JoSoTL is a collaboration between The Mack Center for Inquiry on Teaching and Learning and the Faculty Colloquium on Excellence in Teaching, Indiana University
<table>
<thead>
<tr>
<th>Volume 4</th>
<th>Number 1</th>
<th>May 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brian L. Fife &amp; Joseph Losco</td>
<td>Reexamining Carnegie Research Institutions: Evidence from IPEDS Data</td>
<td>1</td>
</tr>
<tr>
<td>Kathleen McKinney</td>
<td>Learning Sociology: Successful Majors Tell their Story</td>
<td>13</td>
</tr>
<tr>
<td>Helaine Alessio</td>
<td>Student Perceptions About and Performance in Problem-Based Learning</td>
<td>23</td>
</tr>
<tr>
<td>Teresa G. Banker</td>
<td>E-Journals: Reflections and Communication</td>
<td>35</td>
</tr>
<tr>
<td>Craig M. Ross &amp; Jennifer E. Lukow</td>
<td>Are Learning Styles a Good Predictor for Integrating Instructional Technology Into a Curriculum?</td>
<td>41</td>
</tr>
</tbody>
</table>

JoSoTL Mission
Submission Guidelines
Editorial Board
Style Sheet

52
53
55
56
Reexamining Carnegie research institutions: Evidence from IPEDS data

Brian L. Fife and Joseph Losco1

Abstract: Officials at the Carnegie Foundation for the Advancement of Teaching changed the system that had been used to classify institutions of higher education in 2000. Part of the redesign was a change in the criteria for placement of doctoral degree granting institutions. Especially noteworthy was the removal of specific levels of research funding as a distinguishing feature of commitment to research. Do the new criteria accurately capture differences in priorities as measured by expenditures across all educational categories? Are there significant differences in overall patterns of spending that distinguish the types of graduate programs categorized by the new instrument? This research effort is an attempt to address these questions by examining expenditures in three major categories of university operations—research, instruction, and public service.

Keywords: research, instruction, public service, Carnegie Foundation

I. Introduction.

The Carnegie classification of institutions of higher education was developed in 1971 and initially published in 1973 under the leadership of Clark Kerr to provide a portrait of the diversity of higher education in America and to enable researchers to make meaningful comparisons about educational performance across a range of similar institutions. The classification was updated in 1976, 1987, and structurally revised in 1994. By the late 1990s, the Foundation members identified significant problems with the categories utilized. These included the tendency by institutions to view the classification as a hierarchy in which they would compete to “move up” the ladder, and the more systemic concern that the classification matrix imposed an external framework that failed to capture the institutions’ own focus or mission. In 1997, Lee Shulman, president of the Foundation, convened a group of scholars to re-conceptualize the scheme. Reconfiguration was to be completed in two stages. First, a reclassification was advanced in 2000 to include updated data and a consolidation of some categories. Second, re-conceptualization and additional data collection would continue until 2005 at which time the Foundation would provide a more “sophisticated, adaptive set of tools that allows users to cluster information in several different ways...[and to]...provide a series of lenses through which to examine and analyze institutional mission and other important differences among institutions” (Carnegie Foundation for the Advancement of Teaching, 2001, p.viii).

Under the original classification, five broad categories were employed: doctoral-granting institutions, comprehensive universities and colleges, liberal arts colleges, two-year colleges and institutes, and professional schools and specialized institutions. The scheme was modified in 1994 to include doctorate-granting institutions, master’s (comprehensive) colleges and universities, baccalaureate colleges, associate of arts colleges, specialized institutions, and tribal colleges and universities (Carnegie Foundation for the Advancement of Teaching, 2001, p.10). In 1973, doctoral institutions were divided into four categories: research universities I and II and doctoral-granting

1 Brian L. Fife (fifeb@ipfw.edu) is Professor of Public Affairs at Indiana University-Purdue University Fort Wayne. Joseph Losco (jlosco@gw.bsu.edu) is Professor of Political Science at Ball State University.
universities I and II. Research universities were ranked not only on the basis of degree conferral but also on the institution’s relative ranking in attracting federal research funds. The top 100 institutions receiving federal money were simply split with the top 50 inserted into category I and the remainder in category II (Carnegie Foundation for the Advancement of Teaching, 2001, pp.10-12).

In 1987, research universities were distinguished not on the basis of relative rank in funding received but on the basis of an assigned threshold of research support. Category I institutions received at least $33.5 million and category II institutions secured between $12.5 and $33.5 million annually. These thresholds were modestly raised in 1994 (Carnegie Foundation for the Advancement of Teaching, 2001, p.12). The 2000 classification scheme has undergone two substantial changes. First, the subcategories of doctoral-granting institutions was reduced from 4 to 2 and labeled doctoral/research universities–extensive and doctoral/research universities–intensive. Second, a new category of baccalaureate colleges was established (baccalaureate/associate’s colleges), continuing in the mode of emphasizing degrees rather than broader functional categorization. Importantly, however, Foundation scholars changed the measures they utilized for inclusion in some categories. A comparison of Carnegie classifications for 1973, 1994, and 2000 is provided in Table 1.

The doctoral/research category is the primary focus of this paper, and the two categories in the 2000 classification are doctoral/research extensive and doctoral/research intensive. The Foundation evaluators deleted the criteria of federal funding for research because they found it to be variable and unreliable from year to year, and because the funding criteria tended to favor institutions specializing in scientific and technical research rather than the humanities and social sciences (Carnegie Foundation for the Advancement of Teaching, 2001, p.14). Instead, the new categorization relies primarily on number of doctoral degrees awarded and number of disciplines represented (i.e., 50 or more doctorates were awarded per year across at least 15 disciplines in the institutions in the doctoral extensive category; at least 10 doctorates per year across 3 or more disciplines, or at least 20 doctorates were awarded per year in the institutions represented in the doctoral intensive category).

The Foundation officials determined that since doctoral education emphasizes research, that the number of degrees serves as an appropriate proxy for research spending (Carnegie Foundation for the Advancement of Teaching, 2001, p.27). The Foundation analysts offer some evidence in this regard by comparing newly categorized institutions with National Science Foundation (NSF) survey data related to federal science and technology funding and to self-reports of federal and nonfederal research expenditures at a subset of institutions (Carnegie Foundation for the Advancement of Teaching, 2001, pp.28-29). As the Foundation leaders hypothesized, research expenditures among the doctoral extensive institutions far exceed that of their doctoral intensive counterparts.

Nevertheless, Foundation findings with regard to categorizing research institutions are not definitive. The classifications do not necessarily account for an institution’s own priorities with regard to its educational mission. Better data does exist for analyzing an institution’s commitment to research. Use of such data and the type of analysis provided below may move the Carnegie Foundation closer to its goal of incorporating the institution’s own sense of mission (as indicated by commitment to expenditure categories) in future classifications.

II. Research Justification.

This investigation affords instructors a foundation of knowledge that is essential in understanding a complex array of institutions in the United States. How can an informed discourse of teaching and learning perpetuate without at least some rudimentary understanding of the importance of resource allocations to instruction, research, and service, the three primary missions within the academy? An enlightened discussion about values and priorities concerning teaching, research, and service will
hopefully ensue. For example, should certain institutions spend more, or less, on these fundamental objectives? Are instruction and research mutually exclusive or complementary, i.e., does more research investment result in lower spending on instruction or enhance the teaching mission as the knowledge base of the instructor/researcher has been increased by some exponent?

Higher education instructors should endorse the very ideal that many promote to their own students in the classroom. By way of illustration, public budgeting students are taught that understanding resource allocation in the public sector is akin to good citizenship. This is why students regularly scrutinize federal, state, and local budgets. After all, how can citizens hold elected officials accountable without knowing how they reallocate resources in a complex world? Many in education, the social sciences, and humanities subscribe to the Holmesian notion (Holmes, Jr., 1897) that the essence to understanding the world is theory. Ideas have been much more central to social and political change than military power. Yet policies have a definitive impact on what we can aspire to accomplish as academicians. A greater understanding of the policy realities of today will help us all work toward a more utopian ideal of the future when it pertains to defining and refining the process of evaluating excellence in teaching and learning.

III. The Data.

The National Center for Education Statistics (NCES) of the U.S. Department of Education receives annual data from all postsecondary institutions in the United States, covering a range of topics including student enrollments, institutional revenues, institutional expenditures, faculty salaries, completions of programs, and demographic characteristics. These surveys are encompassed by the Integrated Postsecondary Education Data System (IPEDS) (U.S. Department of Education, 2003). For this evaluation, the finance survey is utilized to obtain a measure of policy commitment to instruction, research, and public service. The finance survey includes data on expenditures in fourteen categories: total current expenditures and transfers; instruction; research; public service; academic support; student services; institutional support; operation and maintenance of the physical plant; scholarships and fellowships; mandatory transfers; nonmandatory transfers; auxiliary enterprises; hospitals; and independent operations (U.S. Department of Education, 2003; Losco and Fife, 2000). The survey has cross-institutional comparative utility as it allows researchers to determine the level of spending (i.e., policy commitment) to each category. The 1999/2000 academic year finance survey is utilized in this evaluation. Bear in mind that incrementalism is typically the dominant budgetary mode for most institutions of higher education (Lindbloom, 1959; Losco and Fife, 2000).

While the primary focus of this paper is the analysis of commitment to research (relative to teaching and service) among doctoral universities, we also utilize data on master’s colleges and universities I as a point of contrast. Two categories of master’s colleges and universities (I and II) are included in the 2000 classification. The master’s colleges and universities I institutions are utilized in this investigation in order to assess whether or not there are substantive differences in budgeting allocations between this group and the doctoral intensive group in particular. The institutions in this category offer a wide range of baccalaureate programs, and are committed to graduate education through the master’s degree (no doctoral programs exist). During the period in scrutiny, these institutions awarded 40 or more master’s degrees per year across 3 or more disciplines (Carnegie Foundation for the Advancement of Teaching, 2001, p.26). Our analysis is guided by the following questions: are there important differences between doctoral extensive and doctoral intensive institutions? Do spending patterns at doctoral intensive institutions differ significantly from master’s colleges and universities I?

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Doctoral-Granting Institutions</td>
<td>I. Doctoral-Granting Institutions</td>
<td>I. Doctoral/Research Universities</td>
</tr>
<tr>
<td>Research Universities I</td>
<td>Research Universities I</td>
<td>Doctoral/Research Extensive</td>
</tr>
<tr>
<td>Research Universities II</td>
<td>Research Universities II</td>
<td>Doctoral/Research Intensive</td>
</tr>
<tr>
<td>Doctoral-Granting Universities I</td>
<td>Doctoral Universities I</td>
<td></td>
</tr>
<tr>
<td>Doctoral-Granting Universities II</td>
<td>Doctoral Universities II</td>
<td></td>
</tr>
<tr>
<td>II. Comprehensive Universities and Colleges</td>
<td>II. Master’s (Comprehensive) Colleges and Universities</td>
<td>II. Master’s Colleges and Universities</td>
</tr>
<tr>
<td>Comprehensive Universities and Colleges I</td>
<td>Master’s (Comprehensive) Colleges and Universities I</td>
<td>Master’s Colleges and Universities I</td>
</tr>
<tr>
<td>Comprehensive Universities and Colleges II</td>
<td>Master’s (Comprehensive) Colleges and Universities II</td>
<td>Master’s Colleges and Universities II</td>
</tr>
<tr>
<td>III. Liberal Arts Colleges</td>
<td>III. Baccalaureate Colleges</td>
<td>III. Baccalaureate Colleges</td>
</tr>
<tr>
<td>Liberal Arts Colleges I</td>
<td>Baccalaureate (Liberal Arts) Colleges I</td>
<td>Baccalaureate Colleges—Liberal Arts</td>
</tr>
<tr>
<td>Liberal Arts Colleges II</td>
<td>Baccalaureate (Liberal Arts) Colleges II</td>
<td>Baccalaureate Colleges—General</td>
</tr>
<tr>
<td>IV. Two-Year Colleges and Institutes</td>
<td>IV. Associate of Arts Colleges</td>
<td>IV. Associate’s Colleges</td>
</tr>
<tr>
<td>V. Professional Schools/Other Specialized Institutions</td>
<td>V. Specialized Institutions</td>
<td>V. Specialized Institutions</td>
</tr>
<tr>
<td>Theological Seminaries</td>
<td>Theological Seminaries</td>
<td>Theological Seminaries</td>
</tr>
<tr>
<td>Medical Schools/Centers</td>
<td>Medical Schools/Centers</td>
<td>Medical Schools/Centers</td>
</tr>
<tr>
<td>Other Separate Health Professional Schools</td>
<td>Other Separate Health Professional Schools</td>
<td>Other Separate Health Professional Schools</td>
</tr>
<tr>
<td>Schools of Engineering and Technology</td>
<td>Schools of Engineering and Technology</td>
<td>Schools of Engineering and Technology</td>
</tr>
<tr>
<td>Schools of Business and Management</td>
<td>Schools of Business and Management</td>
<td>Schools of Business and Management</td>
</tr>
<tr>
<td>Schools of Art, Music, and Design</td>
<td>Schools of Art, Music, and Design</td>
<td>Schools of Art, Music, and Design</td>
</tr>
<tr>
<td>Schools of Law</td>
<td>Schools of Law</td>
<td>Schools of Law</td>
</tr>
<tr>
<td>Teachers Colleges</td>
<td>Teachers Colleges</td>
<td>Teachers Colleges</td>
</tr>
<tr>
<td>Other Specialized Institutions</td>
<td>Other Specialized Institutions</td>
<td>Other Specialized Institutions</td>
</tr>
<tr>
<td>VI. Tribal Colleges and Universities</td>
<td>VI. Tribal Colleges and Universities</td>
<td></td>
</tr>
</tbody>
</table>

Minor revisions from 1976 and 1987 are not included.
Source: Adapted from Carnegie Foundation for the Advancement of Teaching, 2001.

