphere." *Technological Horizons in Education Journal*. Retrieved July 2010 from http://www.thejournal.com/magazine/vault/articleprintversion.cfm?aid=4677.

Galbraith, M.W. (2003). The adult education professor as mentor: A means to enhance teaching and learning. *Perspectives: The New York Journal of Adult Learning, 1*(1), 9–20.

Gilles, C., & Wilson, J. (2004). Receiving as well as giving: Mentors' perceptions of their professional development in one teacher induction program. *Mentoring and Tutoring, 12*(1), 88-106.

Glaser, N., Hall, R., & Halperin, S. (2006). Students supporting students: The effects of peer mentoring on the experiences of first year university students. *Journal of the Australia and New Zealand Student Services Association, 27*, 4-19.

Hall, R. (2000). *The First Year Experience at University. A Study of Transition to University in Arts and Science Students at the University of New South Wales.* (Report). Faculty of Arts and Social Sciences and Science and Technology: University of New South Wales.

Jacobi, M. (1991). Mentoring and undergraduate academic success. A literature review. *Review of Educational Research, 61*(4), 505-532.

Jaye, C., Egan, T., & Parker, S. (2005). Learning to be a doctor: Medical educators talk about the hidden curriculum in medical education. *Focus on Health Professional Education, 7(2),* 1-17.

Jones I., & Cookson J. (2001). Computer assisted learning design for reflective practice supporting multiple learning styles for education and training in pre-hospital care. *International Journal of Training and Development, 5*(1), 74-80.

Juntunen, A., & Heikkinen, E. (2004). Lessons from interprofessional e-learning: Piloting a care of the elderly module. *Journal of Interprofessional Care, 18,* 269-278.

Kember, D., Jones, A., Loke, A. Y., McKay, J., Sinclair, K., … (2000). *Reflective teaching and learning in the health professions. Action Research in professional education.* Oxford, Blackwell Science.

Kennedy, G. E., Judd, T. S., Churchward, A., & Gray, K. (2008). First year students' experiences with technology: Are they really digital natives? *Australasian Journal of Educational Technology, 24*(1), 108-122.

Kinsella, E. A. (2007). Technical rationality in Schon's reflective practice: Dichotomous or non-dualistic epistemological position. *Nursing Philosophy, 8(2)*, 102-113.

Kirkpatrick, D. (1996). Revisiting Kirkpatrick's four-level model. *Training and Development, 50,* 54-59.

Kolb, D. (1984). *Experiential Learning: Experience as the Source of Learning and Development.* Englewood Cliffs: Prentice-Hall.

Krause, K. (2005). Serious thoughts about dropping out in first year: Trends, patterns and implications for higher education. *Studies in Learning, Evaluation, Innovation and Development, 2*(3), 55-67.

Krause, K.L., & Coates, H. (2008). Students' engagement in first-year university. *Assessment & Evaluation in Higher Education, 33*(5), 493-505.

Lammy, M., & Goodfellow, R. (1999). Reflexive conversations in the virtual language classroom. *Language, Learning, and Technology, 2*(2), 43-61.

Lei, J. (2009). Digital natives as preservice teachers: What technology preparation is needed? *Journal of Computing in Teacher Education, 25*(3), 87-95.

Mann, K. V. (2004). The role of education theory in continuing medical education: Has it helped us? *The Journal of Continuing Education in the Health Professions, 24,* s22-s30.

Mann, K., Gordon, J., & MacLeod, A. (2009). Reflection and reflective practice in health professions education: A systematic review. *Advances in Health Science Education, 14*, 595-621.

Masella, R. S. (2005).The hidden curriculum: Value added in dental education. *Journal of Dental Education, 70(3),* 279-283.

Masella, R. S. (2007). Renewing professionalism in dental education: Overcoming the market environment. *Journal of Dental Education, 71(2),* 205-216.

Mason, R., & Rennie, F. (2006). *Elearning: The key concepts.* New York: Routledge.

McCrindle, M., & Wolfinger, E. (2009). *ABC of XYZ: Understanding the global generations.* Sydney: UNSW Press.

McInnis, C. (2003). From marginal to mainstream strategies: Responding to student diversity in Australian universities. *European Journal of Education*, *38,* 387–400.

McInnes, C., James, R., & Hartley, R. (2000). *Trends in the First Year Experience: In Australian Universities* (Report). Melbourne: Centre for the Study of Higher Education, University of Melbourne.

McPherson, T. (Ed). (2008). *Digital Youth, Innovation, and the Unexpected.* Cambridge: The MIT Press.

Mezirow, J. (1998). On critical reflection. *Adult Education Quarterly, 48,* 185-198.

Miers, M. E., Clarke, B. A., Pollard, K. C., Rickaby, C. E., Thomas, J., & Turtle, A. (2007). Online interprofessional learning: The student experience. *Journal of Interprofessional Care, 21*(5), 529-542.

Ng, C. S. L., & Cheung, W. S. (2007). Comparing face to face, tutor led discussion and online discussion in the classroom. A*ustraliasian Journal of Educational Technology, 23*(4), 455-469.

Oravec, J. (2002). Bookmarking the world: Weblog applications in education. *Journal of Adolescent and Adult Literacy, 45*(7), 616-621.

Parkison, P. T., & Bartek, J. K. (2010). Peer mentoring and collaboration in the clinical setting: A case study in dental hygiene. *Reflective Practice, 11(*2), 231-243.

Philip, R., & Nicholls, J. (2009). Group blogs: Documenting collaborative drama processes. *Australiasian Journal of Educational Technology, 25*(5), 683-699.

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon, 9*(5), 1-6.

Prensky, M. (2006). *Don't bother me Mon – I'm learning!* St Paul MN: Paragon House.

Richardson, W. (2006). *Blogs, Wikis, Podcasts, and Other Powerful Web Tools for Classrooms.* Thousand Oaks, CA: Corwin Press.

Schon, D. A. (1983). *The Reflective Practitioner. How Professionals Think in Action.* New York: Basic Books.

Schon, D. A. (1991). *The Reflective Practitioner: How Professionals Think in Action*. Aldershot: Ashgate Area.

Sheahan, P. (2005). *Generation Y: Thriving and Surviving with Generation Y at Work.* Prahran, Victoria, Australia: Hardie Grant Books.

Skiba, D. J. (2005). The millennials: Have they arrived at your school of nursing? *Nursing Education Perspectives*, *25*(6), 370–371.

Skorga, P. (2002). Interdisciplinary and distance education in the Delta: The Delta Health Education Partnership. *Journal of Interprofessional Care, 16,* 149-157.

Strampel, K., & Oliver, R. (2008). We've thrown away the pens, but are they learning? Using blogs in higher education. In *Hello! Where are you in the landscape of educational technology?* Proceedings Ascilite Melbourne. Retrieved July 2010 from http://www.ascilite.org.au/conferences/melbourne08/proc/strampel.pdf.

Strauss, R., Mofidi, M., Sandler, E. S., Williamson III, R., McMurty, B. A., Carl, L. S., & Neal, E. M. (2003). Reflective learning in community-based dental education. *Journal of Dental Education, 67*(11), 1234-1242.

Trathen, A., & Gallagher, J. E (2009). Dental professionalism: Definitions and debate. *British Dental Journal, 206,* 249-253.

Tsang, A. K. L. (2010). The evolving professional (EP) concept as a framework for the scholarship of teaching and learning. *International Journal for the Scholarship of Teaching and Learning, 4*(1). Retrieved July 2010 from http://www.georgiasouthern.edu/ijsotl.

Tsang, A. K. L., & Walsh, L. J. (2010). Oral Health students' perceptions of clinical reflective learning – relevance to their development as evolving professionals. *European Journal of Dental Education, 14*, 99-105.

Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Cambridge: Harvard University Press.

Watson, G., Cavallaro Johnson, G., & Austin, H. (2004). Exploring relatedness to field of study as an indicator of student retention. *Higher Education Research and Development, 23*(1), 57-72.

Wetherell, J., & Mullins, G. (1996). The use of student journals in problem-based learning. *Medical Education, 30,* 105-111.

Williams, J. B., & Jacobs, J. (2004). Exploring the use of blogs as learning spaces in the higher education sector. *Australasian Journal of Educational Technology, 20*(2), 232-247.

Wong, F. K. Y., Chung, L. Y. F., & Yan, L. (1995). Assessing the level of student reflection from reflective journals. *Journal of Advanced Nursing, 22*, 48-57.

Yielder, J., & Thompson, A. (2007). The use of online discussion forums to support the learning of clinical educators. *Focus on Health Education, 8*(1), 12-24.

Zieger, L., & Pulichino, J. (2004). Establishing a community of learners: A case study of a university graduate orientation program for online learners. *Journal of Interactive Online Learning, 2*(4), 1-13.

Incorporating case studies into an undergraduate genetics course

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Genetics is considered one of the most challenging courses in the biology curricula at both the secondary and post secondary levels. Case based teaching has been shown to improve student perception and performance outcomes in both non-science and science courses. Thus in an effort to improve outcomes, case studies were integrated into an undergraduate genetics course as a supplement to lecture and replacement to recitation. Student perception and performance when case studies were used was compared to two previous years before the incorporation of case studies. Student course evaluations, pre and post surveys of student knowledge, and exam scores indicated that when case studies were used student perception improved while student performance showed mixed results.

Keywords: case studies, case-based teaching, genetics

I. Introduction.

The discipline of genetics serves as the core of biology education by providing a set of unifying concepts essential for the other disciplines in biology (AAAS, 1993; Banet & Ayuso, 2003; Tsui & Treagust, 2004a). Genetics is considered one of the most important and difficult courses to teach and learn (Johnstone & Mahmoud, 1980, Finley, Stewart, & Yarroch, 1982; Kinfield, 1994; Bahar, Johnstone, & Hansell, 1999; Lewis & Wood-Robinson, 2000; Banet & Ayuso, 2000; Tsui & Treagust, 2004). One reason for this difficulty is the complex and abstract nature of many of the concepts in genetics. Understanding these concepts require multi-level thinking described as the micro (chromosomes, gametes), macro (organismal), and molecular (DNA, genes) levels. Transitioning between these levels may be done with ease by instructors but can be a major challenge for students (Marbach-Ad & Stavy, 2000; Duncan & Riser, 2007).

Students struggle to make connections between concepts because instructors and textbook authors often compartmentalize topics (Griffith, 2008). For example meiosis and inheritance (Wynne, Steward, & Passmore, 2001; Knippels, 2002) or genes and chromosomes (Lewis & Wood-Robinson, 2000) are often presented as four separate topics instead of being integrated. This instructional separation of key concepts does nothing to foster the multilevel thinking necessary for proficiency in genetics. Without connections between concepts, most genetics courses end up being an encyclopedia of genetics information, understanding of which is often complicated by the discipline-specific vocabulary and terminology (Knippels, Waarlo, & Boersma, 2005; Griffith, 2008).

Mastering genetics requires the application of complex content to the complex task of problem solving-an integral part of genetics especially Mendelian genetics (Collins & Stewart, 1989). However, unlike problems in mathematics and physics that have one correct answer usually derived by a clearly defined algorithm, there may be more than one approach to solving a problem in genetics (Collins & Stewart, 1989). Proficiency in problem solving-the primary means by which understanding is assessed in genetics is an atypical method of assessment in biology and requires higher levels of Bloom's taxonomy. Thus traditional study habits such as

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memorization are ineffective (Griffith, 2008). It is therefore not uncommon for students who perform well in other biology courses to not perform as well in genetics (Banet & Ayuso, 2000; Griffith, 2008).

With genetics playing such a central role in biology, genetics education reform is clearly needed. Recommendations for reform include strategies that teach genetics using a conceptual approach with intentional emphasis on integration of concepts (Banet & Ayuso, 2003, Lewis, Leach, & Wood-Robinson, 2000b; Chattopadhyay, 2005). Learning genetics through the discussion of social issues is one approach proposed by Finkel (1996) and by Lewis and Wood-Robinson (2000). Other studies recommend a scientific approach to understanding, described as inquiry-based pedagogy (Finkel 1996; Ibáñez-Orcajo & Martinez-Aznar, 2005). With this approach, students gain knowledge through analysis rather than algorithms thus developing their analytical skills (Lewis & Wood-Robinson, 2000). An example of this approach is case based teaching (CBT). CBT encourages active learning and requires students to analyze and think critically, thus fostering the development of a higher order of thinking (Herried, 1994, Wood &Anderson 2001; Dori, et. al., 2003; Weil, et. al., 2001; Handelsman, et. al., 2007). Case studies help students recognize the relevance of the course material and can be used to promote collaborative learning, an approach preferred by college students (Cabrera, et. al., 2002). Thus this approach has the potential to improve student perception of the course (Seymour & Hewitt, 1977; Hayes, 2002).

CBT has been used for many years in business, law and medical schools, however until relatively recently its use in the science curriculum remained sparse (Gabel, 1999). A number of studies have reported the positive benefits of using case studies in science courses. For example, Cliff and Wright (1996) reported improvement in exam performance in an anatomy and physiology course after case studies were introduced. Similar improvements were observed in a biochemistry course when CBT pedagogy was used (Cornely, 1998; 2003). Even among non-science majors, CBT proved to be beneficial by leading to increased knowledge and understanding and the development of higher order thinking skills in a biotechnology course (Dori, Tal, & Tsaushu, 2003). As in non-science courses, CBT has been associated with positive student perception of an upper-division cell and molecular biology lab course (Knight, et. al., 2008). Despite these examples of the use of CBT in science courses, studies reporting the impact of CBT in genetics courses are limited in their scope. For example, in the 2009 paper "Constructing and Using Case Studies in Genetics to Engage Students in Active Learning," Styer discusses the use of case studies in the teaching of genetics and describes one method used to administer the case. However the paper does not report on the impact of CBT on student outcomes. Holtzclaw, et. al., (2006) assessed students confidence in using case-based learning to better understand genetics when used to introduce a bioinformatics component in the course and reported an improvement in confidence levels. To my best knowledge, no study, has reported on the impact of the incorporation of CBT on student perception and performance in an undergraduate genetics course. Thus, in an effort to improve student perception and performance outcomes in genetics, CBT was used to introduce and expand on several topics in the course and the effect of this pedagogical approach on student perception and performance was assessed by comparing outcomes before (2007 and 2008) and after (2009) the incorporation of CBT.

II. Method.

A. Course Description and Content.

At Andrews University, genetics is a three-credit core course for biology majors. It covers the mechanisms of heredity in light of molecular and population genetics. The prerequisites are an introduction to biology course that contains a significant genetics component, and completion of or simultaneous enrollment in first semester general chemistry. The course instruction consists of two 50-minute weekly lectures on Monday and Wednesday, a three-hour lab on Thursday and a 50-minute weekly recitation on Fridays. The first 1/3 of the course covers classical genetics and the remaining 2/3 focuses on molecular and population genetics. In 2009, case studies were used to supplement lectures and replace Friday recitation.

B. Participants.

During 2007, 48 students were enrolled in this genetics course, 42 of which were biology majors while the remaining 6 included other science and non-science majors. There were 33 sophomores, 6 juniors and 9 seniors. Of the 55 students enrolled in the course in 2008, 46 were biology majors while the remaining 9 held majors in other science and non-science disciplines. The class standing distribution was as follows: 34 sophomores, 15 juniors and 6 seniors. Of the 51 students enrolled in 2009, 37 were biology majors and the remaining 14 included majors in science and non-science disciplines. This class consisted of 27 sophomores, 12 juniors, 9 seniors and 3 post-graduate or graduate students.

C. Cases Used.

All cases were obtained from the National Center for Case Study Teaching in Science (NCCSTS) Case Study collection website (http://sciencecases.lib.buffalo.edu/cs/) hosted by the University of Buffalo. Teaching notes and Answer keys for all cases are password protected and available to faculty only. The cases used were as follows:
1. Those Old Kentucky Blues (Leander & Huskey, 2008), an interrupted case used to address concepts in Mendelian inheritance, extensions to Mendelian inheritance and allelelism.
2. Cross- Dressing or Crossing-Over (Knabb & Sharp, 2008), a clicker case was used to expand on Meiosis and the basis of sex determination in mammals.
3. Colon Cancer (Casper, 2008) was used as an introduction to the NCBI database and the associated bioinformatics tool and included pedigree analyses.
4. Living With Her Genes (Gildensoph, Stanford, & Wygal, 2008) was used to reinforce several topics such as Mendelian inheritance, allelism, DNA composition and gene expression.
5. Two Peas in a Pod? (Welsh, 2003) was used as a follow up on DNA analysis, recombinant DNA technologies and opened up discussion on the ethics of reproductive technologies.
6. The Death of Baby Pierre (Herreid, 1999) was used as part of the first exam and reinforced concepts in Mendelian Inheritance and the rules of probability.

D.Case Methods Used.

Cases were administered using the following methods described by Herreid (2005):
1. The Small Group Method: Permanent groups were formed the first day of class and consisted of six to seven students and at least one male and one female. Cases were assigned to each group at the beginning of class and time was given for analysis and discussion within the group.

