Chapter 3
Inventorying the Scholarship of Teaching and Learning Literature

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In his 1990 volume *Scholarship Reconsidered: Priorities for the Professoriate*, Boyer delineated the importance of expanding the definition of scholarship beyond the predominate emphasis on the scholarship of discovery to include three other domains of scholarship: the scholarships of application, integration, and teaching. Of the four domains, the scholarship of teaching invokes the most attention in the literature (Braxton, Luckey, & Helland, 2002).

This scholarly attention includes such matters as defining the goals and objectives of the scholarship of teaching, offering conceptual perspectives on this domain of scholarship, and determining the extent to which faculty publish scholarship reflective of this scholarship domain. In addition to Boyer (1990), scholars such as Rice (1991), Hutchings and Shulman (1999), Kreber (2002) and Braxton et al. (2002) offer viewpoints on the goals and objectives of the scholarship of teaching. To provide some direction in this matter, Braxton et al. (2002) posit the goal of the scholarship of teaching as the development and improvement of pedagogical practice. Moreover, Hutchings and Shulman (1999) assert that the scholarship of teaching is a process through which the profession of teaching itself advances as it transpires with one eye on improvement of one's own teaching and the other on the practice of teaching. Hutchings and Shulman also posit that the scholarship of teaching requires a focus on student learning by addressing such questions as how

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learning occurs and under what conditions students learn. These questions link teaching and learning, which gives rise to the term SOTL, or the Scholarship of Teaching and Learning.

Conceptual perspectives on the scholarship of teaching and learning include formulations that situate this form of scholarship within the context of social action systems. Paulsen and Feldman (1995) contend that scholarship constitutes a social action system. For their existence and effectiveness, social action systems require the performance of four functional imperatives: adaptation, goal attainment, pattern maintenance, and integration (Parsons & Smelser, 1956; Parsons & Platt, 1973). Paulsen and Feldman posit the scholarship of teaching as performing the functional imperative of adaptation of scholarship as a system of social action. Adaptation entails interactions with the external environment to acquire resources to develop and maintain the social action system (Parsons & Platt, 1973). The scholarship of teaching contributes to adaptation by exchanging the transmission of knowledge for student enrollments (Paulsen & Feldman, 1995).

Moreover, Paulsen and Feldman (2006) extend this earlier work by conceptualizing the scholarship of teaching as a distinct system of social action. They present a model of the scholarship of teaching and learning as social action systems comprised of aspects of teaching that perform each of the four functional imperatives previously delineated (Paulsen & Feldman, 2006). Paulsen and Feldman present this model as an analytical framework for the clarification, organization and discussion of the literature of the scholarship of teaching and learning.

Further conceptual approaches to the scholarship of teaching and learning include Weimer's (2006) *Enhancing Scholarly Work on Teaching and Learning: Professional Literature that Makes a Difference.* In this landmark book, Weimer delineates a classification schema to array published work on the scholarship of teaching and learning, or as she puts it, "pedagogical scholarship" (p. 39). Through her own reading and analysis, Weimer delineates various approaches used by practitioners to describe and understand teaching and learning in the published literature on this topic. She contends, "To advance our understanding of scholarly work on teaching and learning we need many thoughtful perspectives on its structure (Weimer, 2006, p. 40)". In a subsequent section of this chapter, we describe the various approaches delineated by Weimer (2006).

On a more concrete level Braxton et al. (2002) empirically addressed the question of the extent to which faculty publish works associated with each of the four domains of scholarship delineated by Boyer including the scholarship of teaching. Another empirical piece focused on the institutional affiliations of faculty members who published articles in four teaching-focused journals (Henderson & Buchanan, 2007). Weimer's (2006) work described above also constitutes an empirical treatment of the scholarship of teaching and learning as she provides examples of published works that exemplify the approaches to classifying such scholarship she identified.

Beyond such macro-level attention to the scholarship of teaching and learning, discipline-specific interest in the Scholarship of Teaching and Learning (SOTL) has been one of the major driving forces behind this field's growth (Healey, 2000), but there are few broad, cross-discipline investigations into the nature of the types of

scholarship that are published in this literature. Instead, most of the literature still focuses on setting the boundary for what is considered to be SOTL or what the implications of SOTL should be (Gilpin & Liston, 2009). Additionally, Gurung & Schwartz (2010, p. 3) argue that SOTL research has entered its third wave, and as such, there exists a "need to situate all the myriad studies of pedagogical research in a common context." In short, researchers in the SOTL community should ask, "what kinds of research are being pursued, where is this research heading, and why [?]" (Woodhouse, 2010, p. 5).

SOTL researchers in some disciplines—namely sociology—have endeavored to review the work in their field and classify the types of scholarship. Paino, Blankenship, Grauerholz, & Chin (2012) reviewed 25 years of articles in *Teaching Sociology* to update and extend research by Baker (1985) and Chin (2002) on whether the sociology SOTL literature included empirically rigorous evaluations, who was publishing SOTL articles, and whether there was a focus on assessment.

More than 25 years have transpired since the publication of Boyer's (1990) *Scholarship Reconsidered: Priorities for the Professoriate* and more than 10 years have passed since the publication of Weimer's *Enhancing Scholarly Work on Teaching and Learning: Professional Literature that Makes a Difference* (2006). The number of teaching-focused journals also now approximates 50 journals. These particulars strongly indicate a need to take stock of the literature on the scholarship of teaching and learning. In addition to these particulars, the calls for such stocktaking by scholars such as Paulsen and Feldman (2006) and Weimer (2006) reinforce the need for such an appraisal of the SOTL or as Weimer calls it "pedagogical scholarship."

We contend that the first step in such a stocktaking process should take the form of an inventory of the SOTL literature. An inventory of this literature should precede efforts to summarize the contents of this literature given the uncertain properties of this body of work. Consequently, an inventory of the literature of the scholarship of teaching and learning (SOTL) or pedagogical scholarship constitutes the purpose of this chapter. We use the terms SOTL and pedagogical scholarship interchangeably throughout this chapter.

3.1 Chapter Overview

This inventory takes the form of a review of articles published over a span of 5 years between 2012 and 2016 in four teaching-focused journals. The four journals we reviewed include *Bioscience*: *Journal of College Biology Teaching* (biology), *The Journal of Chemical Education* (chemistry), *Teaching History* (history) and *Teaching Sociology* (sociology). We reviewed only articles focused on undergraduate instruction in higher education. We did not review editorials, letters, news items, or other similar types of writings. The four academic disciplines represented by these four journals correspond to the four academic disciplines used by Braxton et al. (2002) in their research on faculty engagement in Boyer's four domains of

scholarship including the scholarship of teaching. Academic disciplines vary in terms of their level of consensus on such matters as theoretical orientation, research methods, and the importance of various research questions to the advancement of the discipline (Biglan, 1973; Kuhn, 1962, 1970; Lodahl & Gordon, 1972). Biology and chemistry stand as high consensus disciplines whereas history and sociology constitute low consensus disciplines. However, all four of these disciplines are pure in their orientation (Biglan, 1973).

From their extensive review of the literature on academic disciplines, Braxton and Hargens (1996) concluded that low consensus disciplines are more oriented toward teaching than their counterparts are in high consensus disciplines. This greater orientation toward teaching finds expression in more time spent on teaching, a greater interest in teaching, and an affinity for teaching activities and practices designed to improve undergraduate education (Braxton, 1995; Braxton & Hargens, 1996; Braxton, Olsen & Simmons, 1998). A recent update of this research—using student perceptions instead of faculty self-reports of use of good practices—similarly concluded that students in low consensus disciplines report greater faculty use of prompt feedback and setting high expectations than those in high consensus disciplines; however, students also reported that faculty in high consensus disciplines make greater use of cooperative learning than their counterparts in low consensus disciplines (Kilgo, Culver, Young & Paulsen, 2017). Given such disciplinary differences, the articles published in these four teaching-focused journals may differ according to their approach to the scholarship of teaching and learning.

We restrict this inventory to a classification of the articles we reviewed in the above four teaching-oriented journals over the 5-year period from 2012–2016. Given that an inventory stands as the purpose this chapter, we do not engage in the scholarship of integration, as we do not place the content of these articles into a larger intellectual pattern (Boyer, 1990) nor do we integrate the content of these articles into a large body of concepts and facts (Halpern et al., 1998). The outcome of this inventory should provide scholars with the foundation for engagement in a scholarship of integration of such content. In the next section, we describe the process we used to classify the articles we reviewed.