IV. Simple Descriptive Statistics.

Simple descriptive statistics are provided for public institutions and private institutions in Table 2. The mean represents the sum of the values in each category (instruction, research, and public service) divided by the number of values. The smaller the standard deviation, the more the data cluster about the mean (Losco and Fife, 2000, pp. 57-58). The standard deviation is the most common measure of dispersion for interval-level data, and reflects the dispersion of data points about the mean. Clearly, doctoral institutions (extensive and intensive) spent more on research; for public institutions, they also spend more on public service. Differences in budget allocations to teaching also exist, with doctoral institutions generally spending a smaller percentage of
Table 2: Institutional Expenditures, By Carnegie Classification Scheme, 1999-2000
(Percent of Institutional Spending)

<table>
<thead>
<tr>
<th>Public Institutions</th>
<th>Mean Instruction</th>
<th>S.D. Instruction</th>
<th>Mean Research</th>
<th>S.D. Research</th>
<th>Mean Public Service</th>
<th>S.D. Public Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctoral Extensive (N = 101)</td>
<td>27.7%</td>
<td>6.4%</td>
<td>15.9%</td>
<td>7.3%</td>
<td>6.2%</td>
<td>4.6%</td>
</tr>
<tr>
<td>Doctoral Intensive (N = 62)</td>
<td>33.1%</td>
<td>7.0%</td>
<td>10.6%</td>
<td>9.0%</td>
<td>3.7%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Master’s I (N = 246)</td>
<td>34.6%</td>
<td>5.5%</td>
<td>2.0%</td>
<td>2.8%</td>
<td>3.1%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Private Institutions</td>
<td>Mean Instruction</td>
<td>S.D. Instruction</td>
<td>Mean Research</td>
<td>S.D. Research</td>
<td>Mean Public Service</td>
<td>S.D. Public Service</td>
</tr>
<tr>
<td>Doctoral Extensive (N = 49)</td>
<td>34.5%</td>
<td>10.5%</td>
<td>15.8%</td>
<td>10.3%</td>
<td>1.3%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Doctoral Intensive (N = 43)</td>
<td>39.5%</td>
<td>12.0%</td>
<td>6.7%</td>
<td>10.7%</td>
<td>2.6%</td>
<td>8.7%</td>
</tr>
<tr>
<td>Master’s I (N = 230)</td>
<td>38.2%</td>
<td>8.3%</td>
<td>1.0%</td>
<td>4.0%</td>
<td>1.2%</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

their budgets on instruction, the differences are also generally small. While these figures are illuminating, a more rigorous analysis follows which affords heightened insight concerning institutional similarities and differences in each of the spending categories in question.

V. Research Hypothesis/Appropriate Statistical Technique.

It is hypothesized, in a general sense, that the Carnegie classification scheme affects institutional spending on instruction, research, and public service:

H1: Carnegie classification scheme (X) impacts institutional spending (Y)

The null hypothesis is that there is no relationship between the Carnegie classification scheme and institutional spending:

H0: β=0

Since the objective of this research effort is to identify a discernible impact, if any, of Carnegie institutional categories (explanatory variables) on institutional spending in the three traditional focal areas in the academy (ultimate dependent variables), multiple regression is the optimum manner in which to empirically test H1 (see Tufte, 1974, pp.135-163; Fife and Miller, 2002).

VI. Specification of the Model.

A multiple regression equation generally takes the following form:

Y = α + β1X1 + β2X2 + e

Where, Y=ultimate dependent variable; α=intercept or constant; β=regression coefficients for the explanatory (x) variables; and e=error term. The dependent variables (Y) in this evaluation are the percentages of overall spending allocated to instruction, research, and public service. The explanatory variables (X) are the three Carnegie institutional categories of interest (doctoral extensive, doctoral intensive, and master’s I). The most plausible manner in which to operationalize them is by creating three dichotomous variables, otherwise known as binary, categorical, or dummy variables.

A. Using Dummy Variables.

Dummy variables are only assessed values of zero or one. In order to prevent perfect
multicollinearity, one category is omitted. The $\beta$ coefficients reflect the changes in the dependent variable with respect to the reference group (the group that is left out). The intercept reflects the value of the dependent variable for the reference group. The t ratio associated with the coefficient on a specific dummy variable is utilized to determine whether or not that group differs statistically from the reference group (Schroeder, Sjoquist, and Stephan, 1986, pp.56-58).

**B. The t Ratio.**

The null hypothesis that $\beta=0$ can be tested by computing the t ratio and comparing it to the appropriate t statistic. If the t ratio is greater than the appropriate t value, the null hypothesis can be rejected at a specified level of significance. In the social sciences, the most common level is the 95 percent confidence interval. If the value of the test statistic lies in the critical region, then it is statistically significant from the other categories (in this instance at the .05 level of significance) and means that the sample size may vary up to 5 percent or less from the population 95 times out of 100. According to Bernstein and Dyer (1992), “The requirement that findings be significant at the .05, or a more restrictive, level reflects the fact that the scientific community fears the acceptance of an untrue hypothesis much more than the failure to accept a true hypothesis. It also reflects the scientific community’s goal of establishing a body of knowledge by building on sets of confirmed hypotheses. If there is any reasonable doubt about the empirical support for a hypothesis, it is better to delay acceptance until it is retested than to accept and build on it. The requirement of such restrictive levels of significance may also stem from a concern that researchers may be advocates of the hypotheses they are testing, and advocates may be tempted to fudge findings ever so slightly to favor their hypotheses” (p.182). With this in mind, the .01 and .05 levels of significance are utilized in this evaluation.

**C. Three Equations.**

Since a reference group has to be deleted when using dummy variable analysis, three equations are utilized in order to test $H_1$ (for both the public and private institutions). Each equation is tested using each of the three dependent variables. The models include the following:

1) $PB = \alpha + \beta_1 \text{ (Doctoral Extensive)} + \beta_2 \text{ (Doctoral Intensive)} + e$

Where, PB=percent of total budget allocated for instruction, research, and public service; $\alpha$=value of the dependent variable for the reference group (Master’s I); Doctoral Extensive=dummy variable (1=Doctoral Extensive institutions; 0=otherwise); Doctoral Intensive=dummy variable (1=Doctoral Intensive institutions; 0=otherwise); and e=error term.

2) $PB = \alpha + \beta_1 \text{ (Doctoral Extensive)} + \beta_2 \text{ (Master’s I)} + e$

Where, PB=percent of total budget allocated for instruction, research, and public service; $\alpha$=value of the dependent variable of the reference group (Doctoral Intensive); Doctoral Extensive=dummy variable (1=Doctoral Extensive institutions; 0=otherwise); Master’s I=dummy variable (1=Master’s I institutions; 0=otherwise); and e=error term.

3) $PB = \alpha + \beta_1 \text{ (Doctoral Intensive)} + \beta_2 \text{ (Master’s I)} + e$

Where, PB=percent of total budget allocated for instruction, research, and public service; $\alpha$=value of the dependent variable of the reference group (Doctoral Extensive); Doctoral Intensive=dummy variable (1=Doctoral Intensive institutions; 0=otherwise); Master’s I=dummy
variable (1=Master’s I institutions; 0=otherwise); and e=error term.

The statistical results are presented for the public institutions in Table 3. The first part of Table 3 presents regression results for Percent of Budget Allocated to Instruction both for public institutions (Panel A) and for private institutions (Panel B); for Percent of Budget Allocated to Research both for public institutions (Panel C) and for private

<table>
<thead>
<tr>
<th>Table 3. Regression Results.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Panel A. Percent of Budget Allocated to Instruction</strong></td>
</tr>
<tr>
<td><strong>Public Institutions</strong></td>
</tr>
<tr>
<td>Constant</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Doctoral Extensive</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Doctoral Intensive</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Masters</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>R^2</td>
</tr>
<tr>
<td><strong>Panel B. Percent of Budget Allocated to Instruction</strong></td>
</tr>
<tr>
<td><strong>Private Institutions</strong></td>
</tr>
<tr>
<td>Constant</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Doctoral Extensive</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Doctoral Intensive</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Masters</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>R^2</td>
</tr>
</tbody>
</table>

Standard errors of the coefficients in parentheses.

** Statistically significant at the 1% level.

* Statistically significant at the 1% level.
D. Interpreting the Results.2

Instruction. The data in Table 2 suggest that Doctoral Extensive do not spend more on instruction than do other types of institutions, and may spend less. For public institutions, the constant term is always significantly different from zero at the 1% level. Whether the reference group is Master’s institutions or Doctoral Intensive institutions, the results indicate that Doctoral Extensive institutions spend a significantly smaller percentage of budgets on instruction. However, the difference between Doctoral Intensive and Master’s institutions is not statistically significant.

For private institutions, Doctoral Extensive institutions allocate a significantly smaller percentage of their budgets to instruction as well, whether compared to Doctoral Intensive institutions or to Master’s institutions; however, the difference is significant only at the 5% level. Once again, Doctoral Intensive and Master’s institutions appear to spend essentially the same percentages of their budgets on instruction. Both for public and for private institutions, the explanatory power of the regressions, as shown by the R²s is small (19% of the variation in instructional spending is explained for public institutions, and only 2% for private institutions).

Research. The raw numbers in Table 2 indicate that doctoral institutions allocate a larger percentage of their budgets to research than do master’s institutions (between 6.7% and 15.9%, compared with 1-2%). The regression analysis demonstrates that these differences are statistically significant. In all formulations of the model, the constant terms and the coefficients are statistically significant from zero. All the coefficients estimated for doctoral institutions are significant at the 1% level, and those for master’s institutions are significant at the 1% level as well. In addition, the models have much larger R²s (0.55 for public institutions and 0.40 for private institutions) than do the models for instructional spending and for public service spending. The importance of doctoral institutions in explaining variation in spending on research is noteworthy, but not unexpected.

Public Service. The pattern of spending shown in Table 2 is not as clear-cut as is the pattern in instructional spending or in research. Among public institutions, Doctoral Extensive institutions allocate a larger percentage of their budgets to public service than do Master’s institutions (Panel D); for Percent of Budget Allocated to Public Service both for public institutions (Panel E) and for private institutions (Panel F); for Percent of Budget Allocated to Research.

\[ \text{Panel D. Percent of Budget Allocated to Public Service} \]

\[ \text{Panel E. Percent of Budget Allocated to Public Service for public institutions} \]

\[ \text{Panel F. Percent of Budget Allocated to Public Service for private institutions} \]

\[ \text{Panel C. Percent of Budget Allocated to Research} \]

\[ \text{Model 1} \]

\[ \text{Model 2} \]

\[ \text{Model 3} \]

---

\[ ^2 \text{We have chosen to present regression results which show the effects of including or excluding each of the three institutional categories. Readers not familiar with regression analysis incorporating dummy variables will note the following two features of the results. First, the choice of which category of institution to exclude has no effect on the explanatory power (R2) of the regression. Second, the choice of which category to exclude has no effect on the structural properties of the regression. For example, consider these two formulations of the model:} \]

\[ \% \text{Research} = \alpha_1 + \beta_{1,1} \cdot \text{(Doctoral Extensive)} + \beta_{1,2} \cdot \text{(Doctoral Intensive)} \]

(where Masters is the excluded category)

\[ \% \text{Research} = \alpha_2 + \beta_{2,1} \cdot \text{(Doctoral Extensive)} + \beta_{2,3} \cdot \text{(Masters)} \]

(where Masters is the excluded category)

\[ \text{The reader will note that} \alpha_2 = \alpha_1 + \beta_{1,2} \text{ and} \beta_{2,1} = \beta_{1,1} - \beta_{1,2} \text{ and} \beta_{2,3} = 0 - \beta_{1,2}. \]

\[ \text{That is, Model 2 is a linear transformation of Model 1. This will be true for all model pairs in which the only change is from one excluded institutional category to another.} \]
<table>
<thead>
<tr>
<th></th>
<th>Public Institutions</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Constant</td>
<td>2.0**</td>
<td>10.6**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.3)</td>
<td>(0.7)</td>
</tr>
<tr>
<td></td>
<td>Doctoral Extensive</td>
<td>14.0**</td>
<td>5.4**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.6)</td>
<td>(0.9)</td>
</tr>
<tr>
<td></td>
<td>Doctoral Intensive</td>
<td>8.6**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Masters</td>
<td></td>
<td>-8.6**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.8)</td>
</tr>
<tr>
<td></td>
<td>R^2</td>
<td>0.55</td>
<td>0.55</td>
</tr>
</tbody>
</table>

Panel D. Percent of Budget Allocated to Research

<table>
<thead>
<tr>
<th></th>
<th>Private Institutions</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Constant</td>
<td>1.0**</td>
<td>6.7**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.4)</td>
<td>(1.0)</td>
</tr>
<tr>
<td></td>
<td>Doctoral Extensive</td>
<td>14.7**</td>
<td>9.1**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.0)</td>
<td>(1.4)</td>
</tr>
<tr>
<td></td>
<td>Doctoral Intensive</td>
<td>5.6**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Masters</td>
<td></td>
<td>-5.6**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1.1)</td>
</tr>
<tr>
<td></td>
<td>R^2</td>
<td>0.40</td>
<td>0.40</td>
</tr>
</tbody>
</table>

Standard errors of the coefficients in parentheses.
** Statistically significant at the 1% level.
* Statistically significant at the 1% level.
Table 3 (Continued). Regression Results.

<table>
<thead>
<tr>
<th>Panel E. Percent of Budget Allocated to Public Service Public Institutions</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>3.1** (0.2)</td>
<td>3.7** (0.7)</td>
<td>6.2** (0.4)</td>
</tr>
<tr>
<td>Doctoral Extensive</td>
<td>3.1** (0.4)</td>
<td>2.5** (0.9)</td>
<td></td>
</tr>
<tr>
<td>Doctoral Intensive</td>
<td>0.6 (0.5)</td>
<td>-2.5** (0.6)</td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td>-0.6 (0.5)</td>
<td>-3.1** (0.4)</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.11</td>
<td>0.11</td>
<td>0.11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel F. Percent of Budget Allocated to Instruction Private Institutions</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.2** (0.3)</td>
<td>2.6** (0.6)</td>
<td>1.3* (0.5)</td>
</tr>
<tr>
<td>Doctoral Extensive</td>
<td>0.1 (0.6)</td>
<td>-1.2 (0.8)</td>
<td></td>
</tr>
<tr>
<td>Doctoral Intensive</td>
<td>1.4* (0.6)</td>
<td>1.2 (0.8)</td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td>-1.4* (0.6)</td>
<td>-0.1 (0.6)</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Standard errors of the coefficients in parentheses.
** Statistically significant at the 1% level.
* Statistically significant at the 1% level.

spend more (twice as large a percentage as do Master’s institutions), while among private institutions, Doctoral Intensive institutions spend twice as large a percentage of their budgets on public service as do Doctoral Extensive or Master’s institutions. The regression results bear this out. The difference between spending in Doctoral Intensive institutions and Master’s institutions is statistically significant in Models 1 and 2, and the difference between Doctoral Intensive institutions
and Doctoral Extensive institutions is nearly (but not quite) statistically significant in Models 2 and 3. However, as was the case with instructional spending, none of the models explains a significant percentage of the variation between institutions (the $R^2$ is only 0.01).