2. *The Interrupted Case Format* was always used with the small group method. With this format, information was given in segments followed by questions after each segment. Groups were evaluated by answers given by the group-designated spokesperson or written answers submitted jointly at the end of class.

3. *Mixed Method*: Involved a combination of the Lecture, Directed and Whole Class Discussion Methods (Herreid, 2005). Cases were presented using a series of power point slides punctuated by close-ended questions that students responded to using personal response systems (clickers), followed by whole class discussion.

4. *Individual Method*: With this method cases were assigned as homework and students evaluated by answers to homework questions turned in one week after assignment.

E. Assessment.

The impact of incorporating case studies on student perception of the course was assessed by the use of the university developed course evaluation instrument administered at the end of the course. The percentage of students completing the survey in 2007, 2008, and 2009 were 81% (39 of 48), 56% (31 of 55) and 84% (43 of 51) respectively. On the first and last days of the course in 2009, the impact of CBT on student knowledge of specific topics was assessed via a survey containing one question on each of the following topics in genetics: Mendelian Inheritance, Alleleism, Exceptions to Mendelian Inheritance, Gene Linkage, DNA Structure and Gene Expression. Students responded anonymously and the percentage of accurate responses was calculated. The number of students completing the pre-course survey was 46 (90%), while 44 students (86%) completed the post-course survey. A comparison of grades before and after CBT incorporation also provided insight on the impact of CBT on student performance.

III. Results.

A. Course Evaluations.

On the university administered online course evaluation used to assess student perception, students were asked to indicate their extent of agreement or disagreement with each statement. Table 1 reports a comparison of student responses to statements before (2007 and 2008) and after (2009) case studies were incorporated. The percentage of students that agreed or strongly agreed that the learning objectives were clearly stated was highest in 2007 (79%) compared to 2008 (68%) and 2009 (72%). In 2007, 59% of students responding agreed/strongly agreed assignments were beneficial for learning the subject matter. That percentage decreased to 52% in 2008 then increased to 70% in 2009. In 2007, 41% of students agreed/strongly agreed the course helped them think clearly while 36% had the same response in 2008. In 2009, 56% had the same response to the somewhat related statement-'the course improved my ability to analyze and evaluate information'. Agreement with the statement-Evaluation methods were fair and appropriate, were highest in 2009 at 67% compared to 2007 and 2008 which were 43% and 39% respectively.

Table 1. Student responses to selected course evaluation statements.

2007 (N=39)						
	SD	D	N	A	SA	N/A
The learning objectives of this course were clearly stated	0	5	15	64	15	0
The assignments were beneficial for learning the subject matter	8	13	18	44	15	0
The course helped me think clearly	13	31	15	33	8	0
Evaluation methods were fair and appropriate	26	15	15	33	10	0
2008 (N=31)						
	SD	D	N	A	SA	N/A
The learning objectives of this course were clearly stated	10	7	16	45	23	0
The assignments were beneficial for learning the subject matter	10	23	16	32	19	0
The course helped me think clearly	13	13	39	29	7	0
Evaluation methods were fair and appropriate	19	26	16	26	13	0
2009 (N=43)						
	SD	D	N	A	SA	N/A
The learning objectives of this course were clearly stated	0	2	26	65	7	0
The assignments were beneficial for learning the subject matter	0	5	26	51	19	0
*The course strengthened my ability to analyze and evaluate information	2	9	33	47	9	0
Evaluation methods were fair and appropriate	0	7	26	58	9	0

SD, strongly disagree, D, disagree, N, neutral, A, agree, SA, strongly agree, N/A, not applicable (*) Indicate statement unique to that year.

Students were also asked to write additional comments on the course. Following is a list of all unsolicited comments made regarding case studies.
"I liked the case studies."
"I really enjoyed the case studies."
"I like the case studies. I thought they related well to what we were learning."
*"Case studies were interesting."*
"The case studies are especially enjoyable."
"Case studies were very informative."
"I would like to see more case studies."

B. Pre and Post-Surveys.

Of the 51 students enrolled in the course, 46 (90%) completed the pre-course survey, while 44 (86%) completed the post-course survey. The results (Figure 1) show that the percentage of accurate responses increased in all topics except DNA structure where the percentage of accurate responses in the pre-survey was the highest (70%). The highest fold increase (4.7) was seen on the Extensions to Mendelian Inheritance question followed by the Gene Linkage question, which had a 4.4 fold increase. Accurate responses on the Allelism, Gene Expression and Mendelian Inheritance questions increased 3.2, 2.0 and 1.2 fold respectively.
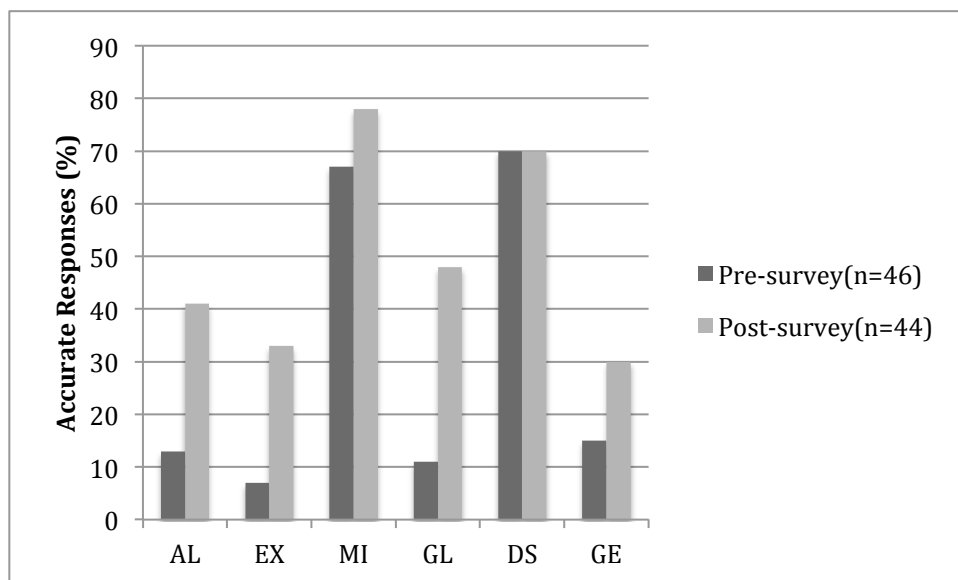

Figure 1. Pre- and post-course survey results of student knowledge in 2009. Forty-six students completed the pre-course survey, and 44 students completed the post-course survey. Students were questioned on Allelism (AL), Exceptions to Mendelian Inheritance (EX), Mendelian Inheritance (MI), Gene Linkage (GL), DNA Structure (DS) and Gene Expression (GE)

C. Student Grades.

Final grades were based on four section exams, one cumulative final, homework, lab reports, quizzes, and case studies analyses (2009 only), which contributed to 6% of the final grade in 2009. Figure 2 shows the class performance during the three years covered by this study. In 2009, 43% of the students earned a grade of *A*, while in 2007 and 2008 the percentage of students earning a grade of *A* were 33% and 30% respectively. In 2009, 7% of students earned a grade of *F* while in 2007 and 2008, the percentage of students earning a grade of *F* were 13% and 14% respectively. The difference in class averages (Figure 3) was not significant t $_{(104)}$ = 1.32, p> 0.05. Only the class averages for years 2008 and 2009 are shown in Figure 3.
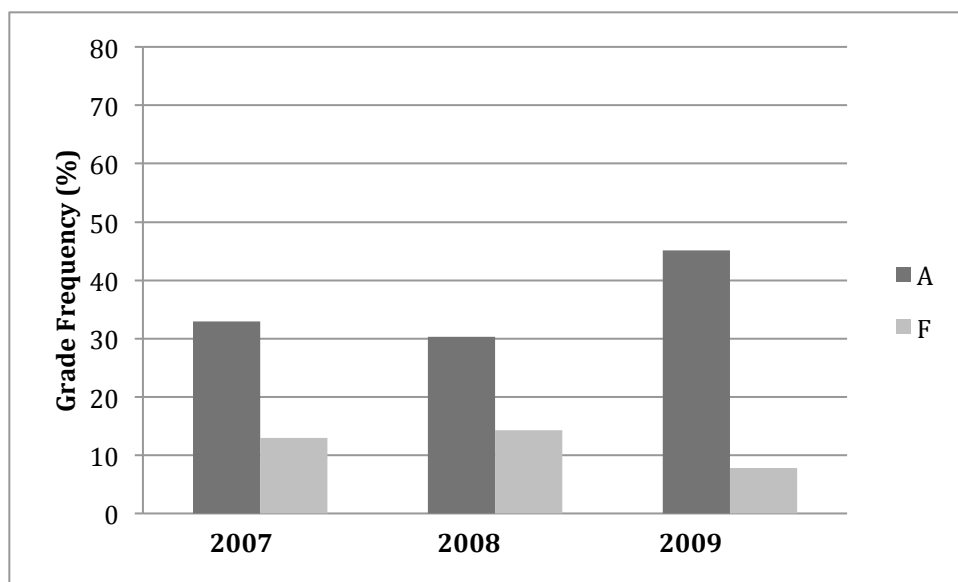
Figure 2. Final grade frequencies of grades _A_ and _F_ before and after incorporation of CBT. 2007, n= 48; 2008, n= 55; 2009, n=51.
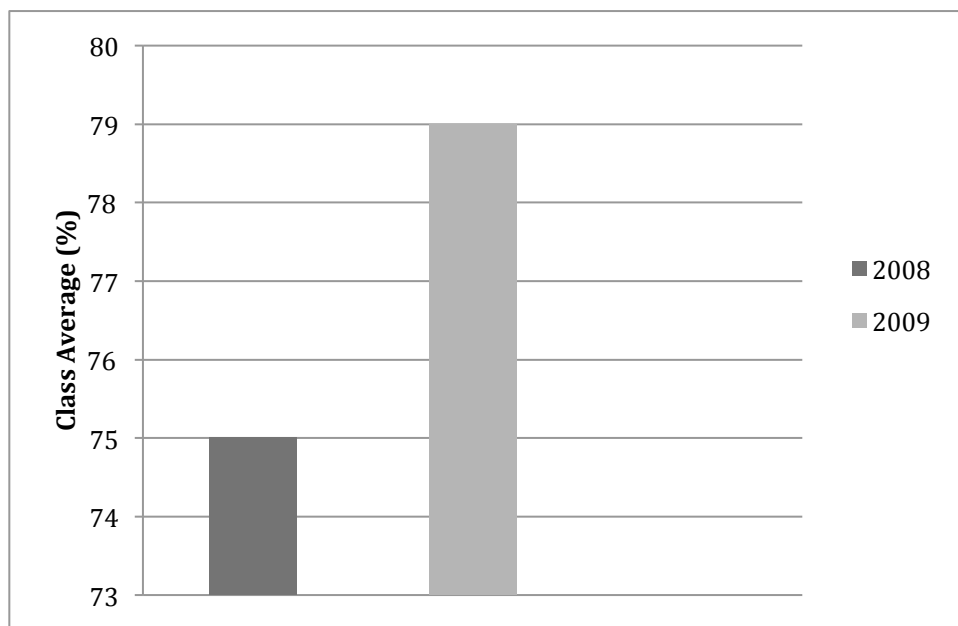
Figure 3. Class averages before and after the incorporation of CBT. 2008, n-55, Mean ± SE= 75 ± 2; 2009, n= 51, Mean ± SE= 79 ± 2.

IV. Discussion.

This study reports the impact of CBT on student perception and performance in an undergraduate genetics course and thus adds to the scholarship of teaching and learning (SoTL) knowledge base. In an effort to improve student perception and performance outcomes in genetics, CBT was

used as a supplement to traditional lectures to introduce and expand several topics in the course. While CBT is commonly used in various disciplines such as business, medicine and law, its use in science remains limited. Anecdotal responses from science teachers regarding the minimal use of case studies is based in the fear that they will not be able to cover all the required course content. The director of the National Center for Case Study Teaching in Science, Clyde Herreid, (1994) acknowledges that the same amount of information cannot be covered when CBT is used. However, the approach used in this study, which was to use CBT as a supplement to lecture, the required and expected course content was not compromised. In fact, additional topics such as bioinformatics and cancer genetics were covered as a direct result of the case studies used.

The current study supports prior findings that CBT improves students' perception of a course (Seymour & Hewitt, 1977; Hayes, 2002; Hudson & Buckley, 2004; Knight, et.al., 2008). Although there was initial reluctance by some students during case study sessions, as the course progressed, most became fully engaged and even requested additional case studies. In addition to the comments regarding case studies on the student evaluations, which were all positive (see list of student comments in results), comments regarding the course such as: *"Genetics has never been my strong point but it was interesting to delve deeper into material that I would have no interest in otherwise"* and *"It was a difficult course, but it has taught me a lot of new concepts that I wasn't able to understand before",* indicate a positive perception of the course and represents a marked improvement compared to previous years. The student evaluations also showed that the percentage of students agreeing that the course strengthened their analytical, problem-solving and critical thinking skills increased the year case studies were used. These are skills enhanced by CBT (Herried, 1994; Wood & Anderson, 2001; Dori, et. al., 2003; Weil, et. al., 2001; Handelsman, et. al., 2007) and necessary for success in genetics. In addition, despite the fact course assignments were the same during the three years of the study (with the exception of the case studies in 2009), the percentage of students agreeing that assignments were beneficial for learning, increased the year case studies were used. There are however limitations to the conclusions that can be made from these results regarding the impact of case studies on student perception, since none of the evaluation statements were designed to directly solicit responses regarding case studies. Therefore to better gauge the impact of case studies on student perception, pre and post SALG (Student Assessment of Learning Gains) surveys will be used in the future. This survey can provide information that more directly link case studies to students' perception (Galluci, 2007; Seymour, Daffinrud, Wiese, & Hunter, 2000).

Pre and post surveys were used to measure student performance in six topics, five of which were covered in cases analyzed in the course. The improvement in student knowledge observed cannot however be attributed solely to the use of case studies since the second highest improvement was seen on the Gene Linkage question- a topic not covered in any of the cases used. However, a comparison of the different CBT methods used in this study showed that students were most engaged in the most commonly used method in this study- the interrupted case format with the small groups. This method encourages inquiry and may foster the development of analytical and critical thinking skills. Therefore it may be suggested that the improvement observed in topics not specifically covered in case studies may be due to the application of these skills. Thus case studies may have indirectly led to better performance on all topics assessed.

Despite the grade criteria and scale remaining unchanged, the percentage of students earning a grade of *A* increased and the percentage failing the course decreased the year case studies were used. However, statistical analysis showed the class average improvement was not

statistically significant suggesting that for a sizable proportion of the students, skills encouraged by CBT and beneficial for learning genetics were probably not improved or did not translate to improved test performance. One possible explanation for this could be the discomfort by both the teacher and students in using this pedagogy and as a result the benefits of CBT was not more widely experienced. Making case based pedagogy the predominant mode of instruction can decrease the awkwardness of using this pedagogy (Herreid, 1994, Yadav, et.al., 2007). Therefore future endeavors include increasing the number of case studies used, specifically using the interrupted case format with the small group method. This method provides structure to the discussion and allows for intentional content coverage while mimicking the way scientists have to analyze problems since information is provided in segments. It also keeps feed-back time to a minimum.

According to the College Learning for the New Global Century Report, the four essential learning outcomes of a twenty-first century college education are: (1) Knowledge of human cultures and the physical and natural world, (2) Intellectual and Practical skills, including inquiry and analysis, critical and creative thinking, teamwork and problem solving, (3) Personal and Social responsibility and (4) Integrative Learning demonstrated through the application of knowledge to complex problems (National Leadership Council, 2007). As previously mentioned, CBT can promote at least two of these outcomes- Intellectual and Practical skills and Integrative Learning. The findings of this study provide evidence that CBT when used as a supplement to lecture is a good method for teaching and learning genetics at the college level. It encapsulates strategies proposed for reforming genetics education such as inquiry-based learning, conceptual learning with integration of concepts and learning via discussion of social issues. Thus although there are limitations to the CBT pedagogy the benefits obtained are worth it's implementation in college genetics courses.

References

Bahar, M., Johnstone, A.H., & Hansell, M.H. (1999). Revisiting learning difficulties in biology. *Journal of Biological Education,* 33 (2), 84-86.

Banet, E., & Ayuso, E. (2000). Teaching genetics at secondary school: a strategy for teaching about the location of inheritance information. *Science Education,* 84, 313-351.

Cabrera, A.F., Nora, A., Crissman, J.L., Ternzini, P.T., Bernal, E.M., & Pascarella, E.T. (2002). Collaborative learning: Its impact on college students' development and diversity. *Journal of College Student Development*, 43(1), 20-34.

Cliff, W.H., & Wright, A.W. (1996). Directed case study method for teaching human anatomy and physiology. *Advances in Physiology Education, 270*, 19-28.

Collins, A., & Stewart, J.H. (1989). The knowledge structure of Mendelian genetics. *The American Biology Teacher*, *51*(3), 143-149.

Cornely, K. (1998). Use of case studies in an undergraduate biochemistry course, *Journal of Chemical Education*, *75*(4), 475–478.