3.1.1 The Classification of the Articles

We previously noted that Weimer (2006) demarcates approaches to describe and understand the published literature of pedagogical scholarship. She makes a distinction between "wisdom of practice scholarship" and "research scholarship". Weimer states that wisdom of practice scholarship emanates from the experiences of practitioners as "faculty learn about teaching as they teach" (2006, p. 40). She delineates four different approaches to wisdom of practice scholarship: personal accounts of change, recommended-practices reports, recommended-content reports, and personal narratives (Weimer, 2006). In contrast, research scholarship entails the

use of "established research protocols" to study teaching and learning (Weimer, 2006, p. 42). Research scholarship includes quantitative investigations, qualitative studies and descriptive research (Weimer, 2006).

In order to ensure reliable classification of articles in our content analysis, the coding authors worked collaboratively to ensure a systematic classification of elements of text. After the development of an initial template based on the wisdom-of-practice scholarship and research scholarship approaches described by Weimar (2006), we calculated inter-coder reliability estimates for individually-coded articles across the journals. Initial reliability was not up to standard, so the template was edited to be more specific (Tables 3.1a and 3.1b), in order to allow for standardized review and classification of the article and analysis types. We derived the characteristics and words, phrases, and operatives based on the texts of the articles that we had coded and discussed to that point. Our reading was guided by the questions: What does the author intend for other faculty to learn from this article? How did they analyze data in order to arrive at these recommendations?

The various classifications for type of article include Personal Account of Change, Recommended-Practices Report, Recommended-Content Report, and Personal Narrative. In a Personal Account of Change, the author describes a change to a curricular or pedagogical policy or practice (Weimer, 2006). Recommended-Practices Reports describe instructional methods for a course or discipline (Weimer, 2006). A Recommended-Content Report endorses particular topics, readings, or units for other faculty members to include in their courses (Weimer, 2006). In Personal Narratives, authors reflect upon their teaching with a critical eye toward their practice and content (Weimer, 2006). Table 3.1a exhibits the words, phrases, and operatives the coding team used to classify an article into one of these four types of articles.

These types of articles employed a number of distinct methods of analysis, including quantitative, qualitative, and mixed methods analyses, as well as descriptive reporting, literature reviews, and personal reflection. Quantitative analyses leveraged experimental or quasi-experimental design in order to estimate the effect of practice or content (Weimer, 2006). Qualitative analyses examined phenomena in their natural environments and employed analyses in a positivist or interpretative manner (Weimer, 2006). An article was coded as mixed methods when it employed both quantitative and qualitative methods of evaluation. Descriptive articles used data in general and survey data in particular to describe phenomena in a non-evaluative way (Weimer, 2006). Literature reviews compiled and commented on the extant literature on practice or content. Personal reflection articles detailed the authors' impressions or interpretations of practice or content in a non-empirical fashion. Table 3.1b presents the words, phrases, and operatives the coding team used to classify an article into one of these six types of analyses.

In addition to type of article and type of analyses, we also classified articles according to their topical focus. We derived various topics from the delineation of publications reflective of the goals of the scholarship of teaching by Braxton et al. (2002). These focal topics include a new teaching approach developed by the author and alterations to a teaching approach. After initial coding, the coding team edited

for specificity and added a number of subcategories to give more specificity to the elements of the various topical foci of the articles for classification.

As indicated by Tables 3.1a and 3.1b, our classification constitutes a refinement of Weimer's (2006) classification schema. Both the types of articles and types of analyses stand as refinements.

Table 3.1a Characteristics utilized for classification of study type

Type of article			
Personal account of change	Recommended-practices report	Recommended-content report	Personal narrative
Characteristics			
Description of change in policy or practice.	Recommends instructional methods for a course or discipline.	Recommends content for a particular course or discipline.	Reflective or critical account of growth or evolution. May take a position.
Words, Verbs, Operatives			
Adaptation	Pedagogy	Illustrate	Reflection
Application	Method	Demonstrate	Critique
Replication	Practice	Source	Growth
			Development
			Evolution
			Advocacy
			Emotions

Table 3.1b Characteristics utilized for classification of analysis type

Type of analysis					
Quantitative	Qualitative	Mixed methods	Descriptive	Literature review	Personal reflection
Characteristics					
Experimental or quasi-experimental design intended to estimate effect.	Examination of phenomenon in naturalistic setting. Data analyzed in positivist or interpretive manner.	Study employs both quantitative analysis and qualitative evaluation.	Data employed to report non-evaluative description of a phenomenon.	Compilation and critique of the extant literature. May take a position.	Non-empirical reflection of author on the subject of study.
Words, Verbs, Operatives					
Experiment	Interview		Survey	Existing	Impression
Quasi-experiment	Focus group		Non-evaluative	Body of literature	Interpretation
Pre-test/post-test	Observation		Describe	Status	Emotion
	Survey		Explain	Critique	

3.1.2 Inter-Coder Reliability

Based on the classification of the SOTL literature described above, we created a codebook with mutually exclusive categories for type of article and type of analysis. This codebook made use of Tables 3.1a and 3.1b. To ensure reliability among the three coders, we randomly sampled ten articles for review by all coders. Hallgren (2012) recommends the Fleiss's kappa statistic to measure the interrater reliability when there are more than two coders and the data are categorical (Fleiss, 1971). The measure of agreement was low in the first review, so the coders met to discuss and review the descriptions of the categories before randomly sampling another ten articles for review. In this second review, the Fleiss's kappa statistic for type of article was 0.497 and for the type of analysis, it was 0.713. This indicates that there was moderate agreement for the type of article and substantial agreement for type of analysis. During the coding process, the three reviewers held back any article that did not clearly fit into one of the categories, and we discussed as a group how to code those articles. Finally, one reviewer coded approximately 92% of the articles.

3.1.3 Description of Our Data Base

Our database consists of 425 coded articles. The number of coded articles ranges from a low of 14 for *Teaching History* to a high of 295 for the *Journal of Chemical Education*. We coded 18 articles published in *Bioscene* and 98 articles published in *Teaching Sociology*. The *Journal of Chemical Education* is published each month whereas *Bioscene* and *Teaching History* are published twice a year. *Teaching Sociology* appears quarterly.

3.2 An Inventory of SOTL Scholarship

Type of article, type of analyses, and the type of analysis juxtaposed to type of article provide a basis for the delineation of the inventory of the literature of pedagogical scholarship or the scholarship of teaching and learning. We also address variation across the four teaching-focused journals by the type of article, the type of analysis, and the type of analysis juxtaposed to type of article. Because of Boyer's (1990) prescriptions for institutional emphasis on the scholarship of teaching, we also attend to the institutional affiliation of the first author of the coded articles by the type of article and across the four teaching-centered journals. We used the categories of the

2015 Carnegie Classification of Institutions to demarcate the institutional affiliation of the first author.

3.2.1 *Type of Article*

Recommended-Practices Reports prevail as the most frequent type of article appearing across the four teaching-focused journals used in this Inventory. Recommended-Practices Reports advocate instructional methods for a course or an academic discipline (Weimer, 2006). Weimer refers to this type of article as "advice-giving" (2006, p. 41). As indicated by Table 3.2, more than two-thirds (64.00%) of the articles coded stand as a recommended-practice report. Recommended-Content reports constitute the second most frequent type of article given that 29.00% of all articles coded fit this category of types of articles. The type of article recommends content for a particular course or academic discipline (Weimer, 2006). Table 3.2 also shows that personal narratives (3.00%) and personal accounts (2.00%) of change rarely appear.

This same pattern of frequencies obtains when we look at the type of articles published in each of the four SOTL journals. Table 3.3 shows that recommended-practices reports predominate in three of the four SOTL journals. Specifically, over

Table 3.2 Types of articles for all journals

Personal account of change	8 (2%)
Recommend-practices report	271 (64%)
Recommend-content report	124 (29%)
Personal narrative	10 (2%)
None of the above categories	12 (3%)
Total	425

Table 3.3 Types of studies for individual journals

	Bioscene	Journal of Chemical Education	Teaching History	Teaching Sociology
Personal account of change	1 (6%)	2 (1%)	1 (8%)	4 (4%)
Rrecommend-practices report	12 (61%)	191 (65%)	5 (36%)	63 (64%)
Recommend-content report	2 (11%)	93 (32%)	5 (36%)	24 (24%)
Personal narrative	1 (6%)	4 (1%)	2 (14%)	3 (3%)
None of the above categories	2 (11%)	5 (2%)	1 (8%)	4 (4%)
Total articles	18	295	14	98

Column percentages in parentheses

60% of the coded articles published in *Bioscene* (61.00%), the *Journal of Chemical Education* (65.00%) and *Teaching Sociology* (64.00%) stand as recommended practices reports. In contrast, more than a third (36.00%) of coded articles published in *Teaching History* are recommended-practices reports. Likewise, more than a third (36.00%) of the coded articles appearing in *Teaching History* stand as reports of recommended content. Moreover, about a third (32.00%) of articles published in the *Journal of Chemical Education* during the period of 2012 to 2016 and 24.00% of articles published in *Teaching Sociology* during this same period of time also prevail as recommended content reports. As indicated by Table 3.3, Personal Accounts of Change and Personal Narratives rarely appear in print in each of these four SOTL journals.