VII. Conclusion.

Our data reinforce the Carnegie Foundation assertion that the number and array of doctoral degree conferrals correlates well with institutional commitment to research. The analysis adds the perspective that this correlation holds whether research is measured by absolute dollars or by spending priority, i.e., as measured by proportion of overall spending committed to research. This investigation adds an additional nuance, however. Whereas officials representing doctoral institutions spend proportionately more on research than master’s degree institutions in both the public and private categories, support for instruction and public service yields interesting similarities.

Among private institutions, there is little variance in commitment to instruction between doctoral extensive, doctoral intensive, and master’s I institutions. Among public sector institutions, only doctoral extensive institutional representatives spend significantly less on instruction than their counterparts in the other two categories. Yet even at doctoral extensive public institutions, however, instructional spending is still the largest budgetary component among the three major functional groups examined. In light of the fact that more undergraduates receive baccalaureate degrees at research institutions than at either masters or baccalaureate colleges (Carnegie Foundation for the Advancement of Teaching, 2001, p.20) and considering the recent debate about the relative neglect of undergraduate education at research institutions (Boyer Commission on Educating Undergraduates in the Research University, 1998), it is important to note the magnitude of expenditures all of these institutions devote to instruction relative to other spending categories. Whatever problems may or may not exist with the deliverance of undergraduate education at research institutions, there is clearly no lack of financial effort by doctoral institutions toward meeting the needs of instruction.

This research effort also suggests that doctoral intensive universities may be the chief beneficiaries of any new Carnegie classification that includes institutional mission. This is because, with the exception of additional resources devoted to research and a small number of doctoral programs, there is little in the objective spending measures that differentiates these institutions from master’s I colleges and universities. Spending on instruction and public service is nearly identical for doctoral intensive and master’s I institutions in the public arena and there is little difference between the two in the private sphere as well. Doctoral intensive schools may be able to attain a greater degree of differentiation once self-reported institutional mission is sufficiently accounted for in the Carnegie classification scheme.

References


Advancement of Teaching.


Learning Sociology: Successful Majors Tell their Story

Kathleen McKinney

Abstract. The focus of this study is to begin to answer the question of how sociology majors come to learn their discipline. In this article, I report on the findings from the first study in a multi-method project on this topic. I conducted a group interview with honors sociology majors from around the United States. Students discussed several questions related to learning sociology. Themes that emerged, and which may be useful in a number of disciplines, included the need to make connections, the importance of other people, talking about the material, experiencing varied pedagogies, and the active construction of knowledge.

Keywords: Learning, Honors students, Student perceptions

I. Introduction.

The central question I pose in this research is “How do sociology majors successfully learn sociology?” The study reported here, using a focus group or group interview of honors sociology majors, is one study in a multi-method project investigating this question. The objective of the focus group phase of the study is to obtain exploratory, qualitative data from the point of view of these honors students on how they believe they learn sociology. In this phase, learning of sociology is not directly measured, rather I assume that these honors students, selected to attend the American Sociological Association annual meetings, are by definition successful learners of the discipline.

I am also gathering and analyzing data from learning logs, qualitative interviews, and self-administered quantitative questionnaires with sociology seniors at one, mid-sized public institution. The primary objectives of the full research project are the following:

1. To uncover the learning strategies, both in- and out-of-class, alone or with others, in terms of study skills or other behaviors, which distinguish more and less successful learners of sociology,
2. To uncover any demographic, learning style, or motivational correlates of these strategies and of learning, and
3. To share this information with colleagues in Sociology and in other disciplines in order to positively impact pedagogy, curriculum, and learning.

1 Kathleen McKinney is the Cross Endowed Chair in the Scholarship of Teaching and Learning, and Professor of Sociology at Illinois State University. This research was funded by a grant from the American Sociological Association Teaching Endowment Fund and is part of a larger, multi-method project supported by the author’s selection as a 2003-2004 Carnegie Scholar. The author gratefully acknowledges the contributions of the nine honors students who participated in the focus group and Kerry Strand who assisted in organizing the focus group at the 2003 American Sociological Association annual meetings. Thanks, also, to Tom Gerschick and Michael Loui for their comments on earlier drafts.
This line of research is significant for a number of reasons. Theoretically, the findings will have implications for several areas of higher education scholarship and for the literature on teaching and learning in sociology. On a practical level, faculty, staff, and students can apply the results at the course and department levels to improve learning. In addition, the results will have implications for faculty and students in related disciplines, as well as staff involved in support services for student learning in higher education.

Based on the literature I reviewed, little past empirical work has been done that focuses on how students learn from the viewpoint of students and, specifically, for the discipline of Sociology. For example, experiments or quasi-experiments have been conducted assessing how different study strategies, note-taking strategies, or assignments impacted learning in psychology courses (e.g., Hartlep and Forsyth, 2000; Kreiner, 1997; Watson, Hagihara, and Tennery, 1999). Novices and experts in a discipline, such as physics, have been compared in their approach to problem-solving (e.g., Chi, Feltovich, and Glaser, 1981).

Some researchers have used interviews, case studies, focus groups or “think alouds” to assess students’ study strategies or views of learning in disciplines other than sociology or across multiple disciplines (e.g., Albaili, 1997; Calder, 2002; Jacobs, 2002; Johnson, 1994; Laurillard, 1979; Light, 2001; Nelson, 1998; Van Etten, Freebern, and Pressley, 1997; Yaworski, Weber, and Ibrahim, 2000). Other research has analyzed quantitative data from questionnaires or institutional data sets about students’ academic views and behaviors (e.g., Dietz, 2002; Entwistle and Tait, 1990; Jacobs, 2002; Nist, et. al, 1991; Paulsen and Feldman, 1999; Prosser, Walker, and Millar, 1996; Vermetten, Lodewijks and Vermunt, 1999). Questionnaires have also been used to assess the role of demographic variables, academic background, interest, or motivation in disciplinary learning (Eckstein, Schoenike, and Delaney, 1995; Meeker, Fox, and Whitley, 1994; Neuman, 1989; Paulsen and Gentry, 1995; Szafran, 1986).

Only four of these studies are in the discipline of Sociology and the focus of all of these was on introductory level students, not specifically majors. In addition, quantitative measures were used in all four studies. Over fifteen years ago, Szafran (1986) studied factors influencing prior knowledge and grade in the introductory course. His research showed that year in school, GPA, and parents’ education all significantly related to course pretest score, and GPA and pretest score were significantly related to course grade. A few years later, Neuman (1989) extended Szafran’s work. Neuman writes “This study confirms Szafran’s finding that pretest scores and GPA predict posttest (final exam) scores with no direct effects from demographic, family background, or prior course work variables. Both studies found few effects on pretest score, course grade, or learning from gender, high school sociology courses, or age” (p. 25). Neuman also looked at pre-post test score differences (amount learned in the course) and reports that “Students learn more if they enter the course knowing less, have a higher GPA, and studied a foreign language” (p. 25).

More recently, in a study on developing the sociological imagination by Catholic and non-Catholic students at a private, Catholic institution, Eckstein, Schoenike, and Delaney (1995) found significant relationships between some student demographic variables and successful development of the sociological imagination. More specifically, non-Catholic students and students from less privileged backgrounds (measured by both social class and income) were more likely to successfully develop the sociological imagination. Finally, Dietz (2002) defined success in the large introductory sociology course as total points earned in the course. Factors significantly and positively related to total points included attendance and reading the required materials. Factors unrelated to success included self-reported study time and use of virtual
learning tools. Interestingly, study group participation was negatively related to total points earned.

In summary, the extant theories on learning in higher education emphasize, to varying degrees, biological mechanisms, individual development and learning preferences, the role of interpersonal variables, and particular experiences or contexts as related to learning. Past empirical work has used a wide range of research methodologies. Learning was defined and measured in many ways in this past research including test score improvement, course grade or points earned, student perceptions, and understanding of the sociological imagination. This work supports the idea that more and less academically successful students do vary somewhat in terms of their study and learning behaviors. Furthermore, some demographic and academic background variables are related to learning. Finally, the efficacy of various study strategies, even for the same students, appears to be context specific. In the study I report here, nine honors sociology majors, in a group interview, discuss the factors and strategies that impact their learning of sociology.

II. Methodology.

I obtained the focus group by soliciting volunteers (using fliers and an announcement by ASA staff) from the group of 33 honors undergraduate sociology majors attending the 2003 American Sociological Association annual meetings in Atlanta. Nine of these students (27%) volunteered and met for over two hours to discuss the questions. The focus group consisted of eight females and one male; all appeared to be Caucasian. Of the nine, seven were traditional and two were nontraditional students. They were all juniors or seniors. The nine students were from diverse types of schools from around the nation. I make the assumption here that these nine students are examples of successful learners of my discipline.

Participation was voluntary and confidential, and verbal informed consent was obtained. As an incentive, I provided the students with food. For a variety of reasons (nine voices, semi-public place, greater confidentiality), I chose not to audiotape the focus group. I took detailed notes, using abbreviations, on the student responses to the focus group questions.

The following questions guided the conversation of the focus group. The students each conceptualized learning in their own way.

1. Why did you become interested in sociology? How did you get into the sociology major?
2. Tell me about the strategies you have used that you believe have helped you learn sociology, understand the sociological imagination, and so on.
3. We often learn things outside of class. What types of out-of-class learning experiences have been helpful in learning sociology?
4. Think about an example of a difficult moment in learning sociology. How did you manage to get beyond this moment of difficulty?
5. Is there anything else you would like to share on how you learn sociology?

Immediately after leaving the focus group, I reviewed my notes and added clarification and details. The notes were then typed up question by question yielding about four pages of notes and brief notations when something was repeated multiple times. I analyzed the responses on a question-by-question basis looking for similar or common phrases and ideas in response to each question. My goal was to find themes for each question that had been repeated or supported by several members of the focus group.
III. Results.

In response to the question about what drew them to the field of sociology and how they became a sociology major, students often told brief life histories about what led them to the major of sociology. As part of this history, they sometimes noted their place in the social structure (e.g., from a single parent family or parents with low education levels or older nontraditional status) and/or critical experiences (e.g., a family member with a social problem, no criminal justice major at their school, taking a great sociology course). From this discussion, three themes emerged. Several of the students stressed that the discipline “fit them,” it was “who they were,” it contained the material or areas in which they, personally, were interested, and it was relevant to who they were and to their lives. Second, the students frequently mentioned the critical influence of a particular person such as an “inspiring teacher,” “good professor,” and involvement with a particular faculty member. Finally, key positive out-of-class experiences were also noted as pathways into the major, including study abroad, internships, and research opportunities. These themes related to selecting the major, then, included characteristics about the students themselves, interactions or relationships with important others, or positive out-of-class learning experiences.

Many ideas surfaced when I asked about their study and learning strategies. The themes I pulled from the data were making connections, the role of special others, talking with others about the material, diversity in pedagogy, and active construction of knowledge. Students repeatedly talked about the need to make connections—connections between class and text, between the abstract and the concrete, between the material and their lives, between the teacher’s style and their own, and between the teacher’s work and their own work. Connections involving relevance and application were seen as very important. A particular type of connection made up a second theme, the role of or connections to others. As in response to the first question, students mentioned the importance of faculty members, and of caring and enthusiastic faculty and staff for their learning. A third theme was also interpersonal. Several students stressed that the best way to learn was to talk with others about the material or to try to explain the ideas to another person, verbally or in writing. They were clear that this “other” did not have to be a faculty member but could also be a friend, a classmate, a roommate, or a relative.

Students also noted, in a fourth theme, the helpfulness of being exposed to diverse pedagogies including discussions, good lectures, seminar formats, collaborative work, reading assignments, writing assignments, and multiple teaching styles. They stated this was important to keep their interest and to appeal to students’ different ways of learning. They argued that there was probably not one best way to learn sociology. Thus, they had some explicit knowledge and understanding of the concept of learning styles. Finally, there were responses that might best be labeled as active and constructivist, as students discussed the need to think critically, reflect, dialogue, question, write, summarize, and create their own knowledge. These themes indicate to me that the meaning of learning, for these students, goes well beyond memorization of concepts or surface learning. Rather, it is deep learning, learning that is integrated, applied, and long-term that they were discussing.

The importance of out-of-class learning was also noted. Students acknowledged that much learning takes place out of class. They pointed to the importance of connections between class and books, class and internships, and class and watching the news. They also acknowledged the benefits of on-campus speakers and Sociology Club or Alpha Kappa Delta but argued that these latter types of experiences may only help students who “already get it.” Many ideas surfaced when I asked about their study and learning strategies. The themes I pulled from the data were making connections, the role of special others, talking with others about the material, diversity in pedagogy, and active construction of knowledge. Students repeatedly talked about the need to make connections—connections between class and text, between the abstract and the concrete, between the material and their lives, between the teacher’s style and their own, and between the teacher’s work and their own work. Connections involving relevance and application were seen as very important. A particular type of connection made up a second theme, the role of or connections to others. As in response to the first question, students mentioned the importance of faculty members, and of caring and enthusiastic faculty and staff for their learning. A third theme was also interpersonal. Several students stressed that the best way to learn was to talk with others about the material or to try to explain the ideas to another person, verbally or in writing. They were clear that this “other” did not have to be a faculty member but could also be a friend, a classmate, a roommate, or a relative.

Students also noted, in a fourth theme, the helpfulness of being exposed to diverse pedagogies including discussions, good lectures, seminar formats, collaborative work, reading assignments, writing assignments, and multiple teaching styles. They stated this was important to keep their interest and to appeal to students’ different ways of learning. They argued that there was probably not one best way to learn sociology. Thus, they had some explicit knowledge and understanding of the concept of learning styles. Finally, there were responses that might best be labeled as active and constructivist, as students discussed the need to think critically, reflect, dialogue, question, write, summarize, and create their own knowledge. These themes indicate to me that the meaning of learning, for these students, goes well beyond memorization of concepts or surface learning. Rather, it is deep learning, learning that is integrated, applied, and long-term that they were discussing.