Cornely, K. (2003). Content and conflict: The use of current events to teach content in a biochemistry course. *Biochemistry and Molecular Biology Education, 31*(3), 173-176.

DiCarlo, S.E. (2006). Cell biology should be taught as science is practiced. *Nature Reviews Molecular Cell Biology, 7*, 290–296.

Dori, Y.J., Tal, R.T., & Tsaushu, M. (2003). Teaching biotechnology through case studies -can we improve higher order thinking skills of nonscience majors? *Science Education, 87*(6), 767-793.

Finley, F.N., Stewart, J., & Yarroch, W.L. (1982). Teachers' perceptions of important and difficult science content. *Science Education, 66* (4), 531-538.

Gabel, C. (1999). *Using case studies to teach science*. Paper presented at the Annual Meeting of the National Association for Research in Science Teaching.

Gallucci, K.K. (2007). The case method of instruction, conceptual change and student Attitude. *Dissertation Abstracts International,* etd-100112007-132733.

Griffiths, T. (2008). *Why do students find genetics so difficult to learn?* The XX International Congress of Genetics, Berlin, Germany.

Handelsman, J., et. al. (2004). Scientific teaching. *Science*, *304*, 521–522.

Hayes, R.Q. (2002). *2001–02 Stem Retention Report: The Retention and Graduation Rates of 1994–2000 Freshman Cohorts Entering Science, Technology, Engineering and Mathematics Majors in 200 Colleges and Universities*. Norman, OK: Consortium for Student Retention Data Exchange.

Herreid, C.F. (1994). Case studies in science: A novel method for science education. *Journal of College Science Teaching*, *23* (4), 221-229.

Herreid, C.F. (2005). Using case studies to teach science. *American Institute for Biological Sciences Electronic Journal,* http://actionbioscience.org/education/herreid.html

Holtzclaw, J.D., Eisen, A., Whitney, E.M., Penumetcha, M., Hoey, J.J., & Kimbro, K.S. (2006). Incorporating a new bioinformatics component in genetics at a historically black college: Outcomes and lessons. *CBE Life Science Education, 5*(1), 52-64.

Hudson, J.N., & Buckley, P. (2004). An evaluation of case-based teaching: Evidence for continuing benefit and realization of aims. *Advances in Physiology Education. 28*, 15-22.

Johnstone, A.H., & Mahmoud, N.A. (1980). Isolating topics of high perceived difficulty in school biology. *Journal of Biological Education, 14*(2), 163-166.

Kindfield, A.C.H. (1994). Understanding a basic biological process: Expert and novice models of meiosis. *Science Education, 78*, 255-283.

Knight, J.D., Fulop, R.M., Márquez- Magaña**,** L., & Tanner, K.D. (2008). Investigative cases and student outcomes in an upper-division cell and molecular biology laboratory course at a minority-serving institution. *CBE-Life Sciences Education, 7,* 382-393.

Kvam, P.H. (2000). The effect of active learning methods on student retention in engineering statistics. *The American Statistician, 54*(2), 136-140.

Lewis, J., & Wood-Robinson, C. (2000). Genes, chromosomes, cell division and inheritance—Do students see any relationship? *International Journal of Science Education, 22*(2), 177-195

National Leadership Council. (2007). *College learning for the new global century.* Retrieved from http://www.aacu.org/leap/documents/GlobalCentury_final.pdf

Seymour, E., & Hewitt, N.M. (1997). *Talking about leaving: Why Undergraduates Leave the Sciences.* Boulder, CO: Westview Press.

Seymour, E., Daffinrud, S.M., Wiese, D.J., & Hunter, A.B. (2000). *Creating a better mousetrap: On-line student assessment of their learning gains*. Paper to the National Meetings of the American Chemical Society, San Francisco.

Styer, S.C. (2009). Constructing and using case studies in genetics to engage in active learning. *The American Biology Teacher, 71*(3), 142-143.

Tsui, C.-Y., & Treagust, D.F. (2004). Motivational aspects of learning genetics with interactive multimedia. *The American Biology Teacher, 66*(4), 277-286.

Weil, S., Oyelere, P Yeoh, J., & Firer, C. (2001). A study of students' perceptions of the usefulness of case studies for the development of finance and accounting-related skills and knowledge. *Accounting Education, 10*(2), 123-146.

Wood, A.T., & Anderson, C.H. (2001). *The case study method: Critical thinking enhanced by effective teacher questioning skills.* Paper presented at the Annual International Conference of the World Association for Case Method Research & Application, Lund, Sweden.

Yadav, A., Lundeberg, M., DeSchryver, M., Dirkin, K., Schiller, N.A., Maier, K., & Herreid, C.F. (2007). Teaching science with case studies: A national survey of faculty perceptions and challenges of using cases. *The Journal of College Science Teaching 37*(1), 34-38.

Competence assessment integrating reflective practice in a professional psychology program

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Abstract: The Midwestern University Clinical Psychology Program – Glendale Campus (MWU) created a Comprehensive Assessment Method in Psychology (CAMP) comprised of 35 different "tasks" of authentic work products representing a variety of assessment techniques based on pedagogical theory. Each task assesses one or more components of one of the program's five identified competence areas. Tasks are submitted at multiple points, increasing in complexity, during the student's tenure in graduate school. CAMP includes an innovative qualifying exam (QE) which formally evaluates a student's ability to self-reflect and to accurately self-assess. In the QE, students engage in a process of reflection and substantive dialogue with a panel of two faculty members about their CAMP work products and describe their development, understanding of the context, and purpose of their education. The goal of the CAMP was not only to achieve and measure student competence, but to create an environment where students and faculty participate in ongoing reflection and even, aspire to artistry. MWU sought expert feedback to establish construct validity of the CAMP and QE processes in the form of a survey. The authors believe the method has relevance for graduate training in many disciplines, particularly those leading to professional practice degrees.

Keywords: reflection, self-regulation, self-assessment, competence, assessment

One hundred years ago, John Dewey published "How We Think." In this book Dewey describes reflection as including, "a) a state of perplexity, hesitation, doubt; and b) an act of searching or investigation directed toward bringing to light further facts which serve to corroborate or to nullify the suggested belief." (Dewey, 1910. p.9) The authors of the current paper began a new doctoral program in professional psychology in 2007. We set out to find superlative methods for developing and evaluating students in their journey to become professionals. We extensively reviewed information on competence assessment and educational development in our field and reviewed educational theory outside our discipline. We found the work of John Dewey (1910), the work on self-reflection by Donald Schön (1987) and the 1985 book "Reflection: Turning Experience into Learning," edited by David Boud, Rosemary Keogh and David Walker, particularly helpful.

We came to the conclusion that reflection is the necessary element for *all* growth and development. In educational programs, imparting knowledge and developing skills are necessary, but not sufficient, for what we wanted to accomplish. We wanted to create an educational environment that enabled students, not only to develop minimum competence in identified areas necessary for our profession, but to aim for what Schön (1987) dubbed *artistry*. Schön explained there are some people in every profession who become truly outstanding

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practitioners. These practitioners are not described as having *more* professional knowledge than peers, but are described as wise, talented, and intuitive, more aptly, artists. We wanted to help our students, and ourselves, seek wisdom and maturity in a context where reflection is integrated, planned and evaluated.

This paper is an articulation of the process undertaken by authors and a compilation of conclusions. We believe it has relevance for graduate programs in many content areas, particularly programs that lead to professional practice.

Finding better ways to assess student competence is a focus of many professional programs, but innovation can be disconcerting. The appearance of legitimacy and tradition is important for programs trying to satisfy accrediting bodies, even when the familiar methods have *not* been proven to accurately assess competence or even acceptably measure an outcome. Established organizations, including academic institutions, often change slowly, even amid dissatisfaction with existing procedures (Shelleyann & Dixon, 2009). Faculty may hesitate to veer from customary paths, because initiating creative methods often startles a system and may have unintended consequences. Planned change requires faculty to reflect on competencies needed by students and by themselves, the nature of learning and education, and logistics of implementation. These processes require insight on the part of faculty, an open recognition of limits, and a commitment to create a milieu that supports ongoing development.

Schön (1987) proposed that a hierarchy exists in the prestige of knowledge in professional schools. Those who teach basic scientific knowledge have the most prestige, decreasing for those who teach applied science and further diminishing for those who teach the technical or clinical skills of day-to-day practice. This prestige imbalance poses challenges for professional programs who seek to train practitioners. Schön (1987) argued against the assumption that the acquisition of *more* basic knowledge is what leads to competence. Schön (1987) explained that the prevailing relationship between professional knowledge and practice competence (which still exists today) needs to be turned upside down.

The high bar for professional competence is artistry, and we need to carefully examine the path to achieve it. Schön (1987) argued artistry is teachable and not just for the lucky. Schön (1987) described an artist as an outstanding professional, who, faced with an unusual circumstance, novel situation or ambiguous area of practice, goes beyond the basic knowledge, technical and applied skills, and learned values and becomes a creative, innovative problem solver. This ability is based on knowledge, skills, attitude/values and experience, but also moves beyond them. Artistry requires ability, when faced with something unexpected or not-yet-learned, to think about what one is doing as one is doing it (reflection-in-action), and to be able to create solutions when there is no clear right answer.

The idea of reaching beyond the knowledge, skills and attitudes/values typically taught may be a long term goal, but the first step is for a program to create necessary frameworks for the development of artistry and commit to the pursuit. This paper describes an attempt to implement the best methods of assessment of professional competence and to integrate planned self-reflection. The authors chose to assess competence in knowledge, technical skill, attitude, ability to reflect and the development of artistry by focusing on assessment using multiple types of knowing and learning.

The authors present a viable method of comprehensive assessment of competence, relying on pertinent pedagogical theory, and based on literature that includes: outcome measurement, evaluation of competence and portfolios comprised of authentic assessment. The authors present a qualifying examination process, proposing evaluation of a student's ability to

self-reflect and self-regulate as the capstone event for advancement to doctoral candidacy. This is combined into an innovative overall approach to competence assessment in a psychology doctoral program. The authors have dubbed the method the Comprehensive Assessment Method in Psychology (CAMP). The following is a case study of a system of outcome measurement and evaluation of self-reflective practice.

CAMP is a compilation of thirty-five tasks performed during the span of the graduate program (See Appendix I for brief description), and includes a series of three self-reflection/self-regulation events. The second of these events is the Qualifying Examination (QE), used to determine advancement to doctoral candidacy (See Appendix II for brief descriptions). Each of the CAMP tasks is directly linked to at least one of the program's five competency goals. The tasks become more complex and integrated as the student progresses through the program, and tasks become linked to multiple potential competencies.

The authors wanted to establish construct validity on the CAMP and QE, and prepared a survey of both, enlisting experts to review and comment, and incorporated the feedback. The authors have additional plans to compile outcomes on the CAMP and QE as students graduate and the program matures.

I. Types of Learning.

Acquisition of knowledge can be described as: declarative (verbal learning), procedural (skill learning), conceptual (concept attainment), analogical (one-trial learning) and/or logical (problem solving) (Farnham-Diggory, 1994). Farnham-Diggory (1994) also describes three types of instructional paradigms that distinguish novice from expert level (defining "expert" as the standard or level of competence a program has set): behavior, development, and apprenticeship. In the behavior paradigm, novices become experts by accumulating some factor (e.g. speed, knowledge). In the developmental paradigm, novices and experts are distinguished based on the complexity of their personal theories, and their experience. In the apprenticeship model, novices become experts via acculturation into the world of the expert. Farnham-Diggory (1994) stated that these models are mutually exclusive.

Declarative knowledge can be memorized or reproduced, but not necessarily applied to situations. Multiple choice exams are a reliable way to assess this accumulation of facts. Procedural knowledge is the ability to apply information to situations; knowledge that can be demonstrated, but is not well-suited to multiple choice examinations. Examination of procedural knowledge often occurs via work samples, either an unstructured portfolio collection or intensive exams of procedures (e.g. a medical school student's ability to perform a history and physical on a standardized patient - an actor trained to respond with a specific diagnosis).

The program's initial purpose was to create competent professionals; for student's to achieve a minimum standard across all competence areas. To achieve this first step, the authors adopted the concept of acculturation described by Farnham-Diggory (1994) in the apprenticeship model. The authors believe that most graduate students, particularly in programs leading to professional practice, need to integrate their acquisition of declarative knowledge by applying it. Students need to demonstrate procedural knowledge and use it effectively. Competent professionals need conceptual knowledge to be able to fit new learning quickly into acquired cognitive schemes and logical knowledge to understand what is connected to what and what leads to what.

In the graduate education process, development can be described in knowledge, skills and/or attitudes or values (KSA) (Kenkel & Peterson, 2009). The more measures we use to evaluate a student's array of KSA, the more assurance of validity we obtain in our estimation of competence, and the more reliability we can assume in our measures of multiple types of knowing and learning and gauged competence. The acquisition of learning process can be a measure of self-reflection, if specifically evaluated. The learning procedures may incorporate novel, ambiguous or indeterminate situations in order for students to have the situations necessary to develop artistry.

The CAMP is an array of measurement procedures sampling student development across time and compiling evaluated work products. It was designed after reviewing literature on assessment methods and incorporating an array of types of learning. The result is that CAMP incorporates a variety of tasks that utilize different techniques for measurement. Some CAMP tasks are traditional portfolio pieces allowing the student to choose a "best work" in a particular area. Most CAMP tasks are faculty guided projects that assess knowledge, skill and/or attitude (KSA) in the competence area or areas being measured. The Qualifying Exam assesses a student's ability to evaluate his or her own development and performance in each of the programs competency areas by engaging in a planned, evaluated dialogue about his or her assessment of completed CAMP work products.

Schön's (1987) work is theoretically broad. One of his practical suggestions about the journey for artistry is to have students engage in what he called the reflective practicum. The reflective practicum is based on an apprenticeship model, and provides students opportunities to reflect upon their application of knowledge into practice. Pearson and Smith (1985) discuss the importance of engaging students in dialogue and "debriefing" about practical experience to increase the opportunity for learning. The concept of practicum is well established in many professional disciplines, including the psychology program where the authors teach. During the supervision process, students are often prompted to reflect upon their application of knowledge to practice, developing conceptualizations to explain the patient's development of symptoms and integrating their knowledge of theory with the outcome of their practice (Fouad et al, 2009; Stoltenberg, McNeil, & Delworth, 1998).

The authors needed to establish a logical and pragmatic process of collecting student work samples to support the reflection. Toward this end the authors researched portfolio projects. The concept of portfolio, though redefined and expanded for the CAMP, served as a platform for the system. With an attempt to correct for criticisms brought to light in the literature the authors reviewed portfolio systems comprised of authentic assessment. In the next section of this paper we review portfolio methods. This is followed by a discussion of types of learning, comprehensive and qualifying exams, and reflective practice that make up the theoretical framework for the CAMP and QE events.

II. Portfolios.

Portfolios include a collection of authentic assessment pieces, actual work products that estimate what students will be required to produce in a profession. The process of choosing one's "best work" is an act of self-reflection and sheds light on the student's understanding of professional standards. A portfolio provides an opportunity for educators to objectively evaluate both the task and the ability of the student to self-assess. Collecting authentic assessment pieces is a sensible

approach for evaluation of competence and self-reflection. It also is a useful tool for remediation and advisement (Lombardi, 2008).

There are several critiques of portfolios (McGuire, Lay, & Peters, 2009; Lombardi, 2008; Tisani, 2008; Cook-Benjamin, 2003) including that portfolios;

- Are a student's compilation of their "best work" and may not be representative of their typical abilities,
- Are summative, a compilation of many projects over a long period of time, and lose the ability to evaluate individual outcomes because feedback is only at the end, not ongoing. Reflective practice requires continuous feedback to students,
- Are large, complex and lack structure. Reflective thinking needs to occur in an orderly fashion,
- Lack of structure and guidance for students leads to decreased compliance due to the overwhelming nature of the project,
- Create logistical problems such as compilation, storage and electronic technology,
- Require a large amount of work for students, faculty and staff,
- Employ vague scoring systems.

In order to capture and utilize the best of portfolio projects while addressing the criticisms, the following procedures were implemented to address each of those concerns;

- CAMP utilizes both student-chosen and faculty guided tasks/ pieces,
- CAMP is broken down into 35 tasks compiled during the student's entire tenure in the program to provide structure and continuous, specific feedback,
- Specific explanations of the practical importance of each task are provided to students. Each task's rubric clarifies how it leads to competence in a stated professional goal. This understanding of a task's importance increases compliance and motivation (Marzano & Kendall, 2007),
- The entire CAMP is broken down into a developmentally appropriate sequence. The tasks become more complex and integrated over time,
- A holistic scoring method is used consistently across all tasks and a staged rubric approach is used, allowing for on-going and increasingly complex feedback to students that engages them in cooperative learning (See Appendix III),
- Self-reflective and self-regulation events are incorporated to allow students to demonstrate a commitment to lifelong learning and ownership of one's development. Self-reflection and self-assessment events occur at major points in the program; the Qualifying Examination (QE) and pre-QE and post-QE tasks,
- The QE requires students to review and choose their best work *and* their least effective work compiled over their tenure in the program to promote self-reflection and to help them identify specific goals for their development.