3.2.2 Type of Analysis

Weimer (2006) describes "research scholarship" as comprised of descriptive research, quantitative investigations, and qualitative investigations. For our analysis, we use these three categories of analysis, as well as literature review, personal reflection and mixed-methods. We acknowledge that mixed methods stands as a form of research scholarship. However, to be consistent with Weimer's depiction of "research scholarship" we do not include mixed methods within this category of types of analyses in our presentation of findings regarding types of analyses.

As indicated by Table 3.4, research scholarship (descriptive research, quantitative investigations, and qualitative investigations) dominates given that 81% of analyses used fit this category of analysis. More specifically, descriptive research constitutes the most frequently occurring type of analysis across the four SOTL journals as 63% of all coded articles used this type of analysis. Descriptive research analyses endeavor to describe or explain a particular phenomenon based on an analysis of survey results (Weimer, 2006). Weimer states that descriptive research stands as the "largest and most well-developed type of analysis" (Weimer, 2006, p. 43). Analyses that employ experimental or quasi-experimental designs constitute quantitative analyses. This particular type of analysis (11%) stands as the next most frequent type of analysis. Moreover, we also note that personal reflection occurs less

Table 3.4 Types of analyses for all journals

Quantitative	45 (11%)
Qualitative	31 (7%)
Mixed methods	19 (4%)
Descriptive	269 (63%)
Literature review	11 (3%)
Personal reflection	36 (8%)
None of the above categories	14 (3%)
Total	425

Table 3.5 Types of analyses for individual journals

	Bioscene	Journal of Chemical Education	Teaching History	Teaching Sociology
Quantitative	6 (33%)	28 (10%)	0	11 (11%)
Qualitative	0	13 (4%)	0	18 (18%)
Mixed methods	4 (22%)	4 (1%)	0	11 (11%)
Descriptive	6 (33%)	226 (77%)	0	37 (38%)
Literature Review	0	10 (3%)	1 (8%)	0
Personal reflection	2 (11%)	9 (3%)	8 (57%)	17 (17%)
None of the above categories	0	5 (2%)	5 (36%)	4 (4%)
Total articles	18	295	14	98

Column percentages in parentheses

frequently (8%) as do qualitative methods (7%). And analyses using mixed methods (4%) and literature reviews (3%) occur the least frequently.

A different picture emerges when we consider the distribution of the types of analysis across each of the four discipline-specific SOTL journals. Table 3.5 exhibits this distribution. For example, descriptive analyses prevail in the coded articles of the *Journal of Chemical Education* as more than three-fourths (77%) of articles fit this description. In contrast, personal reflections dominate as the type of analysis found in *Teaching History* given that we coded 57% of the articles in this journal as such. We also note that 36% of the coded articles of *Teaching History* fail to fit any of the types of analyses. Personal reflections rarely occur in *Bioscene* (11%) and *The Journal of Chemical Education* (3%).

The type of analyses described in articles appearing in *Bioscene* and *Teaching Sociology* show more variation than the other two SOTL journals. To elaborate, Table 3.5 indicates that the modal percentage of articles published in *Bioscene* take the form of quantitative (33%) and descriptive (33%) type analyses. Mixed methods also account for 22% of such articles. More variation obtains in *Teaching Sociology* as the proportion of articles ranges from a low of 4% for articles that fail to align with any of the other categories of analyses through 11% for quantitative analyses to a high of 38% for descriptive analyses.

Literature reviews as a form of analysis occur rarely across the four SOTL journals. Specifically, none of the coded articles of *Bioscene* or *Teaching Sociology* used literature reviews as a form of analysis. Nevertheless, literature reviews appear but very infrequently (8%) in *Teaching History* and *the Journal of Chemical Education* (3%).

3.2.3 Type of Analysis Juxtaposed to Type of Article

Table 3.6 juxtaposes the type of article with the type of analysis employed. Table 3.6 shows that descriptive analyses predominate as the analytical foundation for

Table 3.6 Cross tabulations for type of study and type of analysis, full sample

	None of the above categories	Personal account of change	Personal narrative	Recommended-content report	Recommended-practices report	Total
None of the above categories	10	0	0	4	0	14
	83.33	0.00	0.00	3.23	0.00	3.29
Descriptive	0	2	5	78	184	269
	0.00	25.00	50.00	62.90	67.90	63.29
Literature review	0	0	0	10	1	11
	0.00	0.00	0.00	8.06	0.37	2.59
Mixed methods	0	0	0	4	15	19
	0.00	0.00	0.00	3.23	5.54	4.47
Personal reflection	0	2	5	10	19	36
	0.00	25.00	50.00	8.06	7.01	8.47
Qualitative	0	1	0	15	15	31
	0.00	12.50	0.00	12.10	5.54	7.29
Quantitative	2	3	0	3	37	45
	16.67	37.50	0.00	2.42	13.65	10.59
Total	12	8	10	124	271	425
	100.00	100.00	100.00	100.00	100.00	100.00
N	425					

Column percentages listed under proportions

recommended-practice reports given that more than two thirds (67.90%) of recommended-practice reports make use of descriptive analyses. Quantitative analyses (13.65%) or the use of experimental or quasi-experimental design stand as the second most frequent type of analysis used in recommended practice reports. As previously stated, Weimer (2006) viewed research scholarship as comprised of descriptive research, quantitative investigations, and qualitative investigations. If we combine these three types of analyses using the percentages exhibited in Table 3.6, the overwhelming majority (87.10%) of recommend-practice reports make use of research scholarship. In stark contrast, less than ten percent (7.01%) of recommended-practice reports spring from personal reflections. Descriptive analyses also prevail as the basis for recommended-content report. As indicated by Table 3.6 about two-thirds (62.90%) of recommended-content reports emanate from descriptive analyses. Moreover, like recommended practice reports, research scholarship (descriptive research, quantitative and qualitative investigations combined) provides the basis for the vast majority (77.42%) of recommended content reports. However, personal reflection infrequently (8.06%) underlies recommended content reports.

Tables 3.7, 3.8, 3.9, and 3.10 exhibit the juxtaposition of type of analysis for different types of articles for each of the four discipline-specific SOTL journals.

Table 3.7 Cross tabulations for type of study and type of analysis, *Bioscene*

	None of the above categories	Personal account of change	Personal narrative	Recommended-content report	Recommended-practices report	Total
Descriptive	0	0	1	1	4	6
	0.00	0.00	100.00	50.00	33.33	33.33
Mixed Methods	0	0	0	1	3	4
	0.00	0.00	0.00	50.00	25.00	22.22
Personal reflection	0	0	0	0	2	2
	0.00	0.00	0.00	0.00	16.67	11.11
Quantitative	2	1	0	0	3	6
	100.00	100.00	0.00	0.00	25.00	33.33
Total	2	1	1	2	12	18
	100.00	100.00	100.00	100.00	100.00	100.00
N	18					

Column percentages listed under proportions

Table 3.8 Cross tabulations for type of study and type of analysis, *Journal of Chemical Education*

	None of the above categories	Personal account of change	Personal narrative	Recommended-content report	Recommended-practices report	Total
None of the above categories	5	0	0	0	0	5
	100.00	0.00	0.00	0.00	0.00	1.69
Descriptive	0	1	4	68	153	226
	0.00	50.00	100.00	73.12	80.10	76.61
Literature review	0	0	0	10	0	10
	0.00	0.00	0.00	10.75	0.00	3.39
Mixed Methods	0	0	0	0	4	4
	0.00	0.00	0.00	0.00	2.09	1.36
Personal reflection	0	0	0	7	2	9
	0.00	0.00	0.00	7.53	1.05	3.05
Qualitative	0	0	0	6	7	13
	0.00	0.00	0.00	6.45	3.66	4.41
Quantitative	0	1	0	2	25	28
	0.00	50.00	0.00	2.15	13.09	9.49
Total	5	2	4	93	191	295
	100.00	100.00	100.00	100.00	100.00	100.00
N	295					

Column percentages listed under proportions

Table 3.9 Cross tabulations for type of study and type of analysis, *Teaching History*

	None of the above categories	Personal account of change	Personal narrative	Recommended-content report	Recommended-practices report	Total
None of the above categories	1	0	0	4	0	5
	100.00	0.00	0.00	80.00	0.00	35.71
Literature review	0	0	0	0	1	1
	0.00	0.00	0.00	0.00	20.00	7.14
Personal reflection	0	1	2	1	4	8
	0.00	100.00	100.00	20.00	80.00	57.14
Total	1	1	2	5	5	14
	100.00	100.00	100.00	100.00	100.00	100.00
N	14					