The importance of out-of-class learning was also noted. Students acknowledged that much learning takes place out of class. They pointed to the importance of connections between class and books, class and internships, and class and watching the news. They also acknowledged the benefits of on-campus speakers and Sociology Club or Alpha Kappa Delta but argued that these latter types of experiences may only help students who “already get it.” They
seemed to believe that students with either a predisposition for, or hard work leading to, the understanding of Sociology would seek out and benefit from these experiences but that other students would not—a person by situation—explanation. Finally, they noted the value of independent work with faculty members, especially on research projects.

In response to the question, “Think about an example of a difficult moment in learning sociology. How did you manage to get beyond this moment of difficulty?” the students raised three ideas. First, they talked about persistence and “stepping away” from something tough then coming back to it later. In addition, they mentioned asking questions, getting feedback, and talking with someone else about the difficult material. Finally, they noted that the level of cognitive and emotional development of the individual learner might also be a factor in understanding difficult ideas or skills. Thus, their three strategies included two they could manage—persistence and getting assistance—and one they had limited control over, level of development.

The last question I asked was whether there was anything else they wanted to share about how they learn sociology. They repeated some ideas mentioned earlier in the group conversation including making connections, critical thinking, and personal fit to the discipline. Two new ideas also emerged. These were, first, the importance of attending class. Second, they discussed the need to sometimes “play the game” with faculty, to occasionally adjust to faculty styles and demands. Though several of the students agreed with this, one student was adamant that she never played such games. I found it striking that, even in this discussion, these students never raised the issue of grades. For them, this discussion was about learning, not necessarily about grades. This may be an artifact of the fact that these were all honors students earning high grades.

IV. Discussion.

These honors students pointed to ideas about learning that were remarkably similar to the main components of models or theories about learning espoused in the higher education literature including the importance of experiential and active learning, the role of developmental factors, the constructivist nature of knowledge, the need to make connections or have integrated learning, and the importance of interpersonal relationships (e.g., Light, 2001; Baxter-Magolda, 1999; Pintrich, 1995). Furthermore, many of the ideas expressed by the students support the widely cited seven principles of good practice in undergraduate education (Chickering and Gamson, 1987) including student-faculty contact, cooperation among students, active learning, prompt feedback from others, and respect for diverse talents and learning styles.

With few exceptions, the responses of these students point to their ability to acknowledge their role in learning and to make internal attributions for their success in learning. Similar to some of the previous studies, these students pointed to the importance of certain academic or study behaviors including attending class, writing, reading, and reflecting. Though some previous research demonstrated relationships between demographic variables and success, these students did not explicitly discuss the role of their own background variables in their learning but, perhaps, their sense that they just “fit” the discipline or sociology “was who they were” is connected to background characteristics or past experiences.

The strongest theme in this conversation was “connections.” This concept, and synonyms such as “relationships” and “links,” was frequently mentioned by most of the focus group members as key to their learning of sociology. Clearly, learning opportunities that help students
integrate their learning across courses, people, settings, and ideas is critical. Perhaps connected and integrated learning experiences also increase time on task and level of challenge, two other best practices in undergraduate education (Chickering and Gamson, 1987). The connections noted between new material or course material and current/past experience fit with theory and empirical work on placing new learning in the context of students’ existing knowledge (e.g., Baxter Magolda, 1999; Kegan, 1994; King and Kitchener, 1994). One form of connections that came up repeatedly was connections to others. These students, though seemingly very secure, independent, and self-confident, strongly valued personally and academically meaningful relationships with faculty members and peers.

I found it interesting that the students did not talk a great deal about the specific processes by which these connections, relationships, active construction, and so on were accomplished. Students provided some examples of process including discussing course material with a mother or using their talent in the visual arts to understand the material. Most of the time, however, there seemed to be an assumption that the specific processes were self-evident. Perhaps, for these successful learners, doing these types and ways of learning is “easy” and, therefore, not as explicit or not something they make evident even to themselves.

The questions I posed to the focus group asked them to reflect on their personal experiences. I was curious, however, to what extent they would utilize their sociological imagination in responding to these questions. They did so but to a limited degree. They noted the relationship between some social characteristics and their choice of sociology as a major. They recognized that context is important for learning. They did not, however, fit their learning into the broader institutional or societal framework. They rarely used language that might be categorized as reflecting any major sociological paradigms.

V. Conclusion.

Faculty, staff, and students can work with these themes in an effort to recruit strong majors and improve the learning of sociology majors. Some may find the students’ ideas to be exactly what they expected, but it is important to confirm our expectations and to hear ideas in the students’ own voices. Given the fit of these sociology students’ ideas with prior research and theory on learning in higher education, faculty and staff working in other disciplines should also consider ways to apply these findings with their majors.

For example, to enhance various types of connections, strong emphasis on high quality teaching and student oriented instructors in introductory and lower-level classes is important. Additional ways, live and virtual, must be created and supported to increase the quantity and quality of student-faculty and student-student contact. More and better faculty-student mentoring programs should be established. Departments can also make an effort to provide, encourage participation in, and reward meaningful out-of-class learning experiences (e.g., McKinney, et. al, 2004) as well as to help students make connections between these experiences and material or skills from the discipline. In course design, instructors must think about the nature of the readings, assignments, and evaluation tasks both in and out of class, and how these can be altered to help students make the types of connections these students found so important.

Faculty members should also provide additional opportunities and encouragement for self-reflection, analysis, and collaborative work. Appropriate faculty development to assist faculty in creating and implementing diverse and active teaching-learning activities, assignments, and contexts as well as in supporting increased student choice and responsibility is also
important. Faculty will need to be recognized for these efforts, especially in disciplines or institutions where such efforts are less common or not highly valued.

On the other hand, one factor related to becoming a major and “getting it,” and mentioned by many of the students, was the “good fit” between who they are and what they believe as an individual, and the content and ideas of the discipline. This person-discipline fit will be a factor much more difficult to control or affect in order to recruit strong majors or enhance learning. Perhaps convincing academically strong, creative students that the discipline of sociology is a good match to who they are, their life, and their goals is a strategy to consider and develop. Faculty members in other disciplines may wish to consider the extent to which there is a similar fit between some characteristic of students and the choice of their discipline as a major, and the implications of such a fit for curriculum and pedagogy.

Those in other disciplines should also consider replicating this or similar work, listening to what their majors have to say about learning in their discipline, and attempting to assess the usefulness of these ideas for learning in their discipline. A critical question for those in other disciplines is whether or to what extent the learning strategies used by the successful sociology students are discipline-specific, general, or a bit of both. The students in this study indicated that there was no one best way to learn sociology, yet they expressed a great deal of consensus on learning strategies that worked for them in their major. I failed to ask these students, however, about how they learn in their classes outside of sociology. What do students in other fields say?

This study includes the data from only one focus group or group interview. In addition, these students were exceptional in a number of ways. Success was measured only by the fact that these were honors students. This must be kept in mind when considering what they had to say about their learning. We have only just begun to answer the question, how do sociology majors learn sociology. There is little knowledge available and much knowledge needed.

Thus, there are many areas for future research for sociologists that would also be transferable to those in other disciplines. Questions include, to what extent do these results generalize to other students or to research using other methods? Do unsuccessful or less successful learners of sociology report similar ideas about how they learn the discipline? Explicit comparisons between more and less successful learners of sociology should be made using a variety of measures of success. Furthermore, do successful learners in sociology share some common predisposition such as personality, interest, or learning style? Are there interactions between learning style or motivation level and the learning behaviors that contribute to successful learning? How do sociology students conceptualize learning in our discipline? This work focused on the views of juniors and seniors. An important line of research would be to look at the development of learning and learning strategies over the course of the major as has been done in some other fields. Do students earlier in the major rely more on surface learning strategies relative to those later in the major, for example? We need to consider the notion of connections in much greater detail. Is the importance of this factor shared by students in other disciplines? What, more specifically, is important about these connections?

Further research is being conducted on my campus to triangulate and extend the results presented here. I urge others in sociology and in related disciplines to gather and share additional, relevant data.
References

Albaili, Mohamed A. 1997. “Differences Among Low-, Average- and High-achieving College Students on Learning and Study Strategies.” Educational Psychology 17(1-2 March - June):171-177


McKinney, K.


Student Perceptions About and Performance in Problem-Based Learning

Helaine Alessio

Abstract. Many graduate and professional programs include Problem Based Learning (PBL) as a mainstay in their curricula. For many undergraduate students, this is a change from a teacher-centered to a student-centered learning method. This study was undertaken to learn about perceptions and test performances of college students (N=116) enrolled in liberal education classes when PBL is used vs. traditional teaching methods. Results indicated students perceived traditional teacher-centered learning more favorably than student-centered PBL. Nevertheless, test scores were similar. Negative student perceptions about learning in PBL classes did not support either teacher observations of learning activity in the classroom or compromised test performances.

Keywords: Problem Based Learning, Teacher Centered Learning, Student Centered Learning

I. Introduction.

Problem Based Learning (PBL) was initially implemented as an alternative higher education teaching method in the 1970’s at McMaster University’s Medical School (Boud & Feletti, 1997). The primary reason for implementing PBL into the curriculum was to better prepare students for real-world problem solving. Medical professionals, when presented with a patient, do not always have all the information necessary to provide appropriate diagnosis and treatment. In particular, in emergency medicine, patients may not be able to communicate all pertinent information. The ability of professionals to distinguish what is known about a patient’s condition from what needs to be known, and how to go about gathering information that will lead to addressing the patient’s condition and solving a health-related problem, will determine the potential for a successful outcome. This type of learning process is not unique to medical school courses and scenarios. Similar real-world problems are often presented in the field of accounting, where, for example, an accountant is presented with a stack of paperwork and is asked to prepare a balance sheet or journalize a transaction. In addition to what is evident before her or him, the accountant will have to sort out what is known, what needs to be known, and how to go about gathering necessary information to solve the problem.

PBL has been successfully implemented in medical and professional education schools around the world (Alleyne et al, 2002; Sundglad et al., 2002; Quinlan, 2000; Albanese & Mitchell, 1993; Vernon & Blake, 1993). PBL is also emerging in undergraduate curricula as many universities and colleges undergo curriculum reform and are exploring new ways to effectively engage and teach students (Seaberry, 2002; Barr & Tagg, 1995). There is growing evidence that real-world type of questions and learning activities that are student-centered may be more valuable than traditional teacher-centered lectures in which most of the pertinent...
information is presented by the teacher, followed by a case study or assignment (Martin et al., 1998; Norman & Smidt, 1992). A goal of PBL is to prepare students for life-long learning by engaging them in active learning in which the students are responsible for discovering facts and uncovering key concepts. This approach contrasts with a traditional teacher-centered approach where key facts and concepts are presented to the students.

Three key features of PBL include:

1) Learning in context, where real life problems are presented;

2) Elaboration of knowledge through social interaction, where students work together in small groups; and

3) Meta-cognitive reasoning and self-directed learning, where independent thinking and life long learning is encouraged (Dahlgren & Dahlgren, 2002). In PBL, students are presented with a realistic problem without prior traditional lectures or presentations (Duch, Groh, & Allen, 2001). In the process of solving the problem, students develop knowledge of theory, practice, facts, concepts, and appropriate inquiry strategies related to the initial problem.

Success or failure of PBL depends upon students’ taking responsibility for their own learning (Quinlan, 2000). Solomon (2001) reported that her masters level Physiotherapy students valued group process and work, as indicated by the following comment: “I learned that each member of the team has a role to play, not simply individuals working independently in a team setting, but that trust, patience, and respect for each member only makes the group stronger. That is what I learned—that I have a role to play to set up this environment.” Nevertheless, PBL has been known to create tension in undergraduate students in studies where they reported dissatisfaction and fear. In particular, the transition from a traditional student to being a PBL student was described by Biley (1999) as being associated with feelings of frustration and uncertainty. It is speculated that once students undertake the transition, then negative perceptions about PBL will be reduced and benefits of PBL will be realized. Outcomes in the form of grades are important to the student in their perception of PBL. Undergraduate nursing students acknowledged benefits of PBL such as the ability to “find things out that we had no previous knowledge of, to go back at the end of the program and work at it, or change direction and follow our own interests and educational needs.” (Biley, 1999).

Although PBL has been implemented and assessed in many graduate and professional school programs, few studies have focused on the impact of PBL in liberal education graduate and undergraduate programs. Many liberal education courses consist of primarily traditional teaching methods. Traditional teaching methods have been described as pedagogues where the teacher transmits knowledge in a securely anchored way to students. Primarily didactic teaching methods contribute to the student’s “comfort zone” (Margetson, 1996). When roles are changed, for example, when the student is required to develop one’s own plan of direction, the comfort zone changes, and tension develops. A key intention of PBL is that such tension may lead to learning material in a different way, creating opportunities for self-directed, deep learning (Dunkbase & Penick, 1990). The initial response to PBL seems to relate to the lack of a “comfort zone” where traditional roles are supposed to be played out with the instructor responsible for the teaching and the student processing the information for learning. Nardi & Kremer (2003) reported a common occurrence found in PBL classes- most students reported discomfort when attempting to solve ambiguous problems in health care. A “comfort zone” is not limited to students as teachers tackle issues such as the extent to which a teacher can “let go” as a facilitator, deal with tensions that arise in student groups, manage time effectively, and balance the need to deliver problem solutions in real time while still meeting the learning needs of students (Conway & Little, 2000).
Several studies have reported student and faculty concerns about PBL implemented in specific coursework and curricula in both pre-professional and professional schools (Alleyne et al., 2002; Sunblad et al., 2002). Nardi and Kremer (2003) used a naturalistic inquiry method (a combination of observation and questions) to learn about the degree of mindfulness undergraduate nursing students displayed about their own academic growth and the ability to link their learning activities to the degree of personal learning in the classroom. They were interested in determining how well students perceived they learned using PBL as well as how well test scores reflected learning.

One factor leading up to this study is the expectations by many professional schools, including medicine, nursing, physical and occupational therapy, that students have experience in PBL. In my role as an academic advisor, I have seen an increasing number of inquiries on graduate and professional school applications about students’ experience with PBL. In my role as a teacher in higher education, I feel obliged to prepare students not only with content but also with appropriate tools needed to succeed in the process of learning. Due in large part to the inquiries by graduate and professional schools on PBL experiences of undergraduates, I introduced PBL into my undergraduate and graduate courses several years ago and noted whether the academic performance differed from traditional teaching methods. I also noted perceptions of the students, in part because of a strong impression of frustration that pervaded the classroom. I felt a strange sense of incongruity between what students wanted and what students needed.