III. Integrating Authentic Assessment and Self-Reflection.

A. Process and products.

There is a new emphasis in education on "process" as well as "product" (Lombardi, 2008). Examples of educational products are; papers, exams or professional reports by students. Process

refers to understanding the context, course and means of one's education. Main (1985) discusses the importance of learning *how* to learn; and emphasizes reflection on the process of learning.

The series of CAMP tasks are "products" and the series of three self-reflection/self-regulation events, (QE, pre-QE, post-QE), are "process" events. During the process events, students review CAMP "products," and examine the context of their education and their own development. During the QE events, the ability to accurately self-reflect, self-assess and self-regulate are specifically evaluated. These novel and indeterminate process events were developed to require problem solving, reflection and to utilization of multiple types of learning and knowledge. This embodiment of ongoing reflection and process is a foundation for artistry.

B. Taxonomy for education.

Marzano and Kendall (2007) propose a revised taxonomy for education. They describe six levels of learning processes, each more integrated and complex: 1) retrieval, 2) comprehension, 3) analysis, 4) knowledge utilization, 5) metacognitive, and 6) self-system. The first four levels of learning processes are more familiar. Retrieval is transferring knowledge to conscious awareness. Comprehension is translating knowledge into a form for memory storage. In analysis, we elaborate on the knowledge as comprehended, and in knowledge utilization, the individuals employs the knowledge they wish to complete a task (Marzona & Kendall, 2007). These first four types of processes are relied upon in most academic coursework and in many authentic assessment pieces. The last two levels of learning processes are more complex, and require reflective practice.

According to Marzona and Kendall (2007), in metacognitive processes, students establish a goal and create a plan for the goal, monitor execution of the goal, determine their knowledge mastery, or in the case of this professional graduate program: the extent of their KSA, and the extent to which they are accurate in their assessment of the development of their KSA in the program.

In self-system processes, students identify how important the KSA are to them. Then students identify beliefs about their ability to improve competence or understand the KSA and the reasoning underlying this perception (thinking about their thinking), identify emotional responses to the KSA and reasons for these responses, identify their overall level of motivation to improve competence or understand KSAs and reasons for this level of motivation (Marzano & Kendall, 2007). In addition, practice-oriented professions involve a type of thinking Erlandson and Beach (2008) described as situational thinking (thinking that concerns situational practice) that defines being a professional.

While examining motivation, Marzano and Kendall (2007) explain that most motivated students perceive the acquisition of KSAs as important, have the necessary ability, power and resources to increase their competence, and have a positive emotional response to the acquisition of KSAs.

C. Reflective Practice.

Saltiel (2007) believes that reflective practice is a crucial component in education, but states it is often employed uncritically and without appreciation of its limitations. Methods to incorporate self-reflection into an evaluated educatory experience are not well established.

According to Saltiel (2007), the concept of reflective practice has been so enthusiastically embraced in education it is, "little short of sacrilege to question it." (pp.2). Saltiel (2007) supports Schön's (1987) theory that reflective practice is the counterpoint to the technical rationality of basic science evidence-based practice. Saltiel (2007) believes that technical rationality has been more readily adopted by practitioners and educators because evidence-based practice seeks "order and certainty in a procedural world." Reflective practice engages with ambiguity and with actual experiences of practitioners, emphasizing skill and artistry (Saltiel, 2007). For professional education, both need to be developed in parallel and given equal weight.

Dewey published his influential ideas about education and training thought in 1910 in *How we think.* However, Erlandson and Beach (2008) trace modern query on reflective practice to Schön's publication of the *Reflective practitioner* in 1983. Schön's paradigm of reflective practice and the concept of reflection-in-action have been central in the education literature and are particularly important in the education of reflective practitioners (Erlandson & Beach, 2008).

Boud, Keogh, and Walker (1985) define reflective process as a conscious process by which teachers and learners organize learning activities. The model describes the outcome of reflection, "which may be a personal synthesis or integration of appropriation of knowledge, the validation of personal knowledge, a new affective state, or the decision to engage in a further activity" (p.20). The concept of collecting educational products (that allow maximum understanding of the competence to be achieved) and then having conscious reflection as a specific learning activity fits with Boud, Keogh, and Walker's (1985) model to increase the conscious reflective process throughout the educational experience and maximize learning. Candy, Harri-Augstein, and Thomas (1985) discuss the importance of examining our own learning in a systematic manner. They posit that as learners, we need to examine our learning to understand our own assumptions and constructs, and to precisely identify our learning strategies.

All students have strengths and weaknesses. Competencies in the areas identified as important by a program need to be assessed regularly and thresholds for achievement set. Areas of strength need to be nurtured and areas of difficulty remediated, if possible. The authors agreed with the premise that learners who accurately identify their strengths and weaknesses were much more likely to be motivated students, become competent professionals, seek development in areas in need of growth, strengthen areas of talent, be cooperative learners during graduate training and work within their areas of competence, seeking guidance when necessary. In short, we are developing self-regulated learners (Zimmerman, 2008) within the broader goal of artistry.

Self-regulation is an expansive concept that includes self-reflective practice. According to Zimmerman (2008), self-regulated learners assess their own behavior in terms of their goals and are able to adequately reflect on their development. This process enhances student satisfaction, motivation to improve, optimism, and the likelihood of becoming a life-long learner. Self-regulation involves knowledge acquisition, self-awareness, self-motivation, behavioral skill to implement knowledge appropriately, and the ability to self-correct when necessary. Self-regulation is complex and not innate, but it can be learned. According to Zimmerman (2004; 2008), the components of a self-regulating student are evident when he/she can; set specific goals, adopt strategies for attaining goals, monitor progress, restructure his/her context (social and environmental) to make it compatible with goals, manage time, evaluate methods, attribute causation to results, and flexibly adapt future methods to improve development of competence.

As with all abilities, people vary widely in their talent for and experience with self-reflection. Reflection comes very easily to some, with some effort for most, and is exceedingly difficult for others, as evident in Borderline Personality Disorder (Bennett, Pollock, & Ryle

2005). Each profession determines the standards and qualities required to practice. Educational programs and practice regulatory boards serve as gatekeepers of that profession. Educational programs have the challenging job of determining admissions and competence standards. Academic failure from lack of knowledge is relatively easy to identify. Skills tend to require more time and consideration to evaluate than knowledge, but the most difficult processes to evaluate have been attitude and ability to reflect. Articulating specific professional standards and competencies that deal with values (e.g. cultural understanding or ethical reasoning) can be a hard task, and therefore more difficult to identify as a professional success or failure.

Dimaggio, Vanheule, Lysaker, Carcione, and Nicolò (2009) state that self-reflection is key in healthy human adaptation. They suggest there are four forms of deficits in self-reflection; difficulty in sense of ownership of one's own thoughts or actions, lack of emotional awareness, difficulty distinguishing between fantasy and reality, and trouble integrating a range of different views of oneself and others. Students, particularly students seeking a professional practice degree, who have a deficit in ability to self-reflect, who cannot evaluate their own performance, who are incapable of benefiting from the milieu, or who cannot incorporate supervisor feedback, will not be able to appropriately mature and develop.

D. Comprehensive and Qualifying Examinations.

Schafer and Giblin (2008) explain that doctoral comprehensive examinations have changed dramatically in recent decades, and vary greatly from program to program. Schafer and Giblin (2008) state that comprehensive exams are assumed to have implicit objectives to: evaluate mastery and integration of knowledge, measure skills, serve a gatekeeping function, and serve as a rite of passage. However, Schafer and Giblin (2008) found little systematic discussion concerning the proper role, objectives and approaches for doctoral comprehensive exam processes in various disciplines. They found an increasing level of flexibility in comprehensive exam structures and considerable variation in timing, format and administration. They conclude that this variability may be a healthy indicator that programs are tying exams to their unique objectives. There are few established comprehensive exams measuring or incorporating reflective practice.

V. Description of the CAMP and QE project.

CAMP is comprised of 35 fundamental assignments or categories of assignment (e.g. supervisor evaluations). Each submission lists the competence area(s) it is intended to demonstrate. The objective of the CAMP and QE was to create a method that is: comprehensive (measuring a wide range of competencies identified for professional practice); developmental (was sampled during several points of training and allowed for early remediation); theoretically sound and grounded in educational principles, a teaching tool that promoted awareness, reflection and artistry; created data useful for outcome measurement; reflective of the goals and philosophy of the program; utilized current best practices in evaluation; and creative, flexible and practical.

CAMP requires: a sampling method based on the program's identified competence areas; a practical, efficient method of compilation and tracking; rubrics for each applicable task; and a scoring system. The authors established a theoretical relationship between each competence area and assessment method, as suggested by Klenowski, (2002) and Leigh, et. al. (2007). The authors were able to integrate thirteen, and part of a fourteenth, of the fifteen categories of

assessment method described in the "competency assessment toolkit" for professional psychology (Kaslow, et. al., 2009) (See Appendix IV for description).

The program delineated five competency areas; 1) research evaluation/foundations of psychological science, 2) professionalism (which includes ethics, diversity and advocacy), 3) diagnostics/assessment, 4) intervention, and 5) relationship and communication (interpersonal skills and professional writing). In addition to these core competence areas, the program has a healthcare emphasis where students are taught how to apply the five core areas in interdisciplinary healthcare settings (See Appendix V for description).

CAMP is a compilation of work products (e.g. reports, videotapes, projects, and activities) sampled throughout a student's program to demonstrate development in each of the competency areas. These products are prepared in courses, field training or as reflection tasks (e.g. service project). CAMP includes; an extensive portfolio of required submissions in specific areas (faculty guided submissions), student choice submissions in specific areas (e.g. favorite literature review paper), the qualifying examination (QE) which is an oral defense by the student of their professional strengths and weaknesses using CAMP submissions as a guide (self-reflective practice and self-regulation) and an analysis of their understanding of the program and professional training model, the doctoral scholarly project, and clinical training materials (e.g. practicum supervisor evaluations). These types of assessment methods prompt faculty to focus on content, process, and context rather than grades to evaluate student development.

MWU chose a six-point holistic scoring system similar to that reviewed in Elbow (2003) for *all* CAMP submissions. The system is based on *expected developmental level*. This method changes the tradition of using single numbers to rank complex performances. A score of "3" is the anchor for developmentally expected level. The range for each submission is a "1: novice/beginning level" (where the student demonstrates notable difficulty in the developmentally expected KSAs evaluated) to "6: sophisticated/advanced level (where the student demonstrates well above developmentally expected level)." Using such a scale typically increases inter-rater reliability (Elbow, 2003) (See Appendix III for description).

The best assessment methods are teaching tools in themselves (Kösters & Ritzen, 2003). CAMP introduces students to competencies in the profession, aids in self-reflection, helps in designing and documenting a student's individual program, assists students in making choices and setting goals, and in managing their learning (self-regulation). Student reflection on the competencies is useful if the competencies are emphasized and transparent throughout the curriculum. The developmental nature of the CAMP gives students time to recognize the sequential, cumulative, and interactive nature of competencies in the larger context of their education and profession. Traditional forms of assessment (e.g. discrete multiple choice competency exams) do not integrate development explicitly into the evaluative process nor tell us how students improve and develop (Hessler & Kuntz, 2003).

CAMP provides an opportunity for faculty to monitor student development through actual work products and for students to monitor their own development. CAMP incorporates guided submissions (tasks that are specifically required), and "portfolio" pieces where students choose their favorite work in designated categories. The CAMP submissions begin with basic abilities early in the program, and ends with advanced and integrated abilities. This allows faculty to determine areas of student strength and challenge early in a student's program to focuses on the development of specific professional competencies, and to monitor program outcomes.

Each submission must be reviewed, accepted and is a prerequisite for the next field training, course or submission. If a student has a developmental weakness, it is immediately addressed, and the student can re-submit the CAMP assignment after remediation. Multiple attempts are allowed, though more than one remediation attempt may significantly delay a student's program and may even prevent a student from completing in the required time period for graduation.

The QE was designed for faculty to evaluate a student's self-reflection and self-regulation capacity. Students review the goals, objectives and competencies of the program, their CAMP materials, and reveal their self-assessment. They are not evaluated on CAMP tasks (already evaluated products), but rather on the accuracy of the observation of their own developmental needs and progress (process) considering program goals. Does the student believe they are as good, or as in need of assistance, as the faculty believe them to be in each competence area?

The program's goal was to develop habits of reflective practice and self-regulation. The QE takes place after the second year of full-time study and field training. A "pre-QE" event occurs at the end of the first year and; helps teach program expectations, broader theoretical goals (e.g. self-reflection), and serves a self-regulatory function to help maintain student motivation. It is a self-reflection paper based on specific questions (e.g. What makes your most effective or least effective CAMP submission?), and is evaluated on the 6-point rating scale. A "post-QE" task occurs at the end of the third year, before students embark on a year of full-time field training. During this project, students develop goals for their final year and entry into professional practice, continuing the reflective process and moving closer to areas where they may have developed are developing or *could* develop artistry. They are given the questions to answer (e.g. What is your plan for continued development after graduation and into practice?), and it is evaluated on the 6-point holistic rating scale.

The QE (along with pre-QE and post-QE events) are integral parts of CAMP. The QE determines whether students advance to doctoral candidacy. Several types of qualifying exam procedures were researched, including traditional multiple-choice knowledge based exams, and skill-based exams. The MWU faculty created the QE events to add self-reflective practice, self-assessment and self-regulation as an integral assessment component. The MWU faculty believe that competence assessment measures for the traditional types of knowledge and skill already existed in the curriculum.

The literature reviewed explained the importance of self-reflective practice and attitude, but few publications revealed formats for *evaluating* these abilities. In the QE manual and preparation materials, students are given background materials on the context of their education. MWU created the QE to be an event where the students engage deeply with their own development, competence literature, history of the profession, and information on the program model. The QE events assess these abilities by requiring students to formally present themselves to a panel of faculty and engage in substantive dialogue. Students are given the questions in advance. Then, using their CAMP materials as a guide, students assess their strengths and weaknesses and create developmental plans across each of the program's competence areas (demonstrating accurate self-assessment, active participation in their learning process and practice for life-long learning).

Students have spent time in field training before the QE and incorporate their professional experiences (including experience in reflective practicum) as well. The QE is designed to specifically practice and assess conscious reflection, develop self-regulation and provide framework for a trajectory toward artistry, with a novel educational exercise that

requires introspection and creative solutions for achieving future goals. Students are holistically scored on knowledge of the context of their training, ability to self-reflect, *accuracy* in self-assessment, professional attitude and developmental planning skill.

Survey. In an effort to measure the construct validity of the method, MWU surveyed experts in doctoral psychology education and training, and experienced in program accreditation. MWU sought to establish construct validity of the CAMP and QE. A survey was created and external experts were identified (See Appendix VI for description of Survey Results). All experts responding to the survey indicated that they believed that a student passing the QE would sufficiently demonstrate self-reflective practices at a level appropriate for advancement to doctoral candidacy (M = 1.80, SD = 0.447) on a 4 points scale from 1 (strongly agree) to 4 (strongly disagree). The majority (80%) felt that a student passing the QE would understand the competence areas required in professional psychology (M = 2.0, SD = 1.225), and most (60%) would consider adopting the QE or a similar assessment in their own programs if practical (M = 2.40, SD = 1.140). Four comments provided with regard to the QE recommended greater depth in measuring the competencies, reflected concerns with regard to measuring self-reflection, and regarded the rubric as a strength of the QE.

VIII. Discussion.

As educators and trainers of graduate students in a program leading to a professional practice degree, the authors sought better ways to achieve excellent outcomes, even of ambiguous abilities, such as reflective practice and artistry. The authors suggest that the act of reflection is required for all development; ethical values and actions, multi-cultural awareness and attitude, critical thinking, and decision-making. This entire project became a way to articulate the need for planned and integrated reflection in graduate professional training by everyone involved, students, faculty, staff and administrators to create an environment that strives for excellence.

Recent publications (Kenkel & Peterson, 2009; Fouad, et. al., 2009) help define competencies of knowledge, skill, and attitudes in psychology graduate education and discuss their importance. These concepts apply broadly to professional practice education. The next logical step is to create methods of evaluating those competencies and creating practical outcome measures, (Kaslow, et. al., 2009). One such measure is the CAMP, which draws upon combinations of types of student learning and evaluations of competence assessment.

The QE events are innovative and engage students in planned self-reflective practice, self-assessment and articulation of their developmental plan as a collaborative learner and budding professional (self-regulation). In addition, the QE events evaluate attitude. Attitude has been more difficult to specifically measure than knowledge or skill. The QE events institute a self-regulatory process integrating both work products and educational process of development.

MWU will continue to evaluate the CAMP as a means to measure student learning and program outcomes and the QE as reflective practice. We plan to incorporate many assessment methods including having a blind, outside rater review the post-QE reflection exercise, collect internship evaluations and review the feedback for student's self-reflective competence, and include questions on the efficacy of the CAMP and QE in our alumni survey.