Column percentages listed under proportions

Table 3.10 Cross tabulations for type of study and type of analysis, *Teaching Sociology*

	None of the above categories	Personal account of change	Personal narrative	Recommended-content report	Recommended-practices report	Total
None of the above categories	4	0	0	0	0	4
	100.00	0.00	0.00	0.00	0.00	4.08
Descriptive	0	1	0	9	27	37
	0.00	25.00	0.00	37.50	42.86	37.76
Mixed methods	0	0	0	3	8	11
	0.00	0.00	0.00	12.50	12.70	11.22
Personal reflection	0	1	3	2	11	17
	0.00	25.00	100.00	8.33	17.46	17.35
Qualitative	0	1	0	9	8	18
	0.00	25.00	0.00	37.50	12.70	18.37
Quantitative	0	1	0	1	9	11
	0.00	25.00	0.00	4.17	14.29	11.22
Total	4	4	3	24	63	98
	100.00	100.00	100.00	100.00	100.00	100.00
N	98					

Column percentages listed under proportions

Table 3.7 pertains to *Bioscene*, Table 3.8 concerns the *Journal of Chemical Education*, Table 3.9 relates to *Teaching History* and Table 3.10 focuses on *Teaching Sociology*.

For *Bioscene,* descriptive research (33.30%) and quantitative investigations (25.00%) together account for nearly 60% (58.30%) of the type of analyses that provide the underpinning for recommended-practice reports published in this journal. Moreover, two of the twelve recommended-practice reports published in *Bioscene* stems from personal reflection. For recommended-content reports, mixed methods and descriptive research supply the basis for this type of article published in *Bioscene.* However, we note from Table 3.7 that only two recommended-content reports were published in this journal during the 5 year period used.

Table 3.8 shows that descriptive research (80.10%) and quantitative investigations (13.09%) comprise the overpowering proportion of the type of analyses that furnish the footing for recommended-practice reports published in the *Journal of Chemical Education*. Of the 93 articles in the *Journal of Chemical Education* coded as recommended-content reports, 81.70% of them use a type of research scholarship (descriptive research, quantitative investigation, or qualitative investigation) as their empirical foundation. Moreover, personal reflections rarely (7.53%) underpin recommended content reports.

Of the five recommended practice reports published in *Teaching History,* personal reflection underpins four of these five articles and a literature review underlies the last of these five articles. Of the five recommended content articles appearing in this journal, one of them springs from a personal reflection. None of the categories of various types of analyses represented in this Inventory provided the basis for the remaining four recommended content articles. Table 3.9 provide support for these observations.

In the case of *Teaching Sociology*, a sizeable proportion (69.90%) of the recommended practices reports published in this journal make use of research scholarship (descriptive research, quantitative investigations and qualitative investigations) as their basis. However, almost one-fifth (17.46%) of such reports originate from personal reflection. Research scholarship (descriptive research, quantitative investigations and qualitative investigations) also provides the empirical rock bed for the vast majority (79.20%) of recommended content reports published in *Teaching Sociology*. In contrast to recommended practice reports, only two of the 24 articles coded as recommended content reports arise from personal reflection. Table 3.10 supports these observations.

3.2.4 Institutional Affiliation of Authors

In *Scholarship Reconsidered: Priorities for the Professoriate* (1990), Boyer stressed the importance of colleges and universities defining their missions and aligning their faculty reward systems with this mission. Accordingly, Boyer (1990) asserted that the domain of scholarship emphasized by a college or university should align with its espoused mission. Although he contended that some faculty might engage in all four domains of scholarship, he viewed the scholarship of teaching as befitting the teaching-oriented mission of liberal arts colleges (baccalaureate colleges and universities). Boyer also viewed the scholarship of teaching as suitable for comprehensive colleges and universities (master's colleges and universities).

We coded the institutional affiliation of the first authors of the coded articles using categories of the Carnegie Classification of Institutions (2015). We used all three levels of the category of doctoral universities: R1-highest research activity, R2-higher research activity, and R3-moderate research activity. For the institutional categories of masters colleges and universities, baccalaureate colleges and universities, associate's colleges we collapsed the subcategories of these categories and assigned only the broader institutional category to the first author.

Because recommended practice reports and recommended content reports stand as the dominant types of articles among the 425 coded articles of this Inventory, we center our attention on the institutional affiliation of the first authors of these two types of articles. Table 3.11 exhibits the cross tabulation of type of article with the institutional type of the first author.

We note from Table 3.11 that first authors at doctoral granting universities with the highest level of research activity publish the greatest percentage of recommended practice articles (28.41%), followed by first authors at primarily master's granting universities (19.56%). First authors at primarily bachelor's granting institutions publish less than 10% of recommended practice reports (9.23%). If we combine the three subcategories of doctoral universities, we find that first authors at such universities produce 45% of the recommended practice reports.

For recommended content reports, we observe that first authors at primarily master's granting universities publish the greatest proportion (20.16%) of such articles followed very closely by first authors at doctoral granting universities with the highest level of research activity (18.55%). First authors at primarily bachelor's granting institutions (12.9%) produce a slightly greater percentage of recommended content reports than they do recommended practice reports. However, by aggregating the three subcategories of doctoral universities, we find that first authors at such universities produce 35.48% of recommended content articles.

We also note from Table 3.11 that first authors from doctoral universities of higher and highest levels of research activity (3 articles) are as likely to publish personal accounts of change as are authors from primarily bachelor's and master's granting institutions (3 articles) combined. Moreover, first authors from primarily bachelor's and master's granting institutions combined publish one more personal

Table 3.11 Cross tabulations for type of article and institution type of first author, full sample

	Personal account of change	Personal narrative	Recommended-content report	Recommended-practices report	None of the above categories	Total
Associate's granting institutions	0	0	2	4	1	7
	0.00	0.00	1.61	1.48	8.33	1.65
Primarily bachelor's granting institutions	1	1	16	25	0	43
	12.50	10.00	12.90	9.23	0.00	10.12
Primarily master's granting universities	2	4	25	53	1	85
	25.00	40.00	20.16	19.56	8.33	20.00
Doctoral universities—moderate research	0	0	8	17	0	25
	0.00	0.00	6.45	6.27	0.00	5.88
Doctoral universities—higher research	1	2	13	28	1	45
	12.50	20.00	10.48	10.33	8.33	10.59
Doctoral universities—highest research	2	2	23	77	8	112
	25.00	20.00	18.55	28.41	66.67	26.35
International university or other institution	2	1	28	59	1	91
	25.00	10.00	22.58	21.77	8.33	21.41

US Company or Governmental institution	0	0	9	4	0	13
	0.00	0.00	7.26	1.48	0.00	3.06
Special focus institution	0	0	0	4	0	4
	0.00	0.00	0.00	1.48	0.00	0.94
Total	8	10	124	271	12	425
	100.00	100.00	100.00	100.00	100.00	100.00
N	425					

Column percentages listed under counts

Table 3.12 Cross tabulations for journal and institution type of first author, full sample

	Bioscene	Journal of Chemical Education	Teaching History	Teaching Sociology	Total
Associate's granting institutions	0	4	0	3	7
	0.00	1.36	0.00	3.06	1.65
Primarily bachelor's granting institutions	4	28	1	10	43
	22.22	9.49	7.14	10.20	10.12
Primarily master's granting universities	7	49	6	23	85
	38.89	16.61	42.86	23.47	20.00
Doctoral universities—moderate research	1	15	1	8	25
	5.56	5.08	7.14	8.16	5.88
Doctoral universities—higher research	1	28	1	15	45
	5.56	9.49	7.14	15.31	10.59
Doctoral universities—highest research	3	75	1	33	112
	16.67	25.42	7.14	33.67	26.35
International university or other institution	1	84	0	6	91
	5.56	28.47	0.00	6.12	21.41
US company or Governmental institution	0	9	4	0	13
	0.00	3.05	28.57	0.00	3.06
Special focus institution	1	3	0	0	4
	5.56	1.02	0.00	0.00	0.94
Total	18	295	14	98	425
	100.00	100.00	100.00	100.00	100.00
N	425				

Column percentages listed under proportions

narrative article (5 articles) than do first authors from doctoral universities from higher and highest levels of research activity (4 articles).

Institutional affiliation of authors of articles published in each of the four teaching-focused journals used herein shapes another pertinent focus of our attention. Table 3.12 displays a cross tabulation of the four journals by institutional affiliation of the first author.