The purpose of this study was to learn about the perceptions and test performances of college students enrolled in liberal education classes in which both PBL and traditional teaching methods are used. It was hypothesized that undergraduate and graduate students enrolled in a liberal education college would experience similar tensions as pre-professional students related to PBL teaching methods. It was further hypothesized that test performance would be inferior in students enrolled in courses which included PBL compared with students enrolled in classes that utilized mainly traditional teaching methods. The hypothesis that students in PBL would do worse on tests than students in traditional lecture was partly formed due to the high level of frustration among students that I perceived and the novelty of the PBL, student-centered approach to virtually all students. In this study, both quantitative and qualitative data are presented, as well as a naturalistic inquiry method by the instructor, that provide insight into undergraduate and graduate student learning, perceptions, and test performance associated with PBL in a liberal arts college setting.

II. Method.

This study was conducted at a midsized college, with a 15,000 student enrollment, located in a small town in a Midwestern state in the USA. It is considered to be a liberal arts college and its mission has an undergraduate focus with a few graduate programs having national recognition. It has a selective admission policy. The community served by the school is mainly Euro-Caucasian with approximately 10% minorities enrolled. Most of the undergraduate students reside on campus and range in age 18-24 years old. A majority of graduate students enroll as full time students and are supported by assistantships on campus. Participants in these studies had similar characteristics as the typical undergraduate and graduate student enrolled in the college, with an average GPA range of 2.8-3.6 for undergraduates and 3.0-3.7 for graduates. All students were volunteers who agreed to allow their test scores to be used in calculations and comparisons. They also agreed to allow their anonymous feedback to be qualitatively analyzed. All students completed informed consent forms and complied with the rules and regulations of Miami University’s Human Subjects Internal Research Board.
Two separate studies, one involving undergraduate and the other, graduate students, were conducted during the academic year. The same instructor taught all class sections, both graduate and undergraduate. A total of 93 undergraduate students, 64% female and 36% male, enrolled in three sections of Exercise Physiology, a senior level class taken by students as either a required or elective course. The age range was 21-28 years. Not one student had experience with PBL methods in previous coursework. Thirty-one students were enrolled in a course that included PBL. Two other sections of the same course included mainly lecture presentations and enrolled 37 and 25 students. Learning objectives included understanding and describing basic anatomy and physiology of muscle, muscle development, muscle atrophy, and theories related to muscle movement and muscle growth.

Traditional lectures included slide presentations and case studies. PBL activities included problems given to students prior to the presentation of information required to address the problems. The instructor consulted a PBL text book (Duch et al, 2001) and web sites for examples of questions and brought to the classroom resources in the form of extra texts, journals, and video clips. PBL activities and questions were undertaken in small groups. Small group formation followed a modification of models presented by Biley (1999), Millis and Cottell (1998), and Van der Vleuten and Weigne (1990), with four students, each having a specific role: leader, devil’s advocate, recorder, and reporter. Roles were changed throughout the course so that every student was responsible for each role at some point during the course. Organization of PBL was loosely structured around Biley’s (1999) eight stages as shown in Table 1. And finally, and importantly, motivational aspects of the problem, as described by Chapman (2000) were taken into account: familiarity, relevance, dramatic appeal, significance, authenticity, and potential for group collaboration.

Table 1. Biley’s (1999) PBL process.

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Interpretation of the scenario, concept, and term clarification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>Brainstorming</td>
</tr>
<tr>
<td>Step 3</td>
<td>Organize the outcome of the brainstorm</td>
</tr>
<tr>
<td>Step 4</td>
<td>Define problems and issues</td>
</tr>
<tr>
<td>Step 5</td>
<td>Establish learning needs</td>
</tr>
<tr>
<td>Step 6</td>
<td>Collect knowledge</td>
</tr>
<tr>
<td>Step 7</td>
<td>Explore newly acquired knowledge in relation to established problems and issues</td>
</tr>
<tr>
<td>Step 8</td>
<td>Apply to scenario</td>
</tr>
</tbody>
</table>

These stages were described to students and then reduced to three major questions that challenged students as they attempted, with their fellow group members, to solve the problem: 1. What do we know? 2. What do we need to know? 3. How do we proceed in finding out what we need to know?

Twenty-three graduate students, 83% female and 17% male, enrolled in two classes, and participated in a separate study. The age range was 22-42 years. One class of 15 participated in PBL and a second class of 8 students participated in a traditional lecture format. The same material on cardiovascular health and age-related disease was presented using either PBL or traditional lecture presentations. The class was a graduate level course titled: Exercise, Age, and Health. This interdisciplinary class addresses physiological, social, and psychological forces that impact health and aging. Learning objectives included understanding and describing a healthy and diseased cardiovascular system, studying causes for disease, and distinguishing between aging and disease processes that affect cardiovascular structure and function.
The same examinations were given to graduate students both in the PBL class and in the traditional lecture format class. Similarly, undergraduates took the same examination. A one-way analysis of variance (ANOVA) was used to compare undergraduate mean grades between the two teaching methods: PBL and traditional, followed by Bonferroni post-hoc analyses tests, if significant differences were detected. A separate one-way ANOVA was also used to compare graduate mean grades between PBL and traditional teaching methods. The chi square test for independence was used to compare grade distribution among the different classes. In both types of analyses, ANOVA and Chi Square, the level of significance was set at 0.05. In addition to these two quantitative comparisons, qualitative information was recorded and categorized. The following open-ended question was posed to all students in the PBL class: “Please comment about the teaching method-PBL-used in this class.” A similar question was posed to all students in the traditional lecture/presentation class: “Please comment about the teaching methods used in this class”. Subjective feedback was provided by students in all courses and analyzed by determining core categories, which captured major themes of student comments. The instructor also recorded perceptions of students as they worked together in both the traditional and PBL classes in a journal following each class. These perceptions included notes on student engagement and assessment of focus and efficacy of small group discussions in the different classes.

III. Results.

A. Undergraduate Course Comparisons.

The mean grade for undergraduate students in the PBL class was 82.3 ± 1.3%. Mean grades for the two traditional classes were 82.6 ± 1.3 and 80.7 ± 1.7%. Grade distribution in the exams was similar and is shown in Figure 1.

ANOVA indicated that there were no differences among the mean test scores for students in PBL versus traditional lecture classes (F_{2,89}=0.53, p=0.59). Chi square test for independence indicated a critical chi-square value=9.48, but the calculated chi-square value=2.90, therefore, we could not reject the null hypothesis-that grade distribution was similar among the three classes. A cursory view of the data indicates a difference in grade distribution between the two traditional lecture classes when comparing the percentage of students scoring in the 60’s, 70’s, and 80’s on the exam. Upon further analysis of the C grade, when combining cells into the grade of C and non-C scores, once again, the calculated chi-square value of 2.59 did not reach the critical chi-square value of 5.99. Therefore, at the 0.05 level of significance, we could not reject the null hypothesis and thus had to accept that the C grade distribution was similar among the three undergraduate classes. Furthermore, in both traditional lecture formats, 80% vs. 76% of
students scored in the 70’s and 80’s grade range. That average compared closely to 77% of students in PBL who scored in the 70’s and 80’s grade range.

Subjective feedback from undergraduate students in the class in which PBL was used, included the following categorized by whether the feedback supported PBL or not. Only two students provided positive feedback about PBL. Most feedback on PBL was categorized as negative. The following include samples of undergraduate student feedback.

Undergraduate student feedback that was supportive of PBL:

“I like interacting with other students in small groups.”

“Reading journal articles helped me learn more about the material in the book.”

These two statements were distinctly categorized as “engaging with other learners” and “independent search for knowledge”. They represent two important learning processes associated with PBL. Despite these positive signs, most undergraduate feedback was negative and several categories: partiality towards didactic or directed learning, perception of reduced learning efficiency, and feelings of uncertainty, emerged.

B. Graduate course comparisons. Mean grades for graduate students in PBL and lecture format-class were 82.0 + 1.4 % and 82.5 + 2.2 %, respectively. Grade distribution of the exams was similar between the two classes, with 26% versus 25% scoring in the 70’s, 60% versus 75% scoring in the 80’s, and 13% versus 0% scoring in the 90’s in PBL and traditional lecture, respectively.

ANOVA of the graduate student grades showed no significant difference between the PBL and traditional lecture classes. Graduate level classes were smaller than undergraduate level classes. The traditional lecture class had no students earn a grade in the 90’s (A range), six
students earn a grade in the 80’s (B range) and 2 students earn a grade in the 70’s (C range) compared to PBL where two students scored in the 90’s nine scored in the 80’s, and four scored in the 70’s. Due to the low number of students, a chi square analysis could not be performed. Grade distributions in the graduate level classes are shown in Figure 2.

Figure 2. Grade Distributions in the Graduate Classes.

Negative feedback toward PBL was given by all but two graduate students. Graduate students specified no negative feedback toward traditional lecture-based learning. Graduate student feedback that was not supportive of PBL was sorted into the same three categories as undergraduate negative feedback: partiality towards didactic or directed learning, perception of reduced learning efficiency, and feelings of uncertainty. In the present study, both undergraduate and graduate students reported a remarkably similar undercurrent of dissatisfaction, frustration, and uncertainty that Biley’s (1999) undergraduate nursing students and Seaberry’s undergraduate chemistry students reported (Table 2).

IV. Discussion.

As an Academic Advisor who completes several dozen recommendations for professional and graduate school-bound students, I have noted the increasing number of programs that request information about student experiences in PBL. Many professional and graduate programs are grounded in PBL curricula. There are many reasons for this. Advocates of PBL believe that students learn better when they actively engage in solving real world problems instead of passively receiving information from the teacher to solve a problem. Deep learning can occur when students work together in small groups and in self-directed learning, where independent thinking is encouraged (Dahlgren & Dahlgren, 2002).

Studies on teaching and learning effectiveness have yielded mixed results comparing PBL with traditional lecture (Martin et al., 1998; Vernon & Blake, 1993). Despite the equivocal results, PBL, which has its roots in medical education in the 1970’s, appears to be gaining favor
with many other types of professional schools including nursing, law, social work, pharmacy, clinical psychology, computer engineering, and physical and occupational therapy (Dahlgren & Dahlgren, 2002).

My first attempts in trying PBL in both undergraduate and graduate courses were prompted by the increased number of professional programs that currently implement PBL throughout the curricula and their desire for students with experience in PBL. Unfortunately, my first experiences in using PBL included perceptions of student frustration and vexation that I had not encountered before with traditional teaching. Despite student objections about the lack of learning they felt was occurring with PBL methods, I perceived that student discussions and knowledge acquisition was, in fact, happening. Nevertheless, I could not dismiss negative reactions and perceptions by students about their learning and so I decided to learn more about

Table 2. Similar student comments recorded by Biley (1999), Seaberry (2002), and Alessio.

<table>
<thead>
<tr>
<th>Comments by Biley’s students (1999)</th>
<th>Comments by Seaberry’s students (2002)</th>
<th>Comments by Alessio’s students</th>
</tr>
</thead>
<tbody>
<tr>
<td>“It is so time consuming, there is such a large volume of knowledge to learn.”</td>
<td>“It too way too much time.”</td>
<td>“I think it would be effective if the teacher would go over essential information.”</td>
</tr>
<tr>
<td>“I can see myself spending days in the library under piles of books…and having great difficulty getting any other work done.”</td>
<td>“This method took around-about way to learn the concepts”</td>
<td>“Too much useless information.”</td>
</tr>
<tr>
<td>“I like to be told things.”</td>
<td>“You (the teachers) need to involve more of the class lecture material into the case work.”</td>
<td>“I prefer getting the information straight from the professor than from working in small groups and learning from students.”</td>
</tr>
<tr>
<td>“Lunging into completely unstructured sessions was frightening”</td>
<td>“It was hard to understand how it was supposed to work.”</td>
<td>I did not like the PBL exercise. I felt lost and did not feel that I learned as well as if I were taught by lecture.</td>
</tr>
<tr>
<td>“There is such a lack of time and a lot of pressure to acquire knowledge.”</td>
<td>“I need more explanation about how to work with the case material and the group itself.”</td>
<td>Students seem to frantically compete for the right answer, talking over and around us less knowledgeable folks.”</td>
</tr>
</tbody>
</table>

more about undergraduate and graduate student perceptions of and performance in classes in which PBL methods were used. All students were enrolled in college programs in which traditional teaching methods predominated. It was hypothesized that these students would experience tensions related to the transition from mainly didactic (teacher centered) to PBL (student centered) methods. Due to the novelty of PBL for virtually all students, it was also hypothesized that test performance may be inferior in students of PBL compared with traditional teaching methods. This hypothesis was not supported however, as test performance was similar between PBL and traditional teaching.
Two main positive themes about PBL emerged in this study.

1) Engaging with other learners, and
2) Independent work.

These two themes represent beneficial perspectives of PBL, but were clearly in the minority with only two students reporting positive comments related to working both independently and with others. The majority of feedback was negative towards PBL, and was categorized in three ways: 1. Preference for directive or didactic learning, 2. Perception of reduced learning efficiency, and 3. Feelings of uncertainty. Students stated that they preferred didactic learning, possibly because that was the main teaching method they had experienced prior to the present class. Students also contended that PBL took too much time compared to traditional lectures. Quinlan (2000) describes a literature database designed to address student concerns about making choices concerning resources and time management in order to guide veterinarian students towards the core material for learning. She found that the majority of veterinary students preferred using their own database for gathering information, so in fact self-directed learning prevailed in these students.

Table 2 includes student feedback from two previous investigations and the current one on the use of PBL in the classroom. The critical statements were surprisingly similar in all three studies with time, information, learning style, and frustration emerging as significant issues for all students. Students in the present study complained that PBL left too much uncertainty to sort out pertinent information. These negative perceptions about PBL by students in this study did not differ from perceptions of PBL by students in other studies, where feelings of insecurity (Des Marchais et al., 1992), uncertainty (West, 1998), frustration, fear (Biley, 1999), reduced learning efficiency and confusion (Walton & Matthews, 1989) have been reported. Concerns expressed by students in the present study were not unique from previous studies, especially concerns related to grade-anxiety (Boud & Feletti, 1997).

In this study, mean grades did not differ in either undergraduate or graduate courses. In the undergraduate classes, the mean grades for traditional lecture classes (82.6 ± 1.6 and 80.8 ± 1.4) were indistinguishable from the mean for PBL (82.5 % ± 1.3). A similar result occurred comparing graduate student grades in traditional lecture (mean = 82.5%) and PBL (82.0%). An analysis of grade distribution also showed that a similar percentage of students scored in the A, B, and C range regardless of the teaching method. These results indicate that neither PBL nor traditional lecture was superior in preparing students for testing. An important finding is that learning was not compromised by either teaching method.