As declared by Roberts, Borden, Christiansen, and Lopez (2005), a culture-shift toward assessment of competence and away from counting hours of practice requires development of innovative and comprehensive assessment methods. This culture-shift is occurring in many areas of graduate study and is particularly interesting in programs that lead to professional practice

degrees. The old adage, "more is not always better" comes to mind when reviewing this culture shift, as does the idea that acquisition of knowledge, technical skills and values can lay the foundation of striving for artistry. Schön's (1987) idea that we are seeking to train reflective practitioners is relevant, and forces us to look for innovation. Schön's (1987) brainstorm that educators can create novel and indeterminate situations for students to develop artistry, is still inspirational, and helps us think beyond the measurement of minimum competence thresholds.

The authors have made some of the changes suggested by the expert reviewers, seeking to clarify definitions, reduce overlap, and refine evaluation methods. Further research on the link between CAMP outcomes and actual practice success is suggested. Further development of practical methods of compilation, electronic submission, storage and maintenance of information are necessary. The authors will continue to reflect on the utility of the CAMP and QE, in their efforts to train artists of professional psychology.

The authors learned several lessons to offer as advice for programs considering adopting a similar method. First, focusing on outcome assessment is a paradigm shift. When we initially described the CAMP method to faculty outside the program, a common reaction was that it would be "too much additional work." The CAMP is not an addition to work on top of what is in a program. It is the spine of our program. It demonstrates achieved entry-level competence in the knowledge, skills, and attitudes of the profession. Everything feeds into competence assessment, including coursework and field training feedback. This is a change from judging a student's competence based on courses completed, grade point average, and field training hours completed. The approach is much more individualized and based on what the student can demonstrate about what he or she knows, what he or she can do, and how he or she thinks. Implementation requires a change of philosophy. Second, logistics are important. We learned that each CAMP task needs a "home." A specific instructor is tied to each task, often in a course or seminar, and is responsible for assuring that students turn it in on time, and that resubmissions, if needed, are completed.

Additional outcome measures will be collected to determine if the CAMP and QE are effective. The authors have prepared an alumni survey with questions on efficacy when our first cohort graduates. We also plan to elicit feedback from supervisors of students at their psychology pre-doctoral internship. Internship is a full-time field training experience as part of a national match and supervisors are not associated with the program. We are planning to have blind, outside raters review the third year self-reflection paper (post-QE).

The authors believe the move to competence assessment and inclusion of self-reflective practice and accuracy in self-assessment are the future of education. This is particularly true in professional practice programs. The CAMP and QE are practical examples of the philosophical shift.

It is our hope to improve the education and training program for our students, contribute to the field of competency assessment, and to develop a learning community that supports aiming for artistry.

Lewis, D., Virden, T., Hutchings, P. S., and Bhargava, R.

Appendix 1. CAMP Contributions & Brief Description.

Key: *IHCE= Integrated Healthcare Emphasis, 1=Research Evaluation & Foundations of Psychological Science, 2=Professionalism (Ethics, Diversity), 3= Diagnostics & assessment, 4= Intervention, 5=Relationship & Communication (See Appendix V for Description)

In Order Due:

Year 1	Competencies Evaluated	Submission Title (Abbreviated)
1-1	2	Board of Psychologist Examiner's Paper 1
1-2	3	Intelligence Test Administration (i.e. WAIS or WISC) on role-play subject
1-3	1	Analysis of a Psychometric Test
1-4	3	Intelligence Test Scoring (i.e. WAIS or WISC) responses supplied
1-5	3, 5	Intelligence Test Interpretation & Write-up (WAIS or WISC)
1-6	3, 5	Objective Personality Test Interpretation & Write-up
1-7	3, 5	Projective Personality Test Interpretation & Write-up
1-8	2,3 & 5	Intake Video Sample & Document: MSE, diagnosis, diversity, ethics, writing quality, treatment plan, recommendations, rapport, self-critique
1-9	2,4 &5	Rapport Video Sample with explanation of a conceptualization including diversity, orientation and self-critique
1-10	2 & 5	Collegiality & Professional Practice (demonstrating supervisee preprtn.)
1-11	5	Presentation of Choice 1 from any class
1-12	5	Pre-QE- self-reflection end of year one after reviewing the CAMP.
1-13	1,5	Literature Review Paper 1 from any class
Year 2	**Competencies**	**Submissions**
2-1	2, 3, 5	Integrated Test Interpretation (i.e. write interpretation of a tests- sample data)
2-2	IHCE*	Integrated Behavioral Healthcare Assignment
2-3	2, 5	Board of Psychologist Examiner's Paper 2
2-4	2,5	Qualifying Examination
2-5	All	Practicum Evaluations
2-6	1, 5	Literature Review Paper 2: from any class demonstrating scholarship (evidence base to inform an area of practice)
2-7	2, 3, 5	Integrated Assessment Report (administer, score and interpret several tests with a client and write-up a report)
2-8	2, 3 & 5	Intake Tape of Actual Client (with document explaining treatment plan and recommendations, multicultural competence, issues of rapport, ethics and self-critique)
2-9	5	Presentation of Choice 2: from any class
Year 3	**Competencies**	**Submissions**
3-0	2	AAPI application
3-1	IHCE & 5	Adv. Integrated Healthcare Assignment: Completes an integrated healthcare assignment
3-2	1	Research Project, 4 options: proposed PSP project OR acting as research assistant OR having a poster or presentation at conference OR master's prjt.
3-3	All	Practicum Evaluations

3-4	5	Consultation Proposal
3-5	5	Relationship Project (Options: mentoring a student, acting as a teaching assistant or consultant to another program)
3-6	1, 5	Literature Review Paper 3 from any class demonstrating evidence base for an area of clinical practice.
3-7	2	Service/Advocacy Project: Participation in community service, university service or committee work, advocacy effort
3-8	All	Intervention Tape -Actual Client (document explaining choice of orientation, multicultural competence, issues of relationship, ethics and self-critique)
3-9	5,2	Presentation of choice 3: given to audience outside the program (e.g. another department, the clinic, community site with program faculty in attendance.
3-10	5	Post-QE,Student reflection:after reviewing CAMP, describing development since the qualifying examination, goals, and self-care plan for Internship
Year 4	**Competencies**	**Submissions**
4-1	1,5 (IHCE, if ap)	Practitioner-Scholar Project
4-2	All (IHCE, if ap)	Internship Evaluations

Faculty will review student's CAMP & progress through the program (Annual Review of Students). Students who have passed all courses, QE, complete CAMP, and training requirements are ready for graduation. Additional Documents include: Annual Student Review Feedback, Field Training Log Reports, Training Plans, Remediation Plans (if applicable).

Appendix 2. Qualifying Examination Manual Excerpts.

Description: The QE is an opportunity for students to demonstrate their skills in analysis and synthesis of information, self-evaluation and reflective thinking, self-direction in their own learning, professional identity, growth and commitment to that growth, creativity, ownership of their own work, and understanding of strengths and areas in need of development. Students will be graded based on holistic methods and rubric distributed prior to the examination. In the areas of self-reflection and self-assessment, a doctoral candidate in the MWU program is able to:

    (Sample Area) Accurately self-assess their competence in the domains and integrate that self-assessment to create plans for growth; Able to accurately assess their own strengths and weaknesses; identify learning objectives & collaborates in the planning of their development.

Structure of the Examination: The Qualifying Examination is an oral defense by the student in the presence of a minimum of two core faculty members of the department chosen by the department chair. The examination is scheduled for a total of 90 minutes. The student will create a PowerPoint presentation on each question for half of the time allotted for the question, leaving the remaining half of the estimated time allotment for follow-up questions by faculty. Please bring CAMP notebook to the exam.

Sample Qualifying Examination Question: Explain your present level of development in each of the five areas and the healthcare emphasis delineated in the developmental sequence of the program. You will present yourself for each competence area and then describe your plan for continued developmental through graduation.

Sample Scoring Rubric for scores: 1, 3 & 6 on: Self-reflection & accuracy of Self-assessment
1: (Beginning/Novice level): Demonstrates significant difficulty or defensiveness in evaluating own performance; not able to identify appropriate strengths or areas for further development and/or misidentifies more than one area or is inaccurate in more than one area; demonstrates little or no appreciation for self-awareness or dedication to self-development based upon personal evaluation; demonstrates significant difficulty in identifying how perceptions & assumptions have changed during his/her development & how this may impact future professional work & attitude. Diversity awareness has gaps, or student is intolerant of interpersonal differences.
3: (Developmentally expected Level): Demonstrates willingness to evaluate own performance, identifies 2 or 3 strengths & areas for further development; and is fairly accurate in self-assessment in all areas; demonstrates an appreciation for self-awareness and dedication to self-development based upon personal evaluation; able to identify how perceptions & assumptions have changed during his/her development & how this may impact future professional work & attitude toward diversity.
6: (Sophisticated/Advanced Level): Demonstrates ease in evaluation of own performance and shows significant insight into many areas of strength and areas for further development; shows clear appreciation for self-awareness and dedication to self-development and is able to self-correct without significant feedback; diversity awareness is sophisticated.

Appendix 3. Holistic Scoring Description- Six (6) point scale.

The scoring method is consistent across all Comprehensive Assessment in Psychology (CAMP) submissions. This method avoids using single numbers to rank complex performances along a single dimension. All CAMP ratings are on a "6" point scale.

A score of "3" is considered a minimum level for an acceptable CAMP submission.

1= Beginning/Novice Level: Student demonstrates difficulty in the expected knowledge, skills or attitude being evaluated.

2= Basic Level: Student demonstrates below developmental expectation in *some* area of knowledge, skills and/or attitude being evaluated.

3= Developmentally Expected Level: Student demonstrates developmentally expected level in knowledge, skill and/or attitude being evaluated.

4= Advanced Basic Level: Student demonstrates above developmental expectations in some area of knowledge, skills or attitude being evaluated.

5= Proficient Advanced Level: Student demonstrates above developmental expectations on all knowledge, skills and attitudes being evaluated.

6= Sophisticated Advanced Level: Students demonstrates sophistication in knowledge, skills and attitudes being evaluated.

Appendix 4. Competency Assessment Toolkit Fifteen Categories of Assessment Method (Kaslow, et. al., 2009).

The authors were able to integrate thirteen (and part of a fourteenth) of the fifteen categories of assessment method described in the "competency assessment toolkit" for professional psychology. The following were integrated as CAMP tasks, and implementation information is provided in parens, if illustrative:

Performance reviews (ratings by field training supervisors), case presentation reviews (in practicum seminars), competency evaluation rating forms (each CAMP submission), consumer surveys (At the MWU in-house clinic), live or recorded performance ratings (CAMP Submissions, 2-8, 3-8), objective structured clinical examinations (CAMP Submission 2-1 using "standardized patients," trained actors to act as clients for students), portfolios, record reviews, simulations/role plays (CAMP Submissions 1-8., 1-9), self-assessment (QE), standardized client interviews (At the MWU in-house clinic), structured oral exams and written exams (QE).

Client outcome data was not being collected at MWU in a format useful for student evaluation, and only part of a 360-degree evaluation was being implemented (peer review was a missing component).

Appendix 5. Brief Description of Competence Areas.

1. **Research and Evaluation/Foundations of Psychological Science:** This competence includes the areas of research and evaluation, test construction, statistics, scholarship, and scientific mindedness. This competence rests on the assessor's foundation of knowledge, skills, and professional attitudes in the areas of tests and measurement, statistics, qualitative methods, and experimental design. This competence also encompasses knowledge of the history of scientific psychology and its clinical applications, including the areas of physiological psychology, neuropsychology, psychopharmacology, cognitive and affective bases of behavior, history and systems of psychology, and social psychology.

2. **Professionalism:** This competence includes the areas of ethics, diversity (defined broadly), self-care, awareness, self-reflection, practice management, collegiality, professional problem solving, a commitment to lifelong learning, critical thinking which underlies all subject matter and professional behavior.

3. **Diagnostics & Assessment:** The Diagnostics and Assessment competence rests on the foundation of knowledge, skills, and professional attitudes in the areas of human development, psychopathology and psychometric assessment. The Diagnostics and Assessment competence requires an ability to acquire and synthesize multiple sources of data into a comprehensive, cohesive and clearly articulated communication form.

4. **Intervention:** This competence requires students to demonstrate an ability to intervene with clients from an articulated theoretical perspective. Intervention is broadly defined to include a variety of activities that promote or sustain well-being or provide remedial or preventative services. Intervention populations are broadly defined (e.g. individuals, groups, couples, families, communities). Students demonstrate knowledge, skills and attitudes congruent with evidence-based practice rationales and can articulate them.

5. **Relationship & Communication:** The relationship competence requires a demonstration of interpersonal skills and effective written and oral communication. Ability to consult and collaborate with others, interdisciplinary teams and members of agencies and organizations is considered part of relationship skills. Evidence of ability to teach/present and manage at a

developmentally appropriate level is also included. Supervisory ability (including the ability to be supervised) is part of this competence.

Health Care Emphasis: The MWU Clinical Psychology Program emphasizes a broad and general training in psychology. In addition, the program has an emphasis of psychological practice in integrated health care settings.

Appendix 6. Construct Validity Survey Method.

A. Participants.

Participants were selected on the basis of expertise in education and training in psychology. All participants had expertise in psychology program accreditation (e.g. served on The Commission on Accreditation of the American Psychological Association (APA), currently serve as consultants to psychology programs for APA accreditation or were a program director of a doctoral psychology program). Eight expert participants were invited and five (62%) agreed to participate and completed the study. All participants were provided with materials concerning the CAMP and QE, including manuals and grading rubrics. Participants were then contacted via email and provided with a link to an online survey evaluating the CAMP and QE.

B. Instrument and Procedure.

The CAMP and QE evaluation survey was a brief, 10-item questionnaire that consisted of 8 rating scale items and 2 open-ended queries. Respondents used a 4-point scale anchored at Strongly Agree (1), Agree (2), Disagree (3), and Strongly Disagree (4) to rate the relative applicability of statements such as "A student who passed all CAMP submissions has adequately displayed the knowledge, skills, and attitude required to successfully begin a psychology internship" and "A student who passed the Qualifying Examination sufficiently demonstrates self-reflective practice at a level appropriate for advancement to doctoral candidacy." Two open-ended queries were free-response items in which the respondent was asked to provide any comments with regard to the assessment of the CAMP and QE.

The survey was placed on the Internet via Limesurvey platform and made available through a URL on the fourth author's server. After clicking on the electronically provided link, respondents were directed by their browsers to the survey site, where they completed the items in 4 screens, including informed consent and debriefing pages. Responses to each item were required in order for respondents to continue to the survey's next section or to submit results. Data was collected automatically and securely on the server and exported into a spreadsheet.

C. Data Analysis.

Due to low sample size, the responses are presented solely via descriptive statistics. Frequency and percentages of responses regarding opinions of the experts surveyed are illustrated in the Appendices. Open-ended responses were evaluated by two independent judges who classified comments into one of eight categories: Competencies, Faculty Training, Health Care Emphasis, Objectives, Rubrics, Ratings and Scoring, Reliability, and Remediation and Repeated Attempts. Ebel's estimated reliability coefficient (1951) indicated consistent interrater reliability ($r_x = 0.84$) as did Pearson's correlation coefficient ($r = 0.737$, $p = 0.004$).

VII. Results.

A. CAMP Responses.

The majority of experts surveyed (80%) reported they believed that a student who passed all CAMP submissions adequately displayed knowledge, skills, and attitude required to successfully begin an internship in psychology (M = 1.50, SD = 0.89) and that CAMP adequately samples the competency areas in professional psychology as defined by the program (M = 1.80, SD = 0.76). All respondents indicated that the CAMP is capable of documenting developmental achievement of competence (M = 1.40, SD = 0.72) and is developmental and graded in complexity (M = 1.40, SD = 0.609). Most of the responding experts (60%) noted that they would adopt the CAMP or a similar method in their own programs if feasible (M = 2.00, SD = 0.884).

The most comments were classified in the Competencies (5), Rating/Scoring (4), and Rubric categories (3). Comments made regarding competencies generally recommended expanding the competencies to include diagnosis and supervision in the field. It was also noted that competencies in the CAMP appeared unclear and overlapped. Some comments reflected a belief that CAMP competencies did not have enough emphasis on the regulatory guidelines for programs seeking accreditation by the APA. Rating and Scoring-related comments indicated confusion as to the utility of the scales and how outcomes are evaluated. Comments regarding the rubric were varied, with some subjects indicating that they found it cumbersome and time-consuming and others noting it as a strength.

Table 1. Frequency (percent) response on response items regarding CAMP and QE.

Question	Strongly Agree	Agree	Disagree	Strongly Disagree
CAMP				
Knowledge skills attitude for internship	3 (60%)	1 (20%)	1 (20%)	0
Adequately samples competency areas	2 (40%)	2 (40%)	1 (20%)	0
Documentation	3 (60%)	2 (40%)	0	0
Developmental and graded in complexity	3 (60%)	2 (40%)	0	0
Would adopt CAMP or similar	3 (60%)	0	1 (20%)	1 (20%)
QE				
Self-reflective	4 (80%)	1 (20%)	0	0
Understands competence areas	2 (40%)	2 (40%)	0	1 (20%)
Would adopt QE or similar	1 (20%)	2 (40%)	1 (20%)	1 (20%)

Lewis, D., Virden, T., Hutchings, P. S., and Bhargava, R.