For *Bioscene,* first authors at primarily bachelor's (n = 4) and primarily master's granting universities (n = 7) generated 11 of the 18 coded articles of this journal. First authors at doctoral universities of all three types combined produced another five articles. Table 3.12 supports these observations.

By aggregating the three subcategories of doctoral universities, we learn that first authors at such universities produce almost 40% (39.99%) of the coded articles of the *Journal of Chemical Education*. From Table 3.12, we also notice that first authors at primarily bachelors and primarily master's granting universities pooled together generated slightly more than 25% of these articles.

Of the 14 coded articles of *Teaching History,* first authors at primarily bachelor's and primarily master's granting universities merged together produced seven of these articles. First authors at doctoral universities of all three types conjoined produced another three articles. Table 3.12 supports these assertions.

First authors at doctoral universities of the highest level of research activity produced more than a third (33.67%) of the articles published by *Teaching Sociology*. Moreover, first authors at primarily bachelors and primarily master's granting universities combined produced an identical proportion (33.67%) of these articles. However, if we aggregate the three subcategories of doctoral universities the first authors of these universities generate the majority of articles (57.14%) appearing in *Teaching Sociology*. These observations find support in Table 3.12.

Having considered the types of articles, types of analyses, types of analyses juxtaposed to the types of articles, and the institutional affiliation of authors of the coded articles, we turn our attention to the topical focus of articles. The topics pursued by the articles we coded constitute possible candidates for engagement in a scholarship of integration centered on the contents of these articles. We provide further elaboration in the section that follows.

3.2.5 Topical Focus of Articles

Under the section "Classification of Articles," we delineate the possible topical foci of articles published in SOTL journals. Of these possible foci, we center our attention on a report of a new teaching approach, a report on author-implemented practice or content, and a report on alterations made to a teaching approach as emphases of central importance to the scholarship of teaching and learning. We view them of central importance because of their congruence with the goal of the scholarship of teaching and learning as the development and improvement of pedagogical practice (Braxton et al., 2002). Put differently, new teaching approaches, author-implemented practices, and alterations to a teaching approach work towards the development and improvement of pedagogical practice.

Moreover, we present these three teaching initiatives as candidates for a scholarship of integration centered on articles that describe them. As stated elsewhere in this chapter, the scholarship of integration entails the placement of the content of these articles into a larger intellectual pattern (Boyer, 1990) as well as the integration of content of these articles into a large body of concepts and facts (Halpern et al., 1998). The outcomes of a scholarship of integration focused on these three teaching initiatives could result in the development of a knowledge base for pedagogical scholarship. However, such a knowledge base should rest on a rock-bed of empirical

Table 3.13 Crosstab for type of analysis and new teaching approach, full sample

	No	Yes	Total
None of the above categories	14	0	14
	100.00	0.00	100.00
	14.14	0.00	3.29
Descriptive	27	242	269
	10.04	89.96	100.00
	27.27	74.23	63.29
Literature review	6	5	11
	54.55	45.45	100.00
	6.06	1.53	2.59
Mixed methods	8	11	19
	42.11	57.89	100.00
	8.08	3.37	4.47
Personal reflection	14	22	36
	38.89	61.11	100.00
	14.14	6.75	8.47
Qualitative	13	18	31
	41.94	58.06	100.00
	13.13	5.52	7.29
Quantitative	17	28	45
	37.78	62.22	100.00
	17.17	8.59	10.59
Total	99	326	425
	23.29	76.71	100.00
	100.00	100.00	100.00
Observations	425		

Row percentages listed under raw counts; column percentages listed under row percentages

research or as Weimer calls it "research scholarship (2006, p.42)." Therefore, the following two questions emerge: What types of analyses underpin articles that report a new teaching approach, an author-implemented practice or alterations to a teaching approach? Does the type of analyses underlying such articles vary across the four SOTL journals? We address these questions in the following paragraphs.

3.2.5.1 New Teaching Approach

From Table 3.13, we note that 326 (76.71%) of the articles coded report a new teaching approach. We also observe that research scholarship (descriptive, quantitative investigations and qualitative investigations) underpins an immense proportion (88.34%) of those articles that report a teaching approach.

Table 3.14 Crosstab for type of analysis and subcategory new teaching approach in *Bioscene*

	No	Yes	Total
Descriptive	5	1	6
	83.33	16.67	100.00
	35.71	25.00	33.33
Mixed methods	2	2	4
	50.00	50.00	100.00
	14.29	50.00	22.22
Personal reflection	1	1	2
	50.00	50.00	100.00
	7.14	25.00	11.11
Quantitative	6	0	6
	100.00	0.00	100.00
	42.86	0.00	33.33
Total	14	4	18
	77.78	22.22	100.00
	100.00	100.00	100.00
Observations	18		

Row percentages listed under raw counts; column percentages listed under row percentages

In the case of Bioscene, only four of the coded articles report a new teaching approach. As indicated by Table 3.14, descriptive research (1 article), mixed methods (2 articles) and personal reflection (1 article) underlie these four articles.

The *Journal of Chemical Education* presents a different picture given that 259 of the 295 coded articles in this journal report a new teaching approach. Of these 259 articles, research scholarship (descriptive, quantitative investigations and qualitative investigations) supplies the underlying bases for 94.59% of these articles. Table 3.15 supports these assertions.

Only two of the 14 coded articles appearing in *Teaching History* report a new teaching approach. Personal reflection stands as the undergirding type of analysis for these two articles. Table 3.16 affords support for this observation.

For *Teaching Sociology,* 61 of the 98 coded articles published in this SOTL journal report a new teaching approach. Research scholarship (descriptive, quantitative investigations, and qualitative investigations) underpins more than two-thirds (68.85%) of these articles reporting a new teaching approach. However, slightly more than one fifth (21.31%) of these articles originates from personal reflection. Table 3.17 affords support for these observations.

3.2.5.2 Author—Implemented Practice

Of the 425 coded articles, Table 3.18 shows that 259 (60.94%) of them report an author-implemented practice. From Table 3.18, we also observe that research scholarship (descriptive, quantitative investigations and qualitative investigations)

Table 3.15 Crosstab for type of analysis and subcategory new teaching approach in *Journal of Chemical Education*

	No	Yes	Total
None of the above categories	5	0	5
	100.00	0.00	100.00
	13.89	0.00	1.69
Descriptive	14	212	226
	6.19	93.81	100.00
	38.89	81.85	76.61
Literature review	5	5	10
	50.00	50.00	100.00
	13.89	1.93	3.39
Mixed methods	1	3	4
	25.00	75.00	100.00
	2.78	1.16	1.36
Personal reflection	3	6	9
	33.33	66.67	100.00
	8.33	2.32	3.05
Qualitative	4	9	13
	30.77	69.23	100.00
	11.11	3.47	4.41
Quantitative	4	24	28
	14.29	85.71	100.00
	11.11	9.27	9.49
Total	36	259	295
	12.20	87.80	100.00
	100.00	100.00	100.00
Observations	295		

Row percentages listed under raw counts; column percentages listed under row percentages

provides the foundation for an immense proportion (85.72%) of these articles reporting an author-implemented practice.

For *Bioscene*, 12 of the 18 coded articles reports an author-implemented practice. Moreover, research scholarship (descriptive and quantitative investigations) affords the basis for more than two thirds (66.6%) of such articles. From Table 3.19, we also note personal reflection underlies one of these 12 articles that reports an author-implemented practice.

Almost all of the coded articles (97.1%) published in *The Journal of Chemical Education* that report an instructor-implemented practice rest on a foundation of research scholarship (descriptive, quantitative investigations and qualitative investigations). Moreover, a sizeable majority (58.31%) of the articles appearing in this Journal report an author-implemented practice. Table 3.20 affords support for these observations.