In contrast to undergraduate and graduate students’ perceptions that learning was somehow compromised via PBL activities, my perception of the classes was that the students were, in fact, engaging in active learning. As I listened to group discussions, I noted that students were asking each other questions that reflected deep learning and abstract thinking. Group interactions may have been facilitated in part by the “devil’s advocate” role of one member in each group, whose job it was to raise critical questions when statements by other group members were made. Questions such as “Are you sure that information is accurate or up-to-date? Is there any evidence that would oppose that conclusion? What if…?” Seaberry (2002) reported similar teacher observations of face-to-face interactions and active discussions among the PBL student groups, during class time. I also observed students using resources other than the required text, to search for answers and information designed to fill in gaps and confirm statements made by group members. As I saw it, students in the small PBL groups engaged actively in the learning process and formed a type of learning community, with each making a meaningful contribution, as they tackled the problems. Student perceptions of their learning did not correspond with my
observations of in-class learning activities, nor did they predict test performance in either undergraduate or graduate students.

V. Conclusions.

A unique aspect of this study was that it focused on undergraduate and graduate students enrolled in liberal education classes, who unlike pre-professional and professional students are not usually accustomed to PBL. Nevertheless, many of these students aspire to enroll in academic programs such as medicine, social work, and law where PBL courses and entire curricula are widespread. Preparing students to cross the bridge from mainly teacher-centered to student-centered learning is important if they are going to succeed in academic programs in which PBL courses predominate. In the current study, negative feedback toward PBL was given by all but two undergraduate students, and was categorized as 1. Partiality towards didactic or directed learning, 2. Perceptions of reduced learning efficiency, and 3. Feelings of uncertainty. Similar results were obtained for graduate students with only two graduate students providing positive feedback about PBL, categorized as 1. Engaging with other learners, and 2. Independent work.

Nevertheless, PBL student test performances, analyzed by ANOVA and chi square analysis for both mean and grade distribution, were no different compared to students from classes in which information was presented by traditional lectures. In conclusion, despite negative student perceptions about learning in PBL classes, based upon student test performances, learning was not compromised in the PBL method. Based upon a combination of observation and questions, I judged the students to be actively engaged in the learning process. Results from the present study demonstrate a need to convince students that learning can and in fact, does occur despite a sense of discomfort by students in the PBL classroom. Furthermore, PBL curricula are ever-increasing in graduate and professional programs world-wide. Therefore, experiences in PBL during undergraduate studies can help to prepare students for success in graduate and professional program PBL curricula and careers in which problem solving takes place. Further research is necessary to learn about different ways in which PBL can be introduced and gradually implemented into both undergraduate and graduate curricula. A measured approach may address students’ initial negative perceptions of PBL, while still providing meaningful student-centered learning experiences.

References


E-Journals: Reflections and Communication Improve Learning Outcomes

Teresa G. Banker

Abstract. This report describes how journaling and email were used to benefit both the teacher and her students on a college campus in Georgia. The report outlines how decisions were made about the content of the journals, submission deadline considerations, and concerns about the e-journal process. Benefits to the teacher/professor are enumerated and discussed as are benefits to the students. E-journaling has been a successful experiment, which, seemingly, has improved the education process for these students and others as well.

Keywords: Journaling, Communication, Student Success

I. Introduction.

Journaling is not a new phenomenon; it is used very successfully in a plethora of situations. It comes as no surprise that the National Council of Teachers of Mathematics (NCTM) has long recommended journaling in the teaching and learning of mathematics (NCTM, 1989, 2000). The Communication (process) Standard, in particular, recommends journaling for the following reasons:

1) Journaling helps students organize and consolidate mathematical thinking through communication.

2) Journaling helps students to communicate mathematical thinking coherently and clearly to peers, teachers, and others.

3) Journaling helps students to use the language of mathematics to express mathematical ideas precisely. (NCTM, 2000, p. 268)

4) Journaling affords students opportunities for using new vocabulary or notation and for reflecting on their understanding of mathematics.

Mathematics is a precise language full of abstract symbols and notation that have no meaning without careful consideration of their purpose. Thus, if students are to communicate mathematically and use mathematics in a productive way, they must find meaningful understandings for the symbols and notation associated with the language of mathematics. The act of communication contributes strongly to connecting intuitive ideas about mathematics to the abstract symbols and notation that constitute the language of mathematics. Very often communication sharpens the understandings that students have about the language of mathematics and the mathematics itself.

The understandings of the language of mathematics are two-fold. The first is the myriad symbols with their applications and the vocabulary that we use to stand for mathematical ideas and concepts. Attaining familiarity with this aspect of the language is often daunting in itself. The second, of course, is understanding the concepts and bringing meaning to their applications. Building clear understandings of mathematics is one of the goals of the mathematics classroom, and communication is a fundamental tool of the classroom where students are asked to think,

1 The author is at Kennesaw State University, Kennesaw, GA, and may be contacted at teresabanker@mindspring.com. An earlier version of this paper was presented at the Georgia Mathematics Conference in October, 2003
reason, and “express results of their thinking orally and in writing” (NCTM, 2000, p. 268). This type of communication can foster a classroom environment that encourages students to explore and refine their knowledge of the language of mathematics.

Such a classroom environment is desirable at all grade levels and is even beneficial in the college or university classroom. Those teachers who provide opportunities for students to communicate about mathematics cultivate a supportive, non-threatening environment that can deepen the understandings that students need to make mathematics meaningful and to connect informal ideas about mathematics to the symbols and notation in the language of mathematics.

II. E – journal Experiment.

In the courses that I teach, which are freshman mathematics (e.g., mathematical modeling/college algebra) and the critical content for elementary education majors, the students bring with them an undercurrent of attitudes about mathematics that tend to hinder their success. Students often come into these courses with very little confidence in their mathematical abilities. Therefore, one of my instructional goals is to encourage better attitudes toward the study of mathematics and, consequently, improve student success, and the use of journals has contributed to meeting that goal.

Williams and Wynne (2000) stated that journal writing allowed students to clarify their mathematical thinking by explaining their ideas about mathematics concepts. Williams and Wynne recommended a three-part approach to journaling: decide what the students write, decide when the students write and how long, and decide the writing format. Williams and Wynne worked with high school mathematics classes to develop their approach to journaling. To tailor their recommendations to the university venue, I chose to use email for the journals because it was convenient for both student and me because each of us could choose the time to complete the composition of or response to the e-journal.

In *Principles and Standards of School Mathematics*, NCTM states that teachers can help students reflect on their learning by asking the students to “write commentaries on what they learned in a lesson or a series of lessons and what remains unclear to them.” (p. 272) This statement guided the formulation of what and when the students would write, the first and second recommendations of Williams and Wynne. I designed the e—journals to be in the form of reflections that addressed the following three questions:

1) What mathematics did I learn this week?
2) What was easy and why?
3) What was difficult and why?

The second recommendation of Williams and Wynne was decide *when* the students write and how long. I decided that the activity could be accomplished outside of class, thus, not using valuable instruction time in the classroom, and students could choose a time to write the journals. Because of the differences in student populations and class meeting schedules, I asked my students to send the email by midnight of the second day after the last class, (e.g. the Monday-Wednesday classes by midnight on Friday). I set this time deadline because the university population is quite different from that of a high school. Many of the students in my classes are non-traditional students who go directly to work and would be unable to submit an e-journal by 5 PM. Also, I have found it beneficial for students to “mull over” the content of the week before writing their journals. This period before the deadline gives them time to work on homework and identify with what concepts or parts of concepts they are still struggling. The length of the reflections was to consist of fifty words or more. I decided that fifty words would be a minimum
if students were truly reflecting on their learning. This approach seemed more reasonable than setting a time limit since the students choose the time that is convenient to them. Lastly, Williams and Wynne recommended that the teacher decide the format of the journal. This aspect of their recommendations was a natural outgrowth of what the students would write, based on the questions for reflection that I designed for my students, with the additional stipulation that the writing use complete sentences.

III. Benefits to Teachers/Professors.

Students who conscientiously reflect on their learning provide benefits not only to themselves but also to the teacher/professor. I have found that three basic benefits for the professor arise from student reflections. The first benefit is the correction of misconceptions. As students communicate what mathematics they have learned, many times the narrative they use will highlight a misunderstood mathematics term or concept. This misconception can be identified for the student and corrected immediately via reply email and, hopefully, get the student back on track. The timeframe that I use for replying to reflections is before the next class meeting. This timeframe is more likely to accomplish the desired outcomes (improved student learning and self-confidence and assisting the teacher/professor with planning).

The second benefit that I have perceived is directly related to planning instruction of the course content. When several students in the same class report difficulties with the same concept, then I know that particular concept needs to be attacked from another direction to aid students’ understanding of the concept. This approach to planning instruction promotes a dynamic classroom based on student needs.

Finally, the third benefit has to do with student success. Once students become accustomed to the e-journaling process and how they can be helped by speedy replies and suggestions for correct thinking, they are less reluctant to contact the teacher/professor with questions at other times not related to journaling. I am very diligent about checking email to answer student questions when a test/quiz/graded homework is scheduled for or is to be turned in the next class meeting. This “conversation” provides even more opportunities to help students deepen their understanding of mathematics and promote student success.

IV. Benefits to Students.

Students (pseudonyms were used to identify each student quote,) involved in e-journaling report personal benefits that enhance the learning experience. Identifying strengths and weaknesses and focusing study time were explicitly cited by Amy and Casey:

…the reflections, what a powerful tool to make us “think” about what we’ve learned, tell [the professor] about it, and evaluate where we need to go… (Amy, in-service middle grades teacher)

I have benefited greatly from doing the weekly reflections…[they] make me think about the math that I did that week…[it] shows me where my weaknesses lie. It helps me see where I need to focus more study time…in order to succeed in math I must go to class, review my notes, and reflect to identify my weaknesses. I love the weekly reflections; it is a wonderful tool to help me with mathematics. (Casey, early childhood major)
A lack of confidence in mathematics abilities is very often an attribute the professor must deal with in certain student populations. Lora, Sarah, and Matthew report that the reflections actually build confidence in their mathematics knowledge and abilities:

By completing the reflections every week, I have found that I am better able to assess my math skills on my own...This knowledge gives me a better sense of confidence in my mathematics abilities. Math has never been my best subject, so the reflections encourage me when I see that I really am learning the material... (Lora, mathematical modeling student)

The reflection website has been very helpful to me since spring semester...I need to be able to explain in English the concept that I learned instead of using numbers. This helps me put the information in simple terms to show that I understand it and can explain it to another person...My favorite question is the one where I explain what I’ve learned. It is so rewarding to me when I have grasped a concept and I can explain it in my reflection. (Sarah, early childhood major)

...this weekly procedure is hardly a sacrifice; it’s a medium for me not only to communicate my thoughts [to the professor], but also to communicate my thoughts with myself. Math has always been a big scary, lonely place where numbers fly around in my head. By “talking” about these numbers and definitions, I’m able to grasp math as a whole much more easily. (Matthew, mathematical modeling student)

A third benefit that students nearly always report is the immediate feedback that is possible via email. They cite the “clearing up” of misconceptions, affirmation of correct thinking, and the “clarifying, supportive, and encouraging” communication between student and professor.

[The professor] always responds to our reflections, often clearing up a misconception. I love the weekly reflections; it is a wonderful tool to help me with mathematics. (Casey, early childhood major)

I am able to let my professor know immediately when I realize that I do not understand something, and my questions are answered almost as soon as they arise. (Lora, mathematical modeling student)

When I put down the concept I am struggling with, the professor always replies with an example, suggestion, or a question that clarifies my confusion. She helps me understand where my misconception is and explains the concept...(Sarah, early childhood major)

In addition to clarification of thought in definition, the communication aspect between student and professor is heightened in this medium...I can be assured of a response from [the professor] either clarifying, supportive, or both! This pleases me not only because of the answers to questions but also the encouraging words and support, which I find invaluable. (Matthew, mathematical modeling)
Finally, many students report that the reflections help them “see” the mathematics from a different perspective that allows for better understanding and contributes to their success as mathematics students. April says it very well:

I am a firm believer that reflections help me better understand mathematics. To write a reflection, I must go through my notes and find key points and think about the importance of them and understand how they fit into the big picture. Often times, I may not realize how things fit together and what is important until expressing these ideas via reflections. Also, I have to remember specific points, reflect on them, and form them into my memory to express them as a reflection. The reflections keep the information fresh in my mind and help me better understand the concepts. (April, mathematical modeling student)

V. Concerns and Cautions.

With every strategy we devise in our endeavors to better educate students in mathematics or any other discipline, there are always concerns and tradeoffs that must be considered. Implementing e-journals is not immune to the arena of concerns. I have currently identified three major concerns.

The first concern involves the amount of time to respond to student e-journals. It is somewhat time consuming to compose and write thoughtful responses to student journals, and if a professor attempts to integrate e-journals for all students, this time factor may be prohibitive. The second concern involves dealing with computer/internet provider downtime. Policies have to be thoughtfully considered in these circumstances because students very often do not have any control of when these circumstances occur nor can the professor actually verify that the problem really existed. The third concern involves the group of students who will abuse the opportunity in one of two ways that I have identified to date. The first abuse is the inevitable “gripe session” journal where the student constantly criticizes what has been done by the professor in teaching the concepts of the week, with no thoughtful suggestions to improve the situation. Of course, the professor controls the privilege to delete the journal or withhold credit for the journal, but, unfortunately, one still has to listen to the “griping.” The second abuse is the student who just does as little as possible in the journaling process to qualify as a journal. In those instances, I have found that stated policies address the problem very well.

In conclusion, e-journaling has been a successful experiment with my students. The process has proven beneficial to both the teacher and the students in several ways that, seemingly, has improved the education process for these students and others as well. E-journaling appears to disarm many misconceptions before they lead to more serious problems with other concepts, to provide opportunity for a dynamic classroom based on student needs, and to build students’ confidence in mathematics abilities that results in better student success.

References


Are Learning Styles a Good Predictor for Integrating Instructional Technology Into a Curriculum?