References

Bennett, D., Pollock, P., & Ryle, A. (2005). The States description process: The use of guided self reflection in the case formulation of patients with borderline personality disorder. *Clinical Psychology and Psychotherapy, 12, 50-57.* doi:10.1002/cpp.416

Borden, K.A., & McIlvried, E.J. (2010). Applying the competency model to professional psychology education, training, and assessment: Mission Bay and beyond (43 – 53). In M.B. Kenkel, & R.L. Peterson (Eds.), *Competency-based education for professional psychology*, American Psychological Association, Washington, DC.

Boud, D., Keogh, R., & Walker, D. (Eds). (1985). *Reflection: Turning experience into learning.* London: Kogan Page.

Candy, P., Harri-Augstein, S., & Thomas, L. (1985). Reflection and the self-organized learner. In Boud, D., Keogh, R., & Walker, D. (Eds). (1985). *Reflection: Turning experience into learning.* London: Kogan Page.

Boud, D., Keogh, R., & Walker, D. (Eds), *Reflection: Turning experience into learning,* 100-11. London: Kogan Page.

Cook-Benjamin, L. (2003). Portfolio assessment: Benefits, issues of implementation, and reflections on its use. In Banta, T. (Ed). *Assessment update collections,* 11-14. San Francisco, CA: John Wiley & Sons.

Dewey, J. (1910). *How we think.* Boston: D.C. Heath & Co. Publishers.

Dimaggio, G., Vanheule, S., Lysaker, P., Carcione, A., & Nicolò, G. (2009). Impaired self-reflection in psychiatric disorders among adults: A proposal for the existence of a network of semi-independent functions. *Consciousness and Cognition: An International Journal, 18,* 653-664. doi:10.1016/j.concog.2009.06.003

Elbow, P. (2003). How portfolios show us problems with holistic scoring, but suggest an alternative. In Banta, T. (Ed). *Portfolio assessment: Uses, cases, scoring and impact. 41-44.* San Francisco, CA: John Wiley & Sons.

Erlandson, P., & Beach, D. (2008). The ambivalence of reflection – rereading Schön. *Reflective practice*, *9,* 409-421. doi: 10.1080/14623940802475843

Farnham-Diggory, S. (1994). Paradigms of knowledge and instruction. *Review of Educational Research*, *64,* 463-477. doi: 10.2307/1170679

Fouad, N., Grus, C., Hatcher, R., Kaslow, N., Hutchings, P.S., Madson, M., Collins, F., & Crossman, R. (2009). Competency benchmarks: A model for understanding and measuring

competence in professional psychology across training levels. *Training and Education in Professional Psycholog*y, 3, 550-553. doi: 10.1037/a0015832

Hessler, A., & Kuntz, S. (2003). Student portfolios – effective academic advising tools. In Banta (Ed.) *Portfolio assessment: Uses, cases, scoring and impact*. 30-34. San Francisco, CA: John Wiley & Sons.

Kaslow, N., Grus, C., Campbell, L., Fouad, N., Hatcher, R., & Rodolfa, E. (2009). *Competency assessment toolkit for professional psychology*. *Training and education in professional psychology, 3,* S27-45. doi: 10.1037/a0015833

Kenkel, M., & Peterson, R. (2009). *Competency-based education for professional psychology.* American Psychological Association: Washington, DC.

Klenowski, V. (2002). *Developing portfolios for learning and assessment: Processes and principles.* London & New York: Routledge/Falmer.

Kösters, J., & Ritzen, M. (2003). The Amsterdam faculty of educations' digital portfolio. In Banta (Ed.) *Portfolio assessment: Uses, cases, scoring and impact.* 30-34. San Francisco, CA: John Wiley & Sons.

Leigh, I. W., Smith, I, L., Bebearu, M. J., Lichtenberg, J. W., Nelson, P. D., Portnoy, S., Rubin, N, J., & Kaslow, N. J. (2007). Competency assessment models. *Professional Psychology: Research and Practice*, *38*, 463-473. doi: 10.1037/0735-7028.38.5.463

Lombardi, J. (2008). To portfolio or not to portfolio: Helpful or hyped? *College Teaching, 56*, 7-10. doi: 10.3200/ctch.56.1.770

Main, A. (1985). Reflection and the development of learning skills. In Boud, D., Keogh, R. & Walker, D. (Eds.), *Reflection: Turning experience into learning*, 91-99. London: Kogan Page.

Marzano, R., & Kendall, J. (2007). *The New Taxomony of Educational Objectives 2nd Ed*. Thousand Oaks, CA.: Corwin Press.

McGuire, L., Lay, K., & Peters, J. (2009). Pedagogy of reflective writing in professional education. *Journal of the Scholarship of Teaching and Learning, 9*, 93-107. Retrieved from http://www.iupui.edu/~josotl

Pearson, M., & Smith, D. (1985). Debriefing in experience-based learning. In Boud, D. Keogh, R. & Walker, D. (Eds). *Reflection: Turning experience into learning,* 69-84. London: Kogan Page.

Roberts, M.C., Borden, K.A., Christiansen, M.S., & Lopez, S. J. (2005). Fostering a culture shift: Assessment of competence in the education and careers of professional psychologists. *Professional Psychology: Research and Practice, 36,* 355-361. doi: 10.1037/0735-7028.36.4.355

Saltiel, D. (2007). Judgment, narrative and discourse: Critiquing reflective practice. Retrieved from http://www.leeds.ac.uk/medicine/meu/lifelong06/papers/P_DavidSaltiel.pdf

Schafer, J., & Giblin, M., (2008). Doctoral comprehensive exams: Standardization, customization, and everywhere in between. *Journal of Criminal Justice Education, 19,* 275-289. doi: 10.1080/10511250802137648

Schön, D. (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in professions*. San Francisco: Jossey –Bass.

Shelleyann, S., & Dixon, K. (2009). Partners in a learning organization: A student-focused model of professional development. *Educational Forum, 73,* 240-255. Retrieved from http://www.tandf.co.uk/journals

Stoltenberg, C., McNeill, B., & Delworth, U. (1998). *IDM Supervision: An integrated developmental model for supervising counselors and therapists.* San Francisco: Jossey-Bass.

Tisani, N. (2008). Challenges in producing a portfolio for assessment: In search of underpinning educational theories. *Teaching in Higher Education, 13,* 549-557. doi: 10.1080/13562510802334830

Zimmerman, B. J. (2004). Sociocultural influences and student's development of academic self-regulations: A social cognitive perspective. In McIerney, D.M. & Van Ellen, S. *Big theories revisited*, 139-166.

Zimmerman, B. J. (2008) Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Educational Research Journal, 45*(1), 166-183. doi: 10.3102/0002831207312909

Reflective Essay

Assessment in History: The case for "decoding" the discipline

David Pace[1]

I have been a professional historian for more than four decades, and I never once envied physicists — at least not until I encountered the "Force Concept Inventory" (Hestenes, Wells, & Swackhamer, 1992). This set of questions allows teachers of physics to determine whether students have internalized the basic Newtonian model taught in physics courses or whether they automatically fall back on "Aristotelian" notions of objects moving in space. It gives instructors in the field a simple instrument for determining the sophistication of students entering their classes and for evaluating the success of their own teaching strategies over a semester. This kind of disciplinary consensus about learning goals allows for the kind of far reaching and impressive assessment of learning that has allowed scholars of teaching and learning like Richard Hake to make convincing claims about the relative value of different teaching strategies (Hake, 1998; Bain, 2004).

A historian reading such work is apt to be immediately struck by the absence in his or her own field of this kind of agreement about what should be taught and what constitutes reasonable evidence that it has been learned. While physicists certainly argue about theoretical issues at the forefront of knowledge, they do not need to spend a great deal of effort justifying either the truth value of Newtonian mechanics or its relevance to the curriculum. In a discipline such as history, by contrast, undergraduates can enter contested spaces from their first day in the college classroom, and the subject matter that they are studying is as varied as the cultures that have left a trace on this planet. Both the ambiguity of sources and the co-existence of mutually contradictory interpretations would seem to dictate that history is and is apt to remain a "fuzzy" discipline.

This relative dearth of consensus is a result of the nature of the phenomena historians study, rather than any great deficiency in their profession, but it does lead to difficulties in creating a credible scholarship of teaching and learning. In a field in which reasoning is, of necessity, somewhat nebulous, it can be daunting to develop a clear consensus on what constitutes evidence that learning has occurred. Yet, assessment is at the core of the entire SoTL enterprise. It is difficult to imagine a robust scholarship of teaching and learning unless our work is cumulative and built on previous research and unless there is a means to systematically evaluate the validity of claims being made about student learning. In the now canonical formulation of Lee Shulman, the scholarship of teaching and learning must be "*public*, susceptible to *critical review and evaluation*, and accessible for *exchange and use* by other members of one's scholarly community" (Shulman, 1998). Historians have made considerable progress in making SoTL public and accessible. An international society of historians working in the field has been created with its own website and newsletter, (http://www.indiana.edu/~histsotl/) and there is a growing programmatic literature exploring how the discipline might respond to the challenge of SoTL (Booth, 1996; Calder, Cutler, & Kelly, 2002; Pace, 2004, 2008; Brawley, Kelly, & Timmins, 2009).

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However, we have, as a discipline, been less successful at making our work "susceptible to *critical review and evaluation*," in large part because of the lack of a consensus on how to assess learning. The great majority of studies involving history classrooms at the college level are based entirely on the instructor's impression that "learning improved" or on a (generally undocumented) sense that student satisfaction increased. A journal such as *The History Teacher*, for example, is filled with wonderful ideas about how to improve instruction in the discipline, but, despite the efforts of the editors, one can read entire volumes of the periodical without encountering a single well substantiated conclusion (Calder, Cutler, & Kelly, 2002).

In earlier generations, when facts and dates occupied a much more central role in college history courses, the problem of demonstrating learning might not have been so daunting. But today, historians demand more complex cognitive processes from their students, and the subject of their inquiries is more often the perspectives, perceptions, and systems of power of earlier eras. If there is to be a credible scholarship of teaching and learning history, it will have to evaluate both what contemporary students actually have to do in the history classroom and how effectively our teaching strategies prepare them for those tasks.

Historians do, of course, evaluate their students' performance, usually through essay exams, short answer identification questions, or multiple-choice exams. All of these provide information about student success and, thus, would seem to provide information about learning. But, at least as commonly interpreted, these instruments of assessment are too global and too impressionistic to provide the basis for a systematic scholarship of teaching and learning. Success or failure in an essay exam, for example, depends upon a host of separate skills, ranging from the ability to decipher a question or provide evidence in support of an interpretation to the capacity to manipulate English grammar or to manage time effectively — not to mention an understanding of a specific subject matter. The difference between an "A" and a "C" may be the result of a host of very different factors — emotional, cognitive, cultural, economic, or even aesthetic. Moreover, procedures for determining grades are generally shrouded in mystery and rest upon processes that may be perfectly legitimate for classroom teaching but do not provide a firm foundation for a systematic exploration of teaching and learning.

Multiple-choice questions are more focused, but, as they are commonly used, they tend to measure students' mastery of facts or their memory of their instructor's interpretation, rather than the ability to employ historical concepts and procedures. As has been noted repeatedly in the literature about teaching history, what really counts in the discipline is not the ability of students to repeat dates and events from memory, but rather their ability to think historically (Drake & McBridge, 1997; Wineburg, 2001). Multiple choice questions can, of course, be crafted to measure higher level skills (Scott, 1983; Karras, 1984), but, even when this is done, they are typically created in reference to a set of content issues, rather than in response to a systematic analysis of the kinds of cognitive skills required in history courses.

Faced with this dearth of clear standards for evaluating student mastery of historical thinking, historians may assume that the only alternative is to abandon the province of their discipline and enter the alien world of classic social science methodologies. But, as so many social scientists themselves have noted, procedures such as the use of double-blind tests which measure the impact of a single variable on learning are rarely applicable to most teaching situations. There are too many variables loose in any real classroom to ever isolate one factor from all the others that have an impact on learning. Differences in the abilities or motivation of particular groups of students, in the investment of instructors in particular teaching methods, in the impact of the physical setting, or even the time of day of particular classes are extremely

difficult to control. In fields such as physics, where there are agreed upon questions, and very similar topics are being taught in hundreds of college classrooms, it may be possible to approach such an ideal. In history classes, where there is an enormous variety of subject matter and very little consensus on either central questions or how to evaluate answers to such questions, this kind of precision is unimaginable. Moreover, even if a few of us succeeded in this demanding task of methodological retooling, it is unlikely that scholarship couched in this language would have much impact on historians accustomed to approaching problems from a very different angle.

Thus, historians may seem to face the question of assessment in a field that seems resistant to systematic evaluation with tools that are both foreign to their professional training and of questionable applicability to the task at hand. It is not surprising that so many of us have chosen to ignore the entire issue of assessment –or rather have limited it to our own general impressions of success or failure. Some would argue that the problem lies in the nature of history teaching itself, that the ability to make reasoned and systematic judgments that we take for granted in the realm of our research can never find a place in that of our teaching. But such a position is thoroughly a-historical and fails to recognize that the standards employed by professional historians in judging traditional disciplinary research are the product of generations of focused cultural labor. The criteria of judgment, rules for the admissibility of evidence, and social foundations of credibility that allow the scholar to think systematically about the past are not intrinsic to the subject matter. Like the procedures of our legal systems, they arose through the need to establish agreed upon bases for decision making. We are currently facing a similar need in the scholarship of teaching and learning history, and we must begin the demanding task of establishing methods of systematic argumentation about student learning in the field.

If the scholarship of teaching and learning is to succeed in history, it will be necessary to move beyond this impasse by finding new criteria for defining the basic operations needed for success in history classrooms and for evaluating student mastery of these skills. I would suggest that we consider the following principles, when attempting to assess learning in history courses:

1. Assessment must be preceded by a clear definition of what is to be assessed. We need to have some idea of what we want to measure before we can measure it.
2. It is best to begin by focusing on the specific operations required in a history course, rather than on generalized forms of critical thinking.
3. In deciding what to assess, it is important to concentrate on measuring things that have a great impact on student success in courses in the discipline. There is always a temptation to measure what is easy to assess (e.g. students' knowledge of facts and dates) rather than the more complex forms of historical reasoning that are usually more essential to success in contemporary history courses.
4. We should concentrate our energies on aspects of history teaching that are problematic. It is less important to develop means of assessing student progress in areas where learning generally occurs spontaneously than in those in which many students are unable to master basic ways of thinking.
5. Assessment will be most effective if it is narrowly focused on particular skills or tightly related clusters of well-defined skills. As has been noted above, traditional history exams do provide a basis for judging students' global mastery of the entire set of skills required for success in history courses, but they generally provide little specific knowledge about which operations have been mastered by students.

6. Assessment in a field such as history rests on judgments that are relative, not absolute. The nature of the phenomena being observed is so complex that positivistic criteria for establishing certainty can only hinder the work. The best that we can do is to make it appear reasonable to expect that certain strategies have a positive impact on learning or that certain ways of approaching historical questions are common in particular groups of undergraduates.

7. Because of the complexity and the ambiguity of the phenomena being studied it will be best to explore a variety of assessment strategies, both quantitative and qualitative.

8. Assessment should be viewed, not simply as a means of evaluating student learning, but, whenever possible, it should serve to further that learning. Assessment should generally be a part of the learning process, not something that is added on as an after thought.

There are almost certainly multiple paths to achieving meaningful assessment of learning in history courses. But each of these will probably have to meet most of the requirements listed above. Personally, I have found it most effective to pursue these goals within the framework of the Decoding the Disciplines process. This approach, developed in the Indiana University Freshman Learning Project, suggests that faculty seeking to understand the learning processes in their courses can productively begin by defining "bottlenecks," i.e. places where large numbers of students have difficulty mastering some concept or action that is essential to success. Then the investigator can begin the intellectually demanding process of defining the steps or operations students would need to overcome the bottleneck. Generally, this requires a painstaking deconstruction of the processes professionals in the field employ automatically, and, like the exploration of other largely unconscious phenomena, it may require the assistance of others who are less involved with the material. Once the task at hand has been broken down into its component parts, each of these can be modeled for students, they can be given opportunities for practice and feedback, and the mastery of each operation can be assessed individually (Pace & Middendorf, 2004).

The Indiana University History Learning Project has demonstrated that this process can be effective at promoting and assessing learning in history classrooms (Diaz, Middendorf, Pace, & Shopkow, 2007; Diaz, Middendorf, Pace, & Shopkow, 2008; Pace, 2008) In the pages that follow I will trace the application of this process to two interrelated bottlenecks frequently encountered in history courses: 1) students' inability to find appropriate evidence to support an interpretation; and 2) their difficulty in making the connections between the evidence and the interpretation clear to their readers. These skills are absolutely essential to any history course that goes beyond simple memorization of facts, and yet they are not part of the skill set of many current college students.