Articles that report an author-implemented practice account for 6 of the 14 coded articles published in *Teaching History*. In stark contrast to the *Journal of Chemical*

Table 3.16 Crosstab for type of analysis and subcategory new teaching approach in *Teaching History*

	No	Yes	Total
None of the above categories	5	0	5
	100.00	0.00	100.00
	41.67	0.00	35.71
Literature review	1	0	1
	100.00	0.00	100.00
	8.33	0.00	7.14
Personal reflection	6	2	8
	75.00	25.00	100.00
	50.00	100.00	57.14
Total	12	2	14
	85.71	14.29	100.00
	100.00	100.00	100.00
Observations	14		

Row percentages listed under raw counts; column percentages listed under row percentages

Table 3.17 Crosstab for type of analysis and subcategory new teaching approach in *Teaching Sociology*

	No	Yes	Total
None of the above categories	4	0	4
	100.00	0.00	100.00
	10.81	0.00	4.08
Descriptive	8	29	37
	21.62	78.38	100.00
	21.62	47.54	37.76
Mixed methods	5	6	11
	45.45	54.55	100.00
	13.51	9.84	11.22
Personal reflection	4	13	17
	23.53	76.47	100.00
	10.81	21.31	17.35
Qualitative	9	9	18
	50.00	50.00	100.00
	24.32	14.75	18.37
Quantitative	7	4	11
	63.64	36.36	100.00
	18.92	6.56	11.22
Total	37	61	98
	37.76	62.24	100.00
	100.00	100.00	100.00
Observations	98		

Row percentages listed under raw counts; column percentages listed under row percentages

Table 3.18 Crosstab for type of analysis and subcategory author-implemented practice, full sample

	No	Yes	Total
None of the above categories	14	0	14
	100.00	0.00	100.00
	8.43	0.00	3.29
Descriptive	84	185	269
	31.23	68.77	100.00
	50.60	71.43	63.29
Literature review	8	3	11
	72.73	27.27	100.00
	4.82	1.16	2.59
Mixed methods	8	11	19
	42.11	57.89	100.00
	4.82	4.25	4.47
Personal reflection	13	23	36
	36.11	63.89	100.00
	7.83	8.88	8.47
Qualitative	17	14	31
	54.84	45.16	100.00
	10.24	5.41	7.29
Quantitative	22	23	45
	48.89	51.11	100.00
	13.25	8.88	10.59
Total	166	259	425
	39.06	60.94	100.00
	100.00	100.00	100.00
Observations	425		

Row percentages listed under raw counts; column percentages listed under row percentages

Education, personal reflection provides the foundation for 5 of these 6 articles that report an author-implemented practice. Table 3.21 provides support for these assertions.

Table 3.22 shows that the vast majority (70.41%) of the coded articles of *Teaching Sociology* report an author-implemented practice. Moreover, research scholarship (descriptive, quantitative investigations and qualitative investigations) offers the foundation for more than two-thirds (68.12%) of these articles. However, about twenty percent (20.29%) of these articles spring from personal reflection.

3.2.5.3 Alterations Made to a Teaching Approach

In strong contrast to the other two focal teaching initiatives, articles reporting alterations made to a teaching approach stand decidedly as a small minority of the 425 coded articles. Specifically, 31 or 7.29% of the 425 coded articles report alterations

Table 3.19 Crosstab for type of analysis and subcategory author-implemented practice in *Bioscene*

	No	Yes	Total
Descriptive	2	4	6
	33.33	66.67	100.00
	33.33	33.33	33.33
Mixed methods	1	3	4
	25.00	75.00	100.00
	16.67	25.00	22.22
Personal reflection	1	1	2
	50.00	50.00	100.00
	16.67	8.33	11.11
Quantitative	2	4	6
	33.33	66.67	100.00
	33.33	33.33	33.33
Total	6	12	18
	33.33	66.67	100.00
	100.00	100.00	100.00
Observations	18		

Row percentages listed under raw counts; column percentages listed under row percentages

made to a teaching approach. However, a sizeable fraction (61.29%) of these articles rest on a foundation of research scholarship (descriptive, quantitative investigations and qualitative investigations). Table 3.23 provides support for these assertions.

Only three of the 18 coded articles of *Bioscene* report alterations made to a teaching approach. Moreover, research scholarship (descriptive research) underlies two of these three articles. Table 3.24 corroborates these statements.

Articles that report alterations made to a teaching approach also make up a small proportion (19 of 295) of the coded articles of *The Journal of Chemical Education*. Moreover, research scholarship (descriptive, quantitative investigations and qualitative investigations) provides the underpinning for 15 of these 19 articles. See Table 3.25 for supporting data.

Personal reflection underlies the only article that reports alterations made to a teaching approach of the 14 coded articles of *Teaching History*. Table 3.26 supports that observation.

Like the other three SOTL journals, a small fraction (N=8, 8.16%) of the 98 articles coded for *Teaching Sociology* report alterations made to a teaching approach. Of these eight articles, personal reflection offers the basis for four of them. Table 3.27 supports these assertions.

Table 3.20 Crosstab for type of analysis and subcategory author-implemented practice in *Journal of Chemical Education*

	No	Yes	Total
None of the above categories	5	0	5
	100.00	0.00	100.00
	4.07	0.00	1.69
Descriptive	77	149	226
	34.07	65.93	100.00
	62.60	86.63	76.61
Literature review	8	2	10
	80.00	20.00	100.00
	6.50	1.16	3.39
Mixed methods	4	0	4
	100.00	0.00	100.00
	3.25	0.00	1.36
Personal reflection	6	3	9
	66.67	33.33	100.00
	4.88	1.74	3.05
Qualitative	9	4	13
	69.23	30.77	100.00
	7.32	2.33	4.41
Quantitative	14	14	28
	50.00	50.00	100.00
	11.38	8.14	9.49
Total	123	172	295
	41.69	58.31	100.00
	100.00	100.00	100.00
Observations	295		

Row percentages listed under raw counts; column percentages listed under row percentages

3.2.6 *Limitations of the Inventory*

We note four limitations to this Inventory. These limitations moderate the conclusions and recommendations for further research we advance. These limitations are as follows.

The first limitation pertains to the selection of four teaching-focused journals representing the academic disciplines of biology, chemistry, history and sociology. According to Biglan's (1973) classification schema of academic subject matter areas, these four disciplines do include both soft or low consensus disciplines (history and sociology) and hard or high consensus disciplines (biology and chemistry); however, all four of these disciplines do hold a pure rather than applied orientation. Thus, the Inventory we present in this chapter pertains only to articles published in *Bioscene*, *The Journal of Chemical Education*, *Teaching History* and *Teaching Sociology*.

The second limitation concerns the time-period we used to classify the articles of the four teaching-focused journals. We confined our review to a span of 5 years between 2012 and 2016. Consequently, the Inventory we present pertains only to the

Table 3.21 Crosstab for type of analysis and subcategory author-implemented practice in *Teaching History*

	No	Yes	Total
None of the above categories	5	0	5
	100.00	0.00	100.00
	62.50	0.00	35.71
Literature review	0	1	1
	0.00	100.00	100.00
	0.00	16.67	7.14
Personal reflection	3	5	8
	37.50	62.50	100.00
	37.50	83.33	57.14
Total	8	6	14
	57.14	42.86	100.00
	100.00	100.00	100.00
Observations	14		

Row percentages listed under raw counts; column percentages listed under row percentages

Table 3.22 Crosstab for type of analysis and subcategory author-implemented practice in *Teaching Sociology*

	No	Yes	Total
None of the above categories	4	0	4
	100.00	0.00	100.00
	13.79	0.00	4.08
Descriptive	5	32	37
	13.51	86.49	100.00
	17.24	46.38	37.76
Mixed methods	3	8	11
	27.27	72.73	100.00
	10.34	11.59	11.22
Personal reflection	3	14	17
	17.65	82.35	100.00
	10.34	20.29	17.35
Qualitative	8	10	18
	44.44	55.56	100.00
	27.59	14.49	18.37
Quantitative	6	5	11
	54.55	45.45	100.00
	20.69	7.25	11.22
Total	29	69	98
	29.59	70.41	100.00
	100.00	100.00	100.00
Observations	98		

Row percentages listed under raw counts; column percentages listed under row percentages

Table 3.23 Crosstab for type of analysis and subcategory alteration made to a teaching approach, full sample

	No	Yes	Total
None of the above categories	14	0	14
	100.00	0.00	100.00
	3.55	0.00	3.29
Descriptive	257	12	269
	95.54	4.46	100.00
	65.23	38.71	63.29
Literature review	10	1	11
	90.91	9.09	100.00
	2.54	3.23	2.59
Mixed methods	15	4	19
	78.95	21.05	100.00
	3.81	12.90	4.47
Personal reflection	29	7	36
	80.56	19.44	100.00
	7.36	22.58	8.47
Qualitative	27	4	31
	87.10	12.90	100.00
	6.85	12.90	7.29
Quantitative	42	3	45
	93.33	6.67	100.00
	10.66	9.68	10.59
Total	394	31	425
	92.71	7.29	100.00
	100.00	100.00	100.00
Observations	425		

Row percentages listed under raw counts; column percentages listed under row percentages

5-year period between 2012 and 2016. We also coded only articles focused on undergraduate instruction in higher education. This restriction forms the third limitation to this Inventory.

Our fourth limitation involves the moderate degree of agreement among the three coding authors for the type of article we obtained. However, one of the three coding authors coded 92 percent of the articles. For the other eight percent of the articles coded, the type of article designated might vary depending on the coder. Nevertheless, we regard this particular limitation as largely blunted given that one individual coded 92 percent of the articles.