Craig M. Ross and Jennifer E. Lukow

Abstract: The purpose of this study was to explore the relationship between learning styles and students’ attitudes towards the use of technology in a leisure study curriculum. All 422 subjects completed the Kolb learning style inventory (LSI) and a computer attitudes survey (CAS) developed by the authors. The LSI is a standardized assessment utilized to identify differences among individual learning styles and corresponding learning environments. The CAS measured students’ attitudes towards the use of technology. Multiple regression analysis, used to distinguish whether attitude toward technology could be predicted by gender, class standing, major concentration, and learning style, showed no significant difference. Results supported the literature regarding the steady increase in the use of electronic mail and the Internet by students in higher education.

Keywords: Instructional Technology, Learning Styles, Kolb Learning Style Inventory

I. Introduction.

It has been widely documented and recognized that student success in the classroom depends not only on the intellectual abilities, skills, and talents of the student, but also on the student’s learning style (Kolb, 1984). Learning styles are an important variable in processing cognitive information (Davidson, 1990; Kolb, 1984; Rasmussen & Davidson-Shivers, 1998). More specifically, learning styles refers to how individuals learn in terms of their perceptions, processes, and preferences (Kolb, 1984). They are “a cluster of psychological traits that determine how a person perceives, interacts with, and responds emotionally to learning environments” (Heinich, Molenda, Russell, & Smaldino, 1999, p. 406).

Over the years, educators have recognized the importance of learning styles for students as well as teachers and have incorporated a variety of teaching and learning methods and strategies in their pedagogy (Ronchetto, Buckles, Barath, & Perry, 1992; Wynd & Bozman, 1996). Moreover, the 21st Century brings to the classroom a vast array of technologies including CD-ROM, videotapes, multimedia presentation software, world wide web (www) discussion forums, and the Internet. The main role of instructional technologies in higher education is to further effective learning methods and teaching pedagogies in ways that are not possible by using traditional classroom methodologies. With this increase in instructional technologies and the integration of instructional technology into the curriculum, there has been a growing concern among educators regarding the effectiveness of these tools to meet the needs of the students (Brouwer, 1996; Grasha, 1996; Jonassen, 2000; Rintala, 1998). This concern is the culmination of such issues as: (a) the knowledge and skill level of students and instructors regarding the technologies, (b) students’ attitudes toward these technologies, and (c) how these technologies influence individual learning styles.

1 Respectively, Associate Professor, Department of Recreation and Park Administration, Indiana University, Bloomington, IN (cmross@indiana.edu) and Human Performance Center, University of New Orleans.
Other issues that are often discussed in relation to instructional technology integration are whether or not these technologies are using sound pedagogical and/or learning theory principles (Ahola-Sidaway & McKinnon, 1999; Grasha & Yangarber-Hicks, 2000). As observed by Grasha and Yangarber-Hicks, faculty may choose certain instructional media based solely on the fact that the structural features associated with them are interesting and attractive. These motives tend to focus on the unique features that the instructional tool can offer while “issues such as how technology fits into a conceptual framework of principles for how people learn or into a broader philosophy of teaching and learning are seldom raised” (Grasha & Yangarber-Hicks, p. 3). This broader analysis can provide a sound theoretical justification for the new technology.

Although there are studies that address the issues of technology integration into a curriculum (Shneiderman, Borkowski, Alavi, & Norman, 1998; Spotts & Bowman, 1995) and the attitudes of students toward the various technologies being utilized (Morris, 1994; Moss, 2000), there is limited research that links these attitudes to individual learning styles (Kraus & Reed, in press). Henke (2001) further stated, “what seems to be missing is a robust body of literature that describes how learning style theory has been incorporated and tested in actual course design and development” (p. 12). Furthermore, no studies to date have attempted to link learning style of leisure studies students to attitudes toward the use of instructional technology and whether attitudes toward technology could be predicted by gender, class standing, and major area of study.

II. Learning styles.

Kolb (1984) developed a model of experiential learning that identified four learning stages and styles based on whether learners are active or reflective information processors and whether their understandings are based on concrete or abstract perceptions (see Figure 1). The learning style types, identified by Kolb, are: divergent, assimilators, convergers, and accommodators.

- **Divergers:** Prefer to engage in collaborative open reflection upon their experiences. They develop a range of solutions rather than simply finding the “right” answer.
- **Assimilators:** Like the process of gathering and reorganizing their reflections and observations into new plans or generalizations.
- **Convergers:** Prefer to solve problems that have definite answers. They enjoy defining problems, reasoning their way to a solution, and then seeking to put the solution into practice.
- **Accommodators:** Enjoy tackling problems by trial-and-error and are freely willing to take risks. They prefer a hands-on learning environment.

The major premise of this learning style theory is that individuals use and prefer different learning styles or strategies that correspond to how effective and comfortable they are when learning occurs. Kolb (1976) theorized that learning is a four stage process involving (a) CE, concrete experience – feeling; (b) RO, reflective observation – watching; (c) AC, abstract conceptualization – thinking; and (d) AE, active experimentation – doing. Kolb further stated
that for a complete learning experience to occur, a successful student functions in all of these domains. In other words, an individual must complete all four of the learning stages. Smith and Kolb (1996) further suggested that learning is a cyclic process involving the four styles of learning. Students should go through the cycle in a sequence beginning with the concrete experience, moving to reflective observation, then to abstract conceptualization and finish at active experimentation. The danger with this theory is that some students prefer one particular style and in the process do not complete the other three types of learning. Harb, Durrant, and Terry (1993) offered two specific reasons for applying the Kolb learning style model to teaching. They suggested that educators should ‘teach’ to each of the learning styles in order to ‘reach’ all students. The authors also believed that the model could very well serve as a framework for students’ lifelong learning experiences.

III. Purpose of the study.

The purpose of this study was to explore the relationship between learning styles and students’ attitudes towards technology use in a leisure studies curriculum. A leisure studies curriculum includes course emphasizing philosophy, history, and effective use of leisure; program planning and evaluation; leadership skill development; facility design, organization, and management; administration; and related course work tailored to meet a students professional goals in the recreation, parks, and leisure service profession. Specifically, the researchers were interested in determining whether learning styles, as measured by the Kolb LSI, would influence students’ attitudes or preferences toward faculty integration of technology into the various major courses.

Figure 1. Kolb’s Learning Style Types As They Relate to the Four Learning Style Categorizations (Kolb, 1984).
It was postulated that the learning styles might in fact influence student attitudes toward instructional technology. The data collected focused on student learning styles, student demographics, computer skills, and attitudes toward the use of instructional technology.

IV. Research Methodology.

The sample for this study was drawn from a leisure studies curriculum at a large Midwestern university. All students in 66 undergraduate courses offered in this department served as the total population. These courses included all sections of all courses offered in the undergraduate program during the fall semester of the 2001-2002 academic school year. There were a total of 671 students enrolled in these courses. Of the total number, 422 different students completed the Kolb Learning Style Inventory and the computer attitudes survey (CAS) for a 63% response rate. Due to the varying knowledge, skill, and interest levels of the instructors in the department, the sample included courses that incorporated not only a range of instructional technologies, but also a range of frequency levels with regard to the uses of these technologies. A self-administered questionnaire was distribution to all students during the eighth week of the sixteen week semester. The researchers reviewed the Study Information Sheet with each class as a whole to ensure that all students were aware of the information contained in the questionnaire. The course instructors were not present at the time of the questionnaire distribution, completion, and collection in order to ensure that participation was strictly voluntary and anonymous.

V. Instruments.

Two separate instruments were used for data collection.

Learning style inventory. The Kolb (1984) Learning Style Inventory (LSI) was administered to ascertain differences among individual learning styles and corresponding learning environments. This instrument, frequently used within many areas of study and research, is a method of assessing a student’s learning style preference (Garner, 2000). The Kolb LSI describes the way a student learns and contains 12 statements with a choice of 4 endings. Each student ranks the endings from most to least like he or she learns. The resulting scores identify an individual’s learning style as one of four types: diverger, assimilator, converger, and accommodator (see previous discussion).

The Kolb LSI was chosen because the inventory is relatively simple to administer and score as well as the fact that it has demonstrated a high degree of reliability with coefficient alpha reliabilities ranging from .81 to .87 for the four learning style scales (Willcoxon & Prosser, 1996). Evidence of adequate construct and predictive validity of the four factors forming two bipolar dimensions has also been found for this instrument (Loo, 1999; Willcoxon & Prosser, 1996).

Computer attitudes survey (CAS). A questionnaire was developed by the researchers which contained three sections: (a) personal information, (b) personal use of computers, and (c) attitudes toward the use of technology. The first section gathered information on demographic variables such as age, gender, class standing, major, and computer skill level. The second section requested specific information about the respondents’ personal use of computers and related technologies. A scale was provided to guide the responses for these 11 questions. This scale provided five options regarding how frequently the respondent uses the specified technology: (a) never – at no time do I use the computer for this purpose, (b) rarely – less than 5 hours a week, (c) sometimes – more than 5 hours a week but less than 1 hour a day, (d) often – more than 1 hour a day but less than 4 hours a day, and (e) frequently – more than 4 hours a day.
The third section of the questionnaire asked students to indicate how they believed the specified instructional technologies had either facilitated or distracted from their achievement of the objectives of the courses. A scale was provided to guide the responses; the range of the scale extended from –5 to +5 with 0 being undecided. The negative end of the scale was labeled with the following sentence: “This technology generally distracts me from achieving the objectives of the course.” The positive end of the scale was labeled as: “This technology generally facilitates my achievement of the objectives of the course.” A total of 12 questions addressed technologies such as on-line quizzes, course websites, and interactive CD-ROMs. The responses in this section were totaled to provide a score ranging from +70 to –70. This score was used as the dependent variable during the data analysis phase of this study.

Prior to the actual study, a pilot study was conducted using the Kolb LSI and the CAS. Both were used in order to test the validity of the attitude survey, and also to test the distribution process. Since the CAS was developed specifically for this study, a principal components analysis (PCA) was used to analyze the datagatherer in the attitude toward technology section was conducted. The Cronbach alpha represented a value of .84.

VI. Results.

A. Demographics.

The first section of the CAS contained several demographic questions addressing the respondents’ gender, age, class standing, major, and computer skill level. Of the 422 survey respondents, 56.9 % were female. A total of 212 (50.3 %) of the respondents were either 20 or 21 years of age. The majority of the students were juniors and seniors (30.1% and 32.9%, respectively). In regards to academic program majors, the Therapeutic Recreation major (19.2%) and Tourism Management major (19.0%) were the two largest majors represented by the respondents. When assessing student’s computer skill level, the majority (55.2%) of the students believed they had “average” computer skills.

The academic department chosen as the sample for this study offers students five different major emphases: Outdoor Recreation and Resource Management, Park and Recreation Management, Recreational Sport Management, Therapeutic Recreation, and Tourism Management. Until students at this institution decide on a major, they are classified as “University Division.” Table 1 presents a profile of the students in the study using a cross-tabulation with the Learning Style Inventory categories.

B. Descriptive analysis of the Kolb learning style inventory.

The Kolb LSI provided data regarding how many students were classified according to the four learning styles. The results from the data set revealed that 124 (31.9 %) of the students were classified as “accommodating,” 106 (27.2 %) in the “diverging” category, 101 (26%) were classified as “assimilating” (26.0%), while only 58 (14.9%) students were classified in the category of “converging.” These results are not at all surprising for leisure studies students even though they differ from the norm as established by Kolb. Recreation and leisure service is a people oriented profession (Edginton, Hudson, Dieser, & Edginton, 2004) and most professionals in the field prefer “hands-on” experiences and action over theory. Many consider multiple perspectives by brainstorming, observing, and gathering information, and then reflecting before acting.
Table 1. Characteristics of the Sample.

<table>
<thead>
<tr>
<th></th>
<th>Accommodating</th>
<th>Diverging</th>
<th>Converging</th>
<th>Assimilating</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>By Major</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outdoor Recreation</td>
<td>17</td>
<td>14</td>
<td>12</td>
<td>14</td>
<td>57</td>
</tr>
<tr>
<td>Park and Recreation</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>Recreational Sport</td>
<td>9</td>
<td>9</td>
<td>4</td>
<td>8</td>
<td>30</td>
</tr>
<tr>
<td>Therapeutic Recreation</td>
<td>30</td>
<td>15</td>
<td>13</td>
<td>16</td>
<td>74</td>
</tr>
<tr>
<td>Tourism</td>
<td>21</td>
<td>21</td>
<td>8</td>
<td>24</td>
<td>74</td>
</tr>
<tr>
<td>University Division</td>
<td>8</td>
<td>9</td>
<td>0</td>
<td>5</td>
<td>22</td>
</tr>
<tr>
<td>Other</td>
<td>35</td>
<td>33</td>
<td>17</td>
<td>31</td>
<td>116</td>
</tr>
<tr>
<td>Total</td>
<td>124</td>
<td>105</td>
<td>57</td>
<td>101</td>
<td>387</td>
</tr>
<tr>
<td>By Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>81</td>
<td>55</td>
<td>33</td>
<td>51</td>
<td>220</td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
<td>50</td>
<td>24</td>
<td>50</td>
<td>167</td>
</tr>
<tr>
<td>Total</td>
<td>124</td>
<td>105</td>
<td>57</td>
<td>101</td>
<td>387</td>
</tr>
<tr>
<td>By Class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fr</td>
<td>11</td>
<td>16</td>
<td>5</td>
<td>15</td>
<td>47</td>
</tr>
<tr>
<td>So</td>
<td>32</td>
<td>20</td>
<td>7</td>
<td>22</td>
<td>81</td>
</tr>
<tr>
<td>Jr</td>
<td>41</td>
<td>27</td>
<td>18</td>
<td>31</td>
<td>117</td>
</tr>
<tr>
<td>Sr</td>
<td>37</td>
<td>42</td>
<td>21</td>
<td>31</td>
<td>131</td>
</tr>
<tr>
<td>Grad</td>
<td>3</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>124</td>
<td>105</td>
<td>55</td>
<td>101</td>
<td>385</td>
</tr>
</tbody>
</table>

A one-way ANOVA was used to compare the data gathered from both the Kolb LSI (4 groups) and the CAS (total attitude score) in order to determine if learning styles of students act as a predictor of their attitudes toward technology use in a recreation course. Although ANOVA is not a statistical analysis that deals with prediction, it can identify if further prediction analyses are needed.

This analysis was chosen for this study to identify if the group means for each of the four learning styles differed with relation to the total attitude score (calculated from responses in section 3 of the CAS). The ANOVA table (Table 2) identified no significant difference between the four learning styles as compared to the total attitude score. The between groups f value of .450 was not significant at the p < .05 level.