In the description below I will focus primarily on a small seminar I taught on "Paris and the Birth of Modern Culture, 1850-1900" in the summer of 2008. This course was offered as part of the Indiana University Intensive Freshman Seminar Program, which provides all first-year students with the opportunity to take a three-week course before the fall semester beings. My thirteen students were highly motivated and very focused on the course, and they began with a wide range of historical skills. Thus, it provided me with a good opportunity to test the Decoding the Disciplines approach and to see if it would yield clear evidence of learning. But, since the nature of this course made it somewhat atypical, I will supplement this discussion with data from a larger course taught in the regular semester in the spring of 2009.

The difficulty many students have in employing evidence to support a historical interpretation was visible from the introductory essay that I asked students to write before they

arrived on campus. They were provided with excerpts from guidebooks to Paris written in the 1850s and 1860s and asked to write a two-page paper discussing how the city was presented to foreign visitors. Some of the students were able to advance a coherent thesis about the representation of Paris and to provide relevant evidence to support this argument. Others seemed to throw facts randomly at the question, hoping that some of them would stick. A careful reading of the latter provided a clearer understanding of the nature of this bottleneck.

One paper, for example, began with what appeared to be a promising thesis: "Paris is a dare. A dare to all other society's cultures, and countries to prove itself…" Here, I thought for a moment, was an adventurous and original thinker, who was focusing on the ways in which Paris was presented as a challenge to other cultures. But the paragraphs that followed rambled through unrelated details borrowed, seemingly without direction, from the readings. A typical bit of "evidence" informed the reader that "As previously stated Paris has an image to uphold, which explains the destruction of numerous buildings such as the building in which Duc de Berri was stabbed on the rue Richelieu and the portico where the Emperor and Empress were assassinated in 1858." This statement was factually incorrect, since the attempt on the ruling family was not successful. But, more importantly, the destruction of buildings was not a particularly good example of the notion of cultural challenge and its link to the larger issue was never spelled out clearly.

There was ample evidence from my own classes and from interviews with other historians that we videotaped as part of the History Learning Project that large numbers of the students taking courses in our department were prevented from fully succeeding by this kind of inability to select and to justify evidence. Following the decoding process, I now needed to describe as precisely as possible the things that I, as a professional historian, would do to get past this potential obstacle. To make this concrete, I focused on what I, myself, would do automatically when faced with a question from one of the web-based assignments for the course. Here students were asked to imagine that they were writing an essay defending the thesis that the activities of the Baron Haussmann, Prefect of Paris in the 1850s and 1860s, had a positive effect on the development of Paris. They did not actually write the paper, but they were asked to select a passage from the readings that could be use to support this interpretation and to explain briefly what about the passage made it useful in defending the thesis.

I then sought to define the kind of operations that would be necessary to successfully complete this task. In the following list I have defined some of these elements and indicated (*in italics*) how each abstract principle would be realized in the context of this particular assignment. Thus, to succeed at this task, students must:

1. Understand that there is more than one plausible explanation of a historical phenomenon. *(Understand that it might be reasonable to say either that Haussmann did or did not improve Paris.)*
2. Understand that, for an explanation to have plausibility, evidence must be presented that makes it seem more likely than competing explanations. *(Understand that it may be possible to discriminate between better and worse explanations of Haussmann's impact on the basis of evidence.)*
3. Define the basic terms used in the thesis. *(Define criteria for "positive effect" and "improved.")*
4. Uncover the propositions, implicit in the interpretation, that must be defended. *(Recognize that to support the thesis one would have to demonstrate that Haussmann' actions had an effect on Paris and that the effect of these actions was positive.)*

5. Identify what kinds of evidence would support or undercut each specific proposition. *(Think: If Haussmann did improve the city, what evidence of this improvement might still be available.)*
6. Find evidence that would have meet the criteria in #4, above. *(Go back through the criteria established in #4 to see if any of these signs are present in the information that they have about the period and what followed.)*
7. Evaluate the quality of the sources of the available evidence. *(Evaluate the validity of the sources containing each relevant bit of information about Haussmann and Paris to determine which are the most dependable)*
8. Demonstrate to a reader how the existence of this evidence would make the argument in question more likely to be true. *(Demonstrate in writing steps #4, #5, and #6 in a manner what will be clear and convincing to an intelligent reader.)*

Breaking up the process of using evidence historically allowed me, first, to model these steps individually for my students and then to assess their ability to perform particular ones. This deconstruction process also made clearer the strategic choices I faced both in teaching and in assessing learning. Eight processes were too many to teach or assess in a single course. Therefore, I had to made choices about which were most important in the context of this course.

The first two steps, which involve the kinds of issues dealt with in William Perry's (1970) classic study of students' intellectual and moral reasoning, seemed to not be problematic for this group of students. They seemed to understand that historical knowledge is based on weighing of evidence, rather than the discovery of some absolute truth. Six basic processes were still a little too much to teach and assess in a three-week period. Therefore, I decided to deemphasize steps 3 (defining terms) and 7 (evaluating the quality of sources). These are very important, but, given the time constraints, I had to hope that they would be reinforced in the later courses that the students took.

Therefore, I devoted class time to modeling steps 4, 5, 6, and 8, and I gave my students opportunities to practice and receive feedback separately on each of them through in-class team exercises and daily on-line assignments, inspired by Gregor Novak's (1999) Just-in-Time Teaching warm-ups. (These assignments and exercises, along with some of the strategies I used in modeling these operations, may be found at http://www.iub.edu/~hlp/supporting materials/Assessment in History.)

Yet, the question remained – had my students really mastered these skills? Had the Decoding the Disciplines process given my students the tools that they would need to overcome similar bottlenecks in future courses. There was, as I have argued above, no way that I could absolutely prove this, any more than historians doing research on a historical problem can be sure that they are establishing the validity of a particular explanation without potential controversy. But I was convinced that I could amass evidence that would strongly suggest whether the students had mastered these operations.

I began by analyzing student responses to one of the on-line assignments near the end of the course. As part of this task they had to 1) generate a thesis about patterns of gender in late 19th century Paris, 2) identify three propositions that had to be true for the thesis to be valid, 3) find a bit of evidence that would support each proposition, and 4) finally explain what about the evidence should convince a reader that each proposition was credible. This promised information concerning students' mastery of operations 4 (define the propositions that would need to be supported to defend a thesis), 5 (identify the kinds of evidence relevant to each proposition), 6

(find examples of such evidence), and 8 (demonstrate the relevance of the evidence to the reader).

I created a rubric in which each relevant part of the assignment was associated with one or two of these operations. I then reread their work, assigning a point or some fraction thereof to each question and entered the results in a spreadsheet. Five of the thirteen students got a perfect score, receiving full credit for all three examples of propositions, supporting evidence, and justifications for the choices of evidence. As a group, they averaged 93 out of a possible 100 on the entire assignment.

These results were very promising, but they did not, in themselves, demonstrate that my students' ability to select and justify evidence had increased over the semester. However, I had also administered pre- and post-tests at the beginning and end of the course. The same questions were asked on both occasions, and I chose subject matter that had not been covered in the course to assure that I was measuring changes in students' ability to process historical material, not in their content knowledge. After the course was over, I had the tests coded and randomized, and, without knowing which of the tests had been taken at the beginning of the semester, I gave points to each answer, based on a rubric I had created. The pre- and post-scores were then separated and the differences compared on a spreadsheet.

In the section of the assessment most relevant to the issue of using evidence, students were presented with a passage from a standard textbook describing an early 19th century American entrepreneur and a brief interpretation of the factors leading to the Industrial Revolution in the United States. Students were asked to find evidence in the passage that would be useful in supporting or contradicting the interpretation and to explain what about the evidence made it useful for this purpose. I identified two types of evidence in the passage which could be used to answer the essay effectively (material dealing with new technologies and with entrepreneurship) and counted the number of times students were able to identify each.

I found that at the end of the three-week course students were 14% more apt to recognize new technologies as potential evidence and were 28% more apt to mention entrepreneurship. My evaluations of the quality of the justifications for their choice of evidence were 34% higher at the end of the course. (All thirteen students in the course took both the pre- and the post-test.)

The ultimate test of any pedagogical strategy must involve the integration of specific skills in a finished piece of work. Therefore, as a final assessment I compared the use of evidence in student papers at the beginning and the end of the course. In this essay students were asked to discuss factors that contributed to Parisian culture becoming more free and experimental in the second half of the 19th century.

Here is a paragraph from the final paper of the student whose pre-class paper was quoted above.

> The social classes were transferring, the economy was revolutionized by the industrial revolution, and so too, the art world made a change. Prior to this point in art history, the Academy had favored the classics of paintings, sculptures, and the like, that portrayed Romanesque figures and a higher nobility of unattainable perfection, but were now forced to reckon with a new ideal in the art world. In this time period that academic art was replaced by impressionist art and romantic ideals portrayed in art. "There were, of course, conservative critics who mourned the decline of the grand tradition; but the greater danger was the invasion of the whole art world by the crude and tasteless standards of the hundreds of new middle-class purchasers". Romanticism and impressionism came about by the

rejection of the enlightenment rationality that was created decades previously, and resulted in conflicting ideas of nature and the exploration of human experience. It was through romanticism that the bohemian counter culture was generated. It had once been acceptable to be educated at the Ecole des Beaux Art, but now replaced by the advent of sharing their preferred form of art at cafes and local restaurants. Along with the romantic and impressionist art movement came a new system of patrons to buy this new depiction of art.

There are still many problems with this work – unfortunate word choices, incomplete understanding of the material, places where more appropriate evidence might have been selected, inadequate explanation of the significance of a quotation. But, unlike the student's initial work, this reads like a historical argument. Here the argument that the art world was changing was accompanied with concrete evidence supporting this claim. She mentions the decline of the influence of the French Academy and of the Ecole des Beaux Arts, the appearance of Impressionist painting, the role of cafes in promoting independent centers of culture, and changes in the economic and social systems supporting the arts. She definitely needs more work on learning to make clear the relevance of her evidence to the central argument, but the discerning reader would, nonetheless, be much more able to grasp the reasons she provided these details, than would have been the case with her initial paper. This represents significant improvement from her work just three weeks earlier.

Finally, I had an indirect means of determining whether students had internalized a sense of the importance of supporting arguments with evidence. On the last day of class each student wrote a short "letter," designed to give a hypothetical younger sibling or friend advice on how to succeed in my course. Instructions for the exercise provided earlier on the course web site listed "using evidence to support a position" as one of ten possible issues for consideration in the essay, but students had a limited amount of time and were generally only able to deal with a small number of the possible topics.

Nonetheless seven of the twelve "letters" made explicit reference to the importance of using evidence to support an argument in history courses. One offered this advice to a hypothetical friend or sibling: "Pay attention to quotes that really strike you in the reading. They will come in handy at some point in helping to back up an argument or support a point." Another clearly understood the use of evidence as part of a disciplinary procedure: "First, let me say what a history class in college is not. It is not a math class. There are no clear formulas that produce exacting answers. There is no one correct interpretation, or even two or three necessarily. Interpreting an event in history means compiling evidence and making some decisions." Others picked up on my use of the metaphor that historians must make and support an argument much as a trial lawyer does in court. One student advised her brother to "act like a lawyer: take a side, give evidence, and explain why that evidence supports your stance." And another quite clearly summed up the challenge facing students in college history course:

> Think to yourself "lawyer, lawyer, lawyer!" when deciding your argument and the evidence that reinforces both the argument and the thesis. Evidence is very crucial in a history paper because it is an account of the past that no longer exists in the present reality. Make sure you use evidence that *actually* supports your argument and not end up with a paper where the defense of the conclusion is different from that of the introduction!

Finally, the student, whom we have been following throughout this essay, indicated that she knew what she needed to do in the course, even if she had not yet completely mastered the steps that she needed to get there:

> I have found through this class that history is a constant barrage of questions and challenging opinions, where you must research and collect evidence and test multiple theories in order to arrive at either a truth or a falsity. You must question what is valued by the author or the person making the argument. You must ask further questions to be able to answer the original observation. Finally, you must provide some sort of evidence to explain your argument and reasoning for answering the question.

One course — particularly one with only thirteen students — cannot by itself provide sufficient evidence to demonstrate the effectiveness of a particular teaching strategy. Therefore, I repeated the teaching strategies in a larger, upper division course and sought evidence on their impact on the students' ability to choose and justify evidence. Students generally began this course with a much higher mastery of basic skills, than those in the class discussed above. But, when I compared the work of 33 students on assignments early and later in the semester, using the approach described above, I detected a 7% increase in their ability to select relevant evidence (from an average of 86% to 92%) and a 16% increase (from an average of 72% to 92%) in their ability to explain the relevance of their evidence.

There was the possibility that these scores were affected by the differences in the subject matter dealt with in the two parts of the course. Therefore, I again gave pre- and posttests at the beginning and the end of the semester, had them coded, and used a rubric to evaluate without knowing which were done at the beginning or end of the course. The students were given a quotation from a 19th century British author and two interpretations of developments within British society in that period. They were asked which interpretation was most clearly supported by the evidence, to specify what would have to be demonstrated to "prove" the interpretation, and to indicate how the interpretation might be used in this demonstration. [The pre- and post-test and the statistical results may be viewed at http://www.iub.edu/~hlp/supporting materials/Assessment in History.]

I again evaluated these tests without knowing which came from the beginning or the end of the course, looking for their choice of interpretation, for certain elements from the passage that could be used to support it, and for the quality of their explanation of the relevance of the evidence. The results of the assessment were quite positive. I limited my analysis to the 43 students (of 67 in the class) who took both the pre- and post-test. The portion of students choosing the more appropriate interpretation, increased from 30 (71%) to 35 (80%), an improvement of 9%. In evaluating their success at understanding what was called for in the interpretation, I decided to limit the analysis to the 25 students who had chosen interpretation A on both tests.[2]   On the second iteration of the test these students collectively did significantly better in all the categories considered. The greatest increase was in the recognition of the importance of issues of regulation and social control, where there was an improvement of 58% across the semester. On the second iteration of the test 30% more acknowledged the importance of the idea of transformation in the interpretation, 18% more mentioned the theme of competition and individuals, and 21% more students made explicit reference to the time period covered by

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2 The 25 students who had taken both tests and who had chosen interpretation "A" accounted for 50 of the 86 tests available. I limited my analysis to these tests because of the difficulties in establishing a clear comparison of students' treatment of different interpretations.

the interpretation. There was also a dramatic 66% decrease in the number of students who framed the entire interpretation in ahistorical and moralistic terms, but the small numbers (3 and 1, respectively) makes this less than meaningful.

The differences in the pre- and post-tests reinforced the suggestions in the comparison of the early and late assignments that across the semester students became more able to define the claims that had to be defended when dealing with a particular interpretation, to find relevant evidence, and to explain the significance of this evidence for the interpretation. The presence of positive results in two very different classes supports the notion that the teaching strategies used in these courses made a contribution to student mastery of basic skills that are essential for success in history courses and that can be invaluable to students in future life.

However, these exercises in assessment raise some important questions about just how much improvement represents real progress. It is obvious that a student's entire way of operating cannot be transformed within a single semester, but just how much change is required for a teaching strategy to be judged a success? It would seem likely that any increase over 20% is a clear positive indicator of success. But what about 10%? Or 5%? Until systematic assessment of learning in history courses becomes more common, it will be difficult to know just what constitutes success.

Moreover, there remains the question of whether the semester is the optimal unit for measuring increases in learning. It is quite possible that deep learning requires a longer time to sink in and that it may only be fully visible a year or even multiple years after the process has been initiated in a particular class. The History Learning Project has begun to explore this issue by taking "snapshots" of student abilities through short assessment exercises in multiple classes each semester. This will hopefully allow us to trace typical skills trajectories across the undergraduate curriculum and, perhaps, to trace the development of particular students, who take multiple history courses. However, the process of capturing an image of student abilities in a brief exercise is daunting, as is the effort to link success or failure to any particular teaching strategy.

It is important, however, to stress that assessment is not just about measuring change. It can also provide useful information about the level of learning with which students begin a course, the type of difficulty students have in mastering certain disciplinary skills, and the manner in which students go about solving problems. The assessments described above, for example, told me that I needed to focus even more on the issue of discovering evidence in the lower level course, but that in the upper level course I could focus more of my effort on helping students unpack the claims that had to be supported in an interpretation.

Other useful information can emerge from this kind of systematic analysis of student achievement. I learned, for example, that in the upper level course students' grade on the second weekly web assignment correlated very closely with the average final grade in the course (82.54% for the assignment versus 83.18% for the course as a whole). This suggests that it might be important to pay particular attention to supporting the learning of students who had difficulty with this assignment. And I noticed that in the later assignment the students in the larger course picked evidence from a wide range of possible primary sources from the web site, rather than hurriedly grabbing something from the source at the top of the page. This indirect evidence suggests that the level of their motivation remained relatively high, even in the harried thirteenth week of the semester.