Table 3.24 Crosstab for type of analysis and subcategory alteration made to a teaching approach in *Bioscene*

	No	Yes	Total
Descriptive	4	2	6
	66.67	33.33	100.00
	26.67	66.67	33.33
Mixed methods	3	1	4
	75.00	25.00	100.00
	20.00	33.33	22.22
Personal reflection	2	0	2
	100.00	0.00	100.00
	13.33	0.00	11.11
Quantitative	6	0	6
	100.00	0.00	100.00
	40.00	0.00	33.33
Total	15	3	18
	83.33	16.67	100.00
	100.00	100.00	100.00
Observations	18		

Row percentages listed under raw counts; column percentages listed under row percentages

3.3 Conclusions

We derived six conclusions from the configuration of findings reported in this chapter. Taken together, these six conclusions provide the defining contours of an Inventory of the scholarship of teaching and learning literature bounded by the four teaching-focused journals we selected and the 5-year time period for review of the articles in these four journals.

1. Weimer (2006) delineated four different approaches to the scholarship of teaching and learning: personal accounts of change, recommended-practices reports, recommended-content reports, and personal narratives. In our classification schema, we labeled these approaches as types of articles. Of these four types of articles**,** recommended-practices reports and recommended-content reports predominate as the most frequently occurring types of article. Taken together, these two types of articles account for 93% of the articles appearing in the four SOTL journals combined. However, recommended-practice reports occur much more frequently (64% of articles coded) than recommended-content reports (29%). In contrast, personal narratives and personal accounts of change rarely find their way into print in these four SOTL journals at an aggregated level. *This pattern leads us to conclude that articles focused on instructional methods (recommended practice reports) dominate the pedagogical scholarship literature.* Articles focused on instructional methods contribute to the development and refinement of pedagogical practice, the goal of the scholarship of teaching (Braxton et al., 2002).

Table 3.25 Crosstab for type of analysis and subcategory alteration made to a teaching approach in *Journal of Chemical Education*

	No	Yes	Total
None of the above categories	5	0	5
	100.00	0.00	100.00
	1.81	0.00	1.69
Descriptive	216	10	226
	95.58	4.42	100.00
	78.26	52.63	76.61
Literature review	9	1	10
	90.00	10.00	100.00
	3.26	5.26	3.39
Mixed methods	3	1	4
	75.00	25.00	100.00
	1.09	5.26	1.36
Personal reflection	7	2	9
	77.78	22.22	100.00
	2.54	10.53	3.05
Qualitative	11	2	13
	84.62	15.38	100.00
	3.99	10.53	4.41
Quantitative	25	3	28
	89.29	10.71	100.00
	9.06	15.79	9.49
Total	276	19	295
	93.56	6.44	100.00
	100.00	100.00	100.00
Observations	295		

Row percentages listed under raw counts; column percentages listed under row percentages

Table 3.26 Crosstab for type of analysis and subcategory alteration made to a teaching approach in *Teaching History*

	No	Yes	Total
None of the above categories	5	0	5
	100.00	0.00	100.00
	38.46	0.00	35.71
Literature review	1	0	1
	100.00	0.00	100.00
	7.69	0.00	7.14
Personal reflection	7	1	8
	87.50	12.50	100.00
	53.85	100.00	57.14
Total	13	1	14
	92.86	7.14	100.00
	100.00	100.00	100.00
Observations	14		

Row percentages listed under raw counts; column percentages listed under row percentages

Table 3.27 Crosstab for type of analysis and subcategory alterations made to a teaching approach in *Teaching Sociology*

	No	Yes	Total
None of the above categories	4	0	4
	100.00	0.00	100.00
	4.44	0.00	4.08
Descriptive	37	0	37
	100.00	0.00	100.00
	41.11	0.00	37.76
Mixed methods	9	2	11
	81.82	18.18	100.00
	10.00	25.00	11.22
Personal reflection	13	4	17
	76.47	23.53	100.00
	14.44	50.00	17.35
Qualitative	16	2	18
	88.89	11.11	100.00
	17.78	25.00	18.37
Quantitative	11	0	11
	100.00	0.00	100.00
	12.22	0.00	11.22
Total	90	8	98
	91.84	8.16	100.00
	100.00	100.00	100.00
Observations	98		

Row percentages listed under raw counts; column percentages listed under row percentages

2. Our findings indicate that research scholarship (descriptive research analyses, quantitative investigations, and qualitative investigations) prevails as the most frequent type of analysis used in articles that comprise the scholarship of teaching and learning literature whereas personal reflection infrequently occurs except in the SOTL journal of *Teaching History*. *Thus, we conclude that the pedagogical scholarship literature springs mostly from research using "established research protocols"* (Weimer, 2006, p. 43) *rather than from the personal experiences of practitioners.*
3. This particular conclusion consists of three interrelated conclusions. We previously reported that the overwhelming majority (87.10%) of recommended-practice reports make use of research scholarship and that less than ten percent (7.01%) of recommended-practice reports spring from personal reflections. This pattern of findings leads *us to conclude that the articles focused on instructional methods (recommended-practice reports) that dominate the pedagogical scholarship primarily rest on a bed of empirical research (research scholarship).*

   We also reported that research scholarship (descriptive research, quantitative and qualitative investigations combined) provides the basis for the vast majority (77.42%) of recommended content reports whereas personal reflection infrequently (8.06%) underlies recommended content reports. *Hence, we conclude*

that articles recommending content for a particular course or academic discipline also rest on a foundation of empirical research (research scholarship).

This pattern of findings gives rise to the third conclusion of this cluster of conclusions. *We conclude that Weimer's* (2006) *contention that recommended-practice reports and recommended-content reports constitute types of wisdom of practice scholarship (see e.g., p. 40) requires serious revision, as they do not flow from the wisdom of practice. They should remain as types of articles but not conflated with type of analysis.*

4. Our configuration of findings indicates that research scholarship provides the primary foundation for recommended practice reports published in *Bioscene,* in the *Journal of Chemical Education* and in *Teaching Sociology*. In contrast, personal reflection predominates as the type of analysis underpinning recommended practice reports in *Teaching History*. Consequently, *we conclude that articles centered on instructional methods that rest on a foundation of research scholarship predominate in teaching-focused journals of two high and one low consensus academic discipline with the discipline of history as an exception. The established disciplinary research protocols hold force in the disciplines of biology, chemistry, and sociology, but not in history, as we gather from the prevalence of personal reflections in Teaching History.*
5. As stated elsewhere in this chapter, Boyer (1990) ascribed the scholarship of teaching as the domain of scholarship best aligned with the teaching-oriented mission of liberal arts colleges (baccalaureate colleges and universities). He also regarded the scholarship of teaching as appropriate for comprehensive colleges and universities (master's colleges and universities). Our pattern of findings indicates that first authors at doctoral universities of highest, high and moderate levels of research activity combined produce 45% of the recommended practice reports. Nevertheless, first authors at primarily master's granting universities publish almost 20% (19.56%) of recommended practice piece. However, authors at primarily bachelor's granting institutions publish less than 10% of recommended practice reports (9.23%). Although first authors at primarily bachelor's granting institutions and master's granting universities follow to some degree Boyer's prescription for domain emphasis, first authors at doctoral universities deliver the bulk of recommended practice reports.

   Moreover, our configuration of findings indicates that first authors at the three subcategories of doctoral universities combine more than a third (35.48%) of recommended-content articles. As in the case of recommended-practice reports, first authors at primarily master's granting universities also generate about 20% (20.16%) of recommended-content reports. Moreover, first authors at primarily bachelor's granting institutions published more than ten percent of these articles (12.90%). Though first authors at primarily bachelor's granting institutions and master's granting universities follow to some degree Boyer's prescription for domain emphasis, first authors at doctoral universities produce a greater proportion of recommended-content reports.

   Despite Boyer's prescriptions for institutional emphasis placed on the scholarship of teaching for primarily bachelor's granting institutions and master's

granting universities, *we conclude that first authors affiliated with doctoral universities generate a larger share of both recommended-practice and recommended-content reports than first authors in primarily bachelor's granting institutions and master's granting universities.* This conclusion resonates with the observation of Braxton et al. (2002) that faculty in doctoral granting universities tend to produce more scholarship than their counterparts in primarily bachelor's granting institutions and master's granting universities

6. Given that both recommended-practice reports and recommended-content reports spring from research scholarship, *we conclude that a knowledge base of pedagogical scholarship might exist* within the context of the four teaching-focused journals used herein. However, the realization of this possibility depends on engagement in the scholarship of integration by scholars of the academic profession in general and of the scholarship of teaching and learning in particular. In addition to a review of the content of articles that recommend instructional methods and content for a course or an academic discipline, articles describing new teaching approaches, author-implemented practices, and alterations to a teaching approach provide additional possibilities for engagement in a scholarship of integration focused on the content of these articles. The outcomes of such a review might also contribute to a knowledge base of pedagogical scholarship.