C. Positive attitudes toward the use of technology.

The CAS included 12 questions addressing the respondents' attitudes regarding how they thought the specified technologies had either facilitated or distracted from their achievement of the objectives of the courses they have taken. Table 3 presents the mean scores from the CAS for each of 12 instructional technologies and the percentage expressing a positive attitude (those greater than 0 on the CAS). Course websites, one to one communication using email, multimedia, and the Internet used by the professor in class scored the highest among the 12 technologies.
Table 2: Analysis of variance for learning styles.

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of squares</th>
<th>Mean square</th>
<th>Df</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>315.644</td>
<td>105.215</td>
<td>3</td>
<td>.450</td>
<td>.717</td>
</tr>
<tr>
<td>Within groups</td>
<td>85748.685</td>
<td>233.648</td>
<td>367</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>86064.329</td>
<td>370</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Significance at the p < .05 level.

Table 3. Positive attitudes towards the use of technology.

<table>
<thead>
<tr>
<th>Attitude</th>
<th>N</th>
<th>M</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course website</td>
<td>417</td>
<td>3.59</td>
<td>81.1</td>
</tr>
<tr>
<td>Email (one to one)</td>
<td>417</td>
<td>2.77</td>
<td>63.8</td>
</tr>
<tr>
<td>Multimedia</td>
<td>418</td>
<td>2.48</td>
<td>56.5</td>
</tr>
<tr>
<td>Internet (used by professor)</td>
<td>418</td>
<td>2.47</td>
<td>57.9</td>
</tr>
<tr>
<td>Internet (IUCAT, Knowledge Base)</td>
<td>416</td>
<td>2.05</td>
<td>47.5</td>
</tr>
<tr>
<td>On-line quizzes</td>
<td>415</td>
<td>1.77</td>
<td>40.5</td>
</tr>
<tr>
<td>On-line course evaluations</td>
<td>417</td>
<td>1.66</td>
<td>37.4</td>
</tr>
<tr>
<td>Interactive CD-ROM</td>
<td>418</td>
<td>1.57</td>
<td>35.3</td>
</tr>
<tr>
<td>Class discussion forum</td>
<td>417</td>
<td>1.51</td>
<td>36.0</td>
</tr>
<tr>
<td>Music CD</td>
<td>418</td>
<td>1.41</td>
<td>35.4</td>
</tr>
<tr>
<td>Class listserv</td>
<td>413</td>
<td>1.26</td>
<td>27.3</td>
</tr>
<tr>
<td>DVD</td>
<td>418</td>
<td>1.04</td>
<td>25.5</td>
</tr>
</tbody>
</table>

D. Multiple regression analysis.

A standard multiple regression analysis was conducted to distinguish whether attitude toward technology could be predicted by gender, class standing, major, and learning style. Table 4 illustrates the correlations between the independent variables (gender, class standing, major emphasis, and learning style) and the dependent variable (attitude total score). No relationship was found between student attitudes toward technology as they related to gender, class standing, major emphasis, or learning style. The highest correlation within this analysis was only -0.183.

Only 1 % ($r^2$ value= .010) of the students’ attitude toward technology was explained by the independent variables of gender, class standing, major emphasis, and learning style. The statistical significance of the prediction equation was analyzed by looking at the ANOVA table. This dataset showed a significance of .878 at the p = .477 level. This result was concluded to be not significant since the alpha level determined a priori by the researchers to be used for significance was $p = .05$.

VII. Discussion.

Results from the study were not anticipated by the researchers. Learning styles, even controlling for gender, age, major, etc., did not predict the aggregate CAS. This lack of support for the influence of preferred learning styles on the attitudes toward instructional technology may be caused by a number of factors. The fact that no matter how a student prefers to learn, students of this age group seemed to have been exposed to, and formed their own opinions toward, the
various technologies before they have even reached the collegiate level. Many junior high and high school instructors are exposing students to an increasing number of technologies so that the use of the technologies is more “normal” than “out of the ordinary.” This familiarity may also be why learning style had no significant relationship with attitude toward technology.

The learning style that consistently included the fewest numbers of students across the variables was Converging. In this leisure studies curriculum, regardless of how the students were categorized (gender, age, class standing, major, and computers skill level), Converging was seen as the least common category 88% of the time. Accommodating seems to be the highest overall with 56% of the time it being the highest category and 32% of the time it is the second highest category.

Table 4. Multiple regression analysis: correlations.

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Attitude total score</td>
<td>-</td>
<td>-.065</td>
<td>-.064</td>
<td>-.017</td>
<td>-.029</td>
</tr>
<tr>
<td>2. Gender</td>
<td>-</td>
<td>.006</td>
<td>.021</td>
<td>.101</td>
<td></td>
</tr>
<tr>
<td>3. Class standing</td>
<td>-</td>
<td>-.183</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Major emphasis</td>
<td>-</td>
<td>-</td>
<td>.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Learning style</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Accommodators typically enjoy dealing with problems by trial-and-error and are willing to take risks. These traits describe a personality that is more comfortable in a hands-on learning environment. Knowing this, one may conclude that a student’s utilization of technology for his/her personal use may support how he/she prefers to learn in the classroom. If students prefer to be risk takers and learn through trial-and-error, then they may choose to utilize technologies that are frequently learned via this process. For example, the Internet, email and multimedia are all technologies that can be learned either through the use of a manual or simply through the trial-and-error process. Although there is no way of identifying how the students in this study learned their computer skills, it is clear what types of technology they use most often.

The results of this study showed that the majority of students in the leisure studies curriculum were quite comfortable with computers; the majority of the students classified their computer skill level as “average.” Course web sites, “one to one” communication via email, and multimedia all scored high on the positive end of the scale on the CAS used in this study. The findings of this study clearly agree with the frequent use of computers for “one to one” communication (email) and web surfing that is supported in the literature regarding the steady increase in the use of electronic mail and the Internet by students in higher education (Goggin, Finkenberg, & Morrow, 1997; Maughan, 1998). The Internet allows for independent learning where students can interact not only with their instructor and classmates, but also with experts and other interested learners from around the world.

The Converging learning style, which was the least common learning style among this sample, can be described as the preference for solving problems that have definite answers. In the leisure studies field, there are often no definite or over-arching answers and solutions to problems typically needed to be created based on experience and the situation. The lack of Convergers in this study may be due to the fact that these learners are not attracted to the leisure studies discipline. Other majors, such as math and science, may provide these types of answers, and therefore, attract more of the Converging style learners.

Overall, the descriptive data regarding the personal use of computers and the students’ attitudes toward the use of technology in the classroom appeared to support the current literature...
on the subject (Alonso, 1995; Shneiderman et al., 1998). The lack of differences found between learning styles and attitudes toward technology were surprising. There appears, however, to be ample reasons why this result may have occurred. In addition, a possible limitation of the study was the fact that students were selected from only one school. Hence, due to the confinement of research to one institution, it is not possible to generalize the findings across other student populations at other universities. Further studies involving a more generalizable sample could provide additional insight regarding learning styles and attitudes toward the use of technology.

A limitation of this type of study is the lack of control of the type and extent or frequency of instructional technology used in different courses. Student “attitudes” may be more reflective of the appropriate vs. the inappropriate use of different technologies rather than reflective of the technology itself. The use of a technology (i.e., web page) as an instructional aid may be appropriate and beneficial or simply a complication. The lack of data concerning the ease with which different instructors used instructional technology is another variable that could have influenced the results.

VIII. Conclusion.

Even though numerous studies (Johnson & Lobello, 1996; Jones, Reichard, & Mokhtari, 2003; Sims & Sims, 1995) have concluded that learning styles play an important role in the learning process, a focus on student learning styles alone is not enough. There are few empirical studies that have explored learning styles as a predictor of college student attitudes toward the use of technology. The results of this study support the concept that instructional technology is perceived by learners to provide a supportive learning environment regardless of learning style. This is a result which would support the further development of this methodology to enhance the learning of all students. Whether this methodology is truly “learning style neutral” would be difficult to access but the data from this study indicates that students of all learning styles have positive attitudes toward the technology.

Further research could investigate the question of whether students’ personal use of technology could be used as a predictor of their preferences for how technology is integrated into teaching by an instructor. If students are more familiar with certain technologies in their personal lives (i.e., Internet, discussion boards), then these technologies may be utilized by instructors to positively influence the learning process. Also, instructors’ preferences for specific technologies should be investigated regarding how much of an influence they have on which technologies they use, how they use them, and the frequency of their use in the classroom. These three components (technology, student preferences, and instructor preferences) all interrelate as they influence the teaching/learning process. All of these areas should be investigated further if a more in-depth analysis of how technology influences learning is to be assessed.

New technological innovations will provide instructors and students alike with tremendous opportunities to enhance student learning. Instructors must make these technologies available to all students by providing a number of different learning options that take into account a variety of learning styles. If instructors simply use these technologies because they are unique and exciting, sound and effective pedagogical principles that should provide the basis of all instruction are completely ignored (Ahola-Sidaway & McKinnon, 1999; Brouwer, 1996; Grasha & Yangarber-Hicks, 2000; Rintala, 1998). Additional studies of this nature will help to solidify the perceived, and often assumed, positive effects of all educational technologies as they are used for classroom instruction.

The task of trying to understand the future influences of instructional technologies is a challenging one since technology is shaped by so many factors associated with both faculty and students. Rintala (1998) and Brouwer (1996) each warned against accepting all new
technologies into the educational framework without investigating whether they are appropriate and useful. All too often instructors blindly use new technologies because of perceived benefits for the students and the educational process, but additional empirical evidence is needed to identify whether students are receiving these expected benefits. In addition, while the focus on learning styles is extremely important, studies on the dynamics involved in the various teaching styles are also needed (Grasha & Yangarber-Hicks, 2000). Lastly, it would be interesting to examine how students with different learning styles compare the uses of technology to traditional classroom activities (e.g. e-mail questions/discussions versus classroom interaction). This approach might yield differences among the learning styles and may lead to ways to further enhance learning through technology.

References


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.

**Every submission must include a cover page preceding the article with the following information:**
Title of article
For each author:
- Name and affiliation
- Postal address
- e-mail address
- telephone number

Abstract (less than 100 words)
Keyword list related to the submission (less than eight words or short phrases)

This cover page should be followed by the article formatted according to the JoSoTL Style Sheet (available in either .doc or .pdf format).

Accepted Work

Authors will be required to sign a [Copyright Agreement](#) with the Trustees of Indiana University. Authors must be prepared to sign this agreement upon acceptance of their work and prior to
publication in the Journal. For more information regarding copyright, please see the statement of copyright and terms of use.

If you have any questions regarding the submission policy, please e-mail Kimberly Olivares (JoSoTL Production Coordinator) or call her at 317-274-0086, or contact a member of the Editorial Board.
Editorial Board

All members of the JoSoTL Editorial Board are affiliated with FACET, the Faculty Colloquium on Excellence in Teaching, at Indiana University.

Don Coffin  
Associate Professor of Economics  
dcoffin@iun.edu  
Division of Business and Economics  
Indiana University Northwest  
219.980.6913

Eugenia Fernandez  
Associate Chair of Computer & Information Technology  
efernand@iupui.edu  
http://www.engr.iupui.edu/~efernand  
Purdue School of Engineering and Technology  
Indiana University Purdue University Indianapolis  
317.274.6794

Joan E. Lafuze  
Professor of Biology  
jlafuze@indiana.edu  
Instructional Programs  
Indiana University East, Richmond, IN  
765.973.8246

David J. Malik  
Chancellor's Professor of Chemistry  
dmalik@iun.edu  
http://chem.iupui.edu/Faculty/malik.html  
School of Science, Indiana University Purdue University Indianapolis

Julie Saam  
Assistant Dean for Program Review and Graduate Studies  
jsaam@iuk.edu  
Division of Education  
Indiana University Kokomo, IN  
765.455.9302

Ellen A. Sigler  
Professor and Department Head  
elsigler@wcu.edu  
Educational Leadership  
Western Carolina University  
828.227.7415

Carol Hostetter  
Director, The Mack Center for Inquiry on Teaching and Learning  
chostett@indiana.edu  
School of Social Work  
Indiana University Bloomington  
812.855.4427
Style Sheet for the
Journal of the Scholarship of Teaching and Learning

John Dewey¹ and Marie Curie²

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.

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.

¹Department of Educational Philosophy, Indiana University Northwest, 3400 Broadway, Gary, IN 46408, jdewey@iun.edu.
²Institut Pasteur, University of Paris, 75015 Paris, France.
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.**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Length, inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point</td>
<td>1/12</td>
</tr>
<tr>
<td>Pica</td>
<td>1/6</td>
</tr>
</tbody>
</table>

Figures should have their captions follow the image. Captions should be single-spaced, with title in bold. Additional text should not be in bold. The Editorial staff may adjust layout to allow optimal use of space.

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

Acknowledgements should identify grants or other financial support for this research by agency (source) and number (if appropriate). You may also acknowledge colleagues that have played a significant role in this research.

Appendix

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

Appendix 1. The Title of the Appendix.

References


Editorial Board Members

Don Coffin  
Associate Professor of Economics  
dcoffin@iun.edu  
Indiana University Northwest  
219.980.6913

David J. Malik  
Chancellor’s Professor of Chemistry and Chemical Biology, IUPUI  
Executive Vice Chancellor of Academic Affairs, Indiana University Northwest  
FACET Director, Indiana University  
dmalik@iupui.edu  
317.278.3314

Eugenia Fernandez  
Associate Professor & Chair of Computer, Information & Leadership Technology  
efernand@iupui.edu  
Indiana University Purdue University Indianapolis  
317.274.6794

Joan E. Lafuze  
Professor of Biology  
jlafuze@indiana.edu  
Indiana University East  
765.973.8246

Julie Saam  
Associate Professor of Secondary Science Education  
Interim Dean of Education  
jsaam@iuk.edu  
Indiana University Kokomo  
765.455.9302

Ellen A. Sigler  
Professor and Department Head of Educational Leadership and Foundations  
esigler@wcu.edu  
Western Carolina University  
828.227.7415

Carol Hostetter  
Associate Professor of Social Work  
Director, The Mack Center for Inquiry on Teaching and Learning  
chostett@indiana.edu  
Indiana University Bloomington  
812.855.4427

Contact Info for the Journal

JoSoTL Editorial Office

Indiana University Purdue University Indianapolis  
755 W. Michigan St, UL 1180D  
Indianapolis, IN 46202

josotl@iupui.edu