It is, however, important to stress that the evaluation of learning in history can never be restricted to a single, externally imposed instrument of assessment. It is clear from both the nature of historical practice and the intellectual politics of the discipline that it would be very unfortunate to attempt to force a single form of assessment of student learning on the discipline from the top down. Different historians appropriately concentrate on different aspects of learning, and no single instrument can possibly capture this useful diversity. Moreover, in attempting to impose such a universal standard, there will always be the temptation to ignore the complexity of what really needs to happen in the history classroom and to focus, instead, on what is easiest to measure – students' memorization of factual knowledge. If historians do not develop their own criteria for evaluating student learning, such crude and inappropriate approaches to measuring student learning may, sadly, be imposed by forces outside academia. But it is difficult to imagine that this would have anything but a negative impact on student learning.

It is possible, however, to imagine a different path toward a loose consensus about how student learning might be evaluated. Individual historians might seek to define specific aspects of historical thinking and to develop means for systematically determining whether student mastery of these increases across a semester or across a student's college career. The results of such assessments could provide useful clues concerning what aspects of individual teaching seem to be yielding positive results and what strategies need to be reevaluated.

On a broader scale these approaches might help a department gain a better understanding of the skills that students bring into history classrooms at various levels in its curriculum. As the work of the History Learning Project suggests, (Diaz, Middendorf, Pace, & Shopkow, 2008) information derived from this work can help departments decide what skills should be introduced at different levels of the curriculum and what disciplinary ways of thinking can be assumed to be present at the beginning of courses. It is, thus, possible to imagine a future in which a faculty member could begin a semester with a much clearer notion of what it is reasonable to expect of students in a particular course and what basic disciplinary skills should be focused on to allow the maximum number of students to master the course material.

If they were made public through publications or websites, such local experiments in creative assessment might provide the basis for a broader discussion among historians about how we evaluate what students are or are not mastering in college history classrooms. Individual instructors could build on the work of others or explore aspects of historical reasoning that had been ignored in previous studies. It is even possible to imagine banks of questions made available to historians interested in determining the level of historical reasoning of the students entering his or her class or in evaluating the amount of change that occurred in these skills across a semester. This would truly create a scholarship of teaching and learning history that is, to return to Shulman's formulation, "accessible for *exchange and use* by other members of one's scholarly community."

References

Bain, K. (2004). *What the Best College Teachers Do*. Cambridge, MA: Harvard University Press.

Booth, A. (1996). Changing assessment to improve learning, in A. Booth and P. Hyland, (Eds.), *History in Higher Education: New Directions in Teaching and Learning.* Oxford: Blackwell Publishers.

Booth, A. (2004). Rethinking the scholarly: Developing the scholarship of teaching in History. *Arts and Humanities in Higher Education,* 3(3), 247-266.

Brawley, S., Kelly, T., & Timmins, G. (2009). SoTL and national differences: Musing from historians from three countries. *Arts and Humanities in Higher Education*, *8*(1), 8-25.

Calder, L., Cutler, W. & Kelly, T. (2002). History lessons: Historians and the scholarship of teaching and learning in M.T. Huber and S.P. Morreale (Eds.), *Disciplinary Styles in the Scholarship of Teaching and Learning: Exploring Common Ground*. Washington, D.C.: American Association for Higher Education and The Carnegie Foundation for the Advancement of Teaching.

Diaz, A, Middendorf, J, Pace, D, & Shopkow, L, (2008). The History Learning Project: A department "decodes" its students. *Journal of American History*, *94* (4), 1211-1224.

Diaz, A, Middendorf, J, Pace, D, & Shopkow, L. (2007). Making thinking explicit: A history department decodes its discipline. *National Teaching and Learning Forum*, *16 (*2), 1-4 .

Drake, F., & McBridge, L. (1997). Frederick D. Drake; Lawrence W. McBride reinvigorating the teaching of history through alternative assessment. *The History Teacher*, *30*, 145-173.

Hake, R. (1998). Interactive-engagement vs. traditional methods. *American Journal of Physics, 66* (1), 64-74.

Hestenes, D., Wells, M., & Swackhamer, G. (1992). Force Concept Inventory. *The Physics Teacher, 30*(3), 141-158.

Karras, R. (1984). A multidimensional multiple-choice testing system. *Perspectives*, Reprinted in R. Blackey, (Ed.), *History Anew: Innovations in the Teaching of History Today.* Long Beach, California: California State University Press.

Novak, G. (1999) Just-in-time teaching: Blending active learning with web technology. Upper Saddle River, NJ: Prentice Hall.

Pace, D. (2008). Opening history's 'black boxes': Decoding the disciplinary unconscious of historians. In C. Kreber, (Ed.), *Teaching and Learning Within and Beyond Disciplinary Boundaries*. London: Routledge.

Pace, D. (2004). The amateur in the operating room: History and the scholarship of teaching and learning. *American Historical Review*, *109*(4), 1171-1192.

Pace, D., & Middendorf, J. (Eds.) (2004). *Decoding the Disciplines: Helping Students Learn Disciplinary Ways of Thinking.* Hoboken, NJ: John Wiley.

Perry, W.G., Jr. (1970). *Form of Intellectual and Ethical Development in the College Years: A Scheme*. New York: Holt Rinehart, and Winston.

Scott, A. (1983). Life is a multiple choice question. *Perspectives*. Reprinted in R. Blackey, (Ed.), *History Anew: Innovations in the Teaching of History Today.* Long Beach, California: California State University Press.

Shulman, L. (1998). Course anatomy: The dissection and analysis of knowledge through teaching. In P.Hutchings, (Ed.), *The Course Portfolio: How Faculty Can Examine Their Teaching to Advance Practice and Improve Student Learning.* Washington, D.C.: American Association for Higher Education.

Wineburg, S. (2001). *Historical Thinking and Other Unnatural Acts: Charting the Future of Teaching about the Past*. Philadelphia: Temple University Press.

Book Review

Engaging the Online Learner: Activities and Resources for Creative Instruction

Marcia Dixson[1]

Citation: Conrad, R. & Donaldson, J.A. (2011). *Engaging the Online Learner: Activities and Resources for Creative Instruction*, Updated Edition. San Francisco, CA: Jossey-Bass. ISBN: 978-1-1180-1819-4

Publisher's Description: This is a revision of the first title in Jossey-Bass' Online Teaching & Learning series. This series helps higher education professionals improve the practice of online teaching and learning by providing concise, practical resources focused on particular areas or issues they might confront in this new learning environment. This revision includes updated activities and resources for instructors teaching online. Based on changes in technology and best practices learned from the field the revision provides new information for even seasoned online instructors. Jossey-Bass http://www.josseybass.com/WileyCDA/WileyTitle/productCd-1118018192.html

The new edition begins with a chapter explaining engaged learning and providing an explanation of the four phases that move students from the role of "Newcomer" through "Cooperator" and "Collaborator" to "Initiator/Partner." Likewise, instructors move from "Social Negotiator" through "Structural Engineer" and "Facilitator" to "Community Member/Challenger." Essentially, you "teach" students how to be engaged learners and to gradually build community and take more responsibility for their own and their peers' learning environment. This framework is prescriptive enough that the authors recommend at least one activity for each phase regardless of how well students are already oriented toward the course, learning online, or each other.

In *Part One: Constructing Activities to Engage Online Learners,* Chapter 2 talks about designing online environments and Chapter 3 offers a brief explanation of what to consider in assessing engaged learning and then some examples of team assessments, self-assessments, and discussion rubrics that, unfortunately, contain few new ideas. Chapter 4 offers activities to help students learn to use online tools, i.e., a skills survey, a scavenger hunt, and a syllabus quiz; all useful ideas for teaching students new to the online learning environment.

The rest of the book is *Part Two: Activities to Engage Online Learners* and each chapter provides a page or two of introduction to a type of activity and then a group of example activities ranging from icebreakers to learner-led activities. As might be expected, some of the activities are widely usable while others are more discipline-specific and might be difficult to transfer to other content areas.

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Dixson, M.

Chapter 5 offers some good ideas for effective icebreakers such as "lineup," where students score themselves on five statements about hobbies (reading, sports etc.) and the content of the course and then look for someone with the score that most closely matches their own (I'm assuming on all five statements rather than each statement or a total although that is not clear from the directions). This seems a unique way to help students make connections.

Chapter 6 offers an overly simplistic view of dyad and team possibilities. There are really no truly collaborative activities, i.e., tasks where students must reach agreement on a single answer or plan except the "Medieval Shield" and it is still a compilation of images. More activities that require interaction, critical analysis, and/or reaching consensus would be more engaging than the critique or respond to each others' work type of activities provided. The new edition does contain useful information on factors to consider in assigning groups.

Chapters 7 and 8 have some interesting and creative reflective and "authentic" activities. For instance, creating a bumper sticker to sum up your learning in a class could be fun. Likewise, interviewing a professional about his/her job, responsibilities, and transition from the beginning of his/her career to this position should be helpful for students. I particularly like the "Social Responsibility" group activity to create potential solutions for an actual community problem.

Chapter 9 does a good job of defining games as includes tasks that provide an element of engagement, decision making and knowledge acquisition from a new perspective" and simulations that "explore and replicate real-life situations" (Chapter 9, para. 2). However, there are only three simulations offered and two are discipline-specific but offer templates that could be adapted to other content areas.

Finally, Chapter 10: Learner led Activities does a good job of listing the steps for creating and implementing learner led activities and provides some good examples of activities that students have created. It might have been more useful to have the assignment directions that the examples came from rather than the work the students created.

All in all, the book provides very brief information about each type of activity. If you are looking for in-depth guidelines about creating simulations or games or using dyads and groups in the online environment, look elsewhere. If you are looking for some simple examples, this is a solid resource. Some of the examples are fairly common but others are creative and could certainly provide a foundation for some interesting assignments.

The primary difference between the 2004 and the 2011 editions is, disappointingly, a few updated references, a few paragraphs nodding toward new technologies (i.e., Skype) and blended courses, and some added *Author's Notes* about the activities which offer alternative ways to use them. There is no substantial difference in content, no new types of activities or chapters, and only one new activity, a survey about readiness for learning online. If you are using many of the activities from the 2004 edition and want to consider alternatives, the *Author's Notes* could be useful. Otherwise, the 2004 edition is roughly equivalent to the 2011 edition unless you want to read it on your iPad - only the 2011 edition is available as an eBook.

Mission

Founded in 2001, the Journal of the Scholarship of Teaching and Learning (JoSoTL) is a forum for the dissemination of the Scholarship of Teaching and Learning in higher education for the community of teacher-scholars. Our peer reviewed Journal promotes SoTL investigations that are theory-based and supported by evidence. JoSoTL's objective is to publish articles that promote effective practices in teaching and learning and add to the knowledge base.

The themes of the Journal reflect the breadth of interest in the pedagogy forum. The themes of articles include:

1. Data-driven studies: formal research projects with appropriate statistical analysis, formal hypotheses and their testing, etc. These studies are either with a quantitative or qualitative emphasis and authors should indicate the appropriate domain. Acceptable articles establish a research rigor that leads to significant new understanding in pedagogy.

2. Reflective essays: integrative evaluations of other work, essays that challenge current practice and encourage experimentation, novel conclusions or perspectives derived from prior work

3. Reviews: Literature reviews illuminating new relationships and understanding, meta-analysis, analytical and integrated reviews, etc.

4. Case studies: These studies illustrate SOTL and its applications, usually generalizable to a wide and multidisciplinary audience.

5. Comments and communications: Primarily, these are comments based on previously published JoSOTL articles, but can also include book reviews, critiques and evaluations of other published results in new contexts or dimensions

Submissions

Authors are encouraged to submit work in one of the following categories:

- **Traditional Research Reports: data driven studies with either a quantitative or qualitative emphasis**
- **Reflective Essays on SoTL**
- **Reviews of current themes in SoTL research including meta-analysis**
- **Case studies illustrating SoTL and its applications**
- **Comments and Communications on previous Journal articles, or book or software reviews**

In your e-mail with your submission, please indicate which of the above categories most applies to your submission. Despite their differences, all of these types of submissions should include the author's expression of the implications their work has for the teaching-learning process. This reflective critique is central to our mission in furthering understanding of SoTL. Authors are encouraged to review the Guidelines for Reviewers in order to understand how their submissions will be evaluated. **Authors are strongly encouraged to study the Reviewer's Rubric that reviewers shall apply in evaluating their submitted work.**

Authors should submit their article to josotl@iupui.edu. Submissions must be prepared in an electronic format using Microsoft Word on either PC or Macintosh platforms. Submissions should be uncompressed files attached to an e-mail, not in the body of an e-mail text. All submissions must be prepared following the guidelines below. While there is no formal page limit, authors should adhere to recent article lengths, typically 20 pages or less. Authors are expected to include proper referencing for their sources, especially URLs for web sites that might contain material of interest to our readership.

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Style Sheet for the
Journal of the Scholarship of Teaching and Learning

John Dewey[1] **and Marie Curie**[2]

Abstract: This paper provides the style sheet for the Journal of the Scholarship of Teaching and Learning. Manuscripts submitted for publication should adhere to these guidelines.

Keywords: radiation, metacognition, identity theory, constructivism, educational philosophy.

I. General Guidelines for the Manuscript.

The final manuscript should be prepared in 12-point, Times New Roman, and single-spaced. Submissions should be double-spaced. All margins should be 1 inch. The text should be fully left- and right-justified. The title (in 16 point bold) and author's name (in 12 pt. bold) should be at the top of the first page. The author's name should be followed by a footnote reference that provides the author's institutional affiliation and address. The abstract should be indented 0.5" left and right from the margins, and should be in italics.

Except the first paragraph in a section subsequent paragraphs should have a 0.5" first line indent. Use only one space after the period of a sentence (word processors automatically adjust for the additional character spacing between sentences). The keywords should be formatted identically to the abstract with one line space between the abstract and the keywords. Authors should use keywords that are helpful in the description of their articles. Common words found in the journal name or their title article are not helpful.

Pages should be unnumbered since they will be entered by the Journal editorial staff. We will also insert a header on the first page of the article, as above.

References should be incorporated in the text as authors name and date of publication (Coffin, 1993), with a reference section at the end of the manuscript (see below for the desired format for the references). Titles of articles should be included in the references in sentence case. Unless instructed otherwise in this Style Sheet, please use APA style formatting. Footnotes should incorporate material that is relevant, but not in the main text.

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It is essential that authors refrain from plagiarism. Plagiarism is a violation of ethics and, in serious cases, will lead to a manuscript being rejected by this journal. No future manuscripts will be accepted from authors who have submitted a plagiarized manuscript.

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II. Section and Sub-Section Headings.

A. Major Sections.

Major section headings should be flush-left, bold-faced, and Roman numeral numbered. Major section headings should have one-line space before and after. The first paragraph(s) of the article do not require a major heading.

B. Sub-Sections.

Sub-section headings should also be flush-left, in italics, and alphabetically numbered. Sub-section headings should have a one-line space before and after. Sub-sub-sections should appear at the beginning of a paragraph (i.e., with an 0.5" indent, followed immediately by the text of the sub-sub-section), with the heading also in italics.

III. Tables and Figures.

Tables and figures should be inserted in the text where the author believes they best fit. They may be moved around a little to better correspond to the space requirements of the Journal. If necessary, tables and figures may occupy an entire page to ensure readability and may be in either portrait or landscape orientation. Insofar as possible, tables should fit onto a single page. All tables and figures should be germane to the paper. Tables should be labeled as follows with the title at the beginning (in bold), with data entries single-spaced, and numbered. Column labels should be half-line spacing above data.

Table 1. The title of the table.

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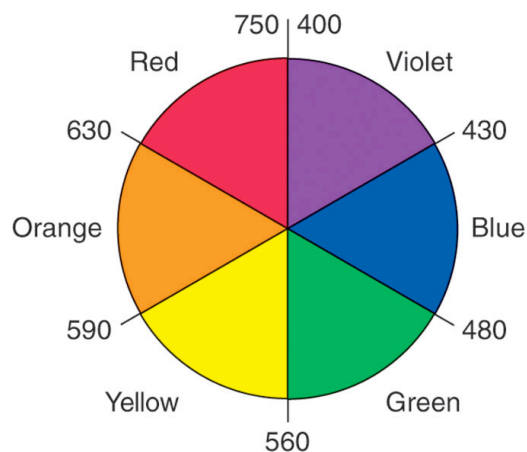
Figure 1. Color wheel with wavelengths indicated in millimicrons. Opposite colors are complementary.

Appendix

Please insert any appendices after the acknowledgments. They should be labeled as follows:

Appendix 1. The Title of the Appendix.

References

Coffin, D.A. (1993). Using the competitive edge. *Journal of Economic Education*, *24* (1), 62-69.

Garcia, J. and Rodriguez, P. (2002). The determinants of football match attendance revisited: Empirical evidence from the Spanish football league. *Journal of Sports Economics*, *3* (1), 18-38.

Hamilton, S. J. (1995). My name's not Susie: A life transformed by literacy. Portsmouth, NH: Boynton/Cook Publishers.

Pappas, D. (2004). Fixing the fan cost index: A more realistic view. Retrieved April 21, 2004, from http://www.baseballprospectus.com/article.php?articleid=2790.

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