Aside from these six specific conclusions, we put forth an overarching conclusion. This overarching conclusion concerns the usefulness of the classification of both the types of articles and types of analyses that we used in this Inventory. In terms of types of articles, this classification schema accounted for 413 of the 425 coded articles. As indicated by Table 3.2, only three percent (N = 12) of the coded articles were classified as not fitting any of the four types of articles delineated by the classification schema we used. A similar pattern exists for type of analysis as we failed to classify 14 of the 425 coded articles into one of the six types of analyses of our classification schema. Table 3.4 supports this assertion. These specifics afford robust support for the usefulness of our classification schema. This classification system takes the form of an extension of Weimer's classification schema she described in her 2006 volume *Enhancing Scholarly Work on Teaching and Learning: Professional Literature that Makes a Difference*. We offer our classification system as a heuristic for future research on the literature of the scholarship of teaching and learning or of pedagogical scholarship.

3.3.1 Recommendations for Further Research and Scholarship

We offer four recommendations for future research**.** Our first three recommendations acknowledge the heuristic value of the classification system used in this Inventory whereas the fourth recommendation centers attention on our call for engagement in the scholarship of integration centered on articles that report a new teaching

approach, report an author-implemented practice or content, and report on alterations made to a teaching approach.

1. As previously stated, the four teaching-focused journals we selected circumscribe the defining demarcations of the Inventory of the scholarship of teaching and learning literature we offer. Accordingly, we recommend that future efforts to extend the classification approach we used should center attention on teaching-focused journals of applied academic disciplines. Biglan (1973) lists engineering, accounting, and finance as examples of applied academic disciplines. Some possible teaching-focused journals for such applied disciplines include *Issues in Accounting Education,* the *Journal of Accounting Education,* The *Journal of Financial Education,* and the *Journal of Engineering Education.*
2. In our fourth conclusion, we posited that history stands as an exception to our conclusion that articles centered on instructional methods predominantly rest on a foundation of research scholarship in the teaching-focused journals of biology, chemistry and sociology. We surmised that personal reflections might prevail in *Teaching History* because the established research protocols of biology, chemistry and sociology do not hold force in the discipline of history. Accordingly, we recommend that future research using the classification schema used in this Inventory include the teaching-focused journals of academic disciplines such as English, foreign languages and philosophy. Possible journals include *College English*, *Research in the Teaching of English*, *Language Learning Journal*, and *Teaching Philosophy*. The frequency of personal accounts of change and personal narratives might increase through engagement in this recommendation for further research.
3. Our first two recommendations pertain to teaching-focused journals of academic disciplines. However, there are also a number of teaching-focused journals that do not focus on any particular discipline. These journals include *Active Learning in Higher Education*, *College Teaching*, *Diversity Digest*, *Innovate—Journal of Online Education* and the *Journal on Excellence in College Teaching. We recommend that future research apply the classification schema used in this Inventory to these journals.*
4. We provide three Appendices to this chapter. These appendices list bibliographic information for articles in *Bioscene*, the *Journal of Chemical Education*, and *Teaching Sociology*. We selected these listed articles because they provide reports on a new teaching approach (Appendix A), report an author-implemented practice or content (Appendix B), or report on alterations made to a teaching approach (Appendix C). Research scholarship also underlies these reports. We provide these Appendices to enable scholars of the academic profession in general, and scholars of the scholarship of teaching and learning in particular, to engage in a scholarship of integration centered on the content of these articles.

3.3.2 Closing Thoughts

Instructional methods and content for a particular course or academic discipline define the central focus of the body of pedagogical scholarship that emerges from articles published in the teaching-focused journals of *Bioscience: Journal of College Biology Teaching*, The *Journal of Chemical Education*, *Teaching History* and *Teaching Sociology*. With the exception of *Teaching History*, research scholarship underpins the articles of this body of pedagogical scholarship. Other bodies of pedagogical scholarship may exist with different defining characteristics of article type and type of analysis. These possible bodies of scholarship might emanate from the teaching-focused journals of academic disciplines such as English, foreign languages and philosophy, as well as from the teaching-focused journals of applied academic disciplines such as engineering, accounting, and finance. Further research by scholars of the academic profession in general and the scholars of teaching and learning in particular should focus on the nature of pedagogical scholarship in additional clusters of academic fields such as these.

Appendices

Appendix A

Article includes new teaching approach

Bioscene

- Kudish, P., Schlag, E., & Kaplinsky, N. J. (2015). An Inquiry-Infused Introductory Biology Laboratory That Integrates Mendel's Pea Phenotypes with Molecular Mechanisms. *Bioscene: Journal of College Biology Teaching*, *41*(1), 10–15.
- MacLaren, R. D., Schulte, D., & Kennedy, J. (2012). Field Research Studying Whales in an Undergraduate Animal Behavior Laboratory. *Bioscene: Journal of College Biology Teaching*, *38*(1), 3–10.
- McCabe, D. J., & Knight, E. J. (2016). Null Models for Everyone: A Two-Step Approach to Teaching Null Model Analysis of Biological Community Structure. *Bioscene: Journal of College Biology Teaching*, *42*(2), 16–25.

Journal of Chemical Education

- Aller Pellitero, M., Álvarez Lamsfus, C., & Borge, J. (2012). The Belousov–Zhabotinskii Reaction: Improving the Oregonator Model with the Arrhenius Equation. *Journal of Chemical Education*, *90*(1), 82–89.
- Barbera, J. (2013). A psychometric analysis of the chemical concepts inventory. *Journal of Chemical Education*, *90*(5), 546–553.

- Galloway, K. R., & Bretz, S. L. (2015). Development of an assessment tool to measure students' meaningful learning in the undergraduate chemistry laboratory. *Journal of Chemical Education*, *92*(7), 1149–1158.
- Grasse, E. K., Torcasio, M. H., & Smith, A. W. (2015). Teaching UV–Vis Spectroscopy with a 3D-Printable Smartphone Spectrophotometer. *Journal of Chemical Education*, *93*(1), 146–151.
- Harper-Leatherman, A. S., & Miecznikowski, J. R. (2012). O true apothecary: How forensic science helps solve a classic crime. *Journal of Chemical Education*, *89*(5), 629–635.
- He, Y., Swenson, S., & Lents, N. (2012). Online video tutorials increase learning of difficult concepts in an undergraduate analytical chemistry course. *Journal of Chemical Education*, *89*(9), 1128–1132.
- Keeler, J. M., & Koretsky, M. D. (2016). Surprises in the Muddy Waters of High-Enrollment Courses. *Journal of Chemical Education*, *93*(11), 1830–1838.
- Kirton, S. B., Al-Ahmad, A., & Fergus, S. (2014). Using Structured Chemistry Examinations (SChemEs) As an Assessment Method To Improve Undergraduate Students' Generic, Practical, and Laboratory-Based Skills. *Journal of Chemical Education*, *91*(5), 648–654.
- Kolk, K. V. D., Beldman, G., Hartog, R., & Gruppen, H. (2011). Students using a novel web-based laboratory class support system: a case study in food chemistry education. *Journal of Chemical Education*, *89*(1), 103–108.
- Laredo, T. (2013). Changing the first-year chemistry laboratory manual to implement a problem-based approach that improves student engagement. *Journal of Chemical Education*, *90*(9), 1151–1154.
- Libman, D., & Huang, L. (2013). Chemistry on the go: review of chemistry apps on smartphones. *Journal of chemical education*, *90*(3), 320–325.
- Mottishaw, J. D., Erck, A. R., Kramer, J. H., Sun, H., & Koppang, M. (2015). Electrostatic Potential Maps and Natural Bond Orbital Analysis: Visualization and Conceptualization of Reactivity in Sanger's Reagent. *Journal of Chemical Education*, *92*(11), 1846–1852.
- Pence, H. E., & Williams, A. J. (2016). Big data and chemical education. *Journal of Chemical Education*, *93*(3), 504–508.
- Saloranta, T., Lönnqvist, J. E., & Eklund, P. C. (2016). Transforming Undergraduate Students into Junior Researchers: Oxidation–Reduction Sequence as a Problem-Based Case Study. *Journal of Chemical Education*, *93*(5), 841–846.
- Schlotter, N. E. (2012). A statistics curriculum for the undergraduate chemistry major. *Journal of Chemical Education*, *90*(1), 51–55.
- Sostarecz, M. C., & Sostarecz, A. G. (2012). A conceptual approach to limiting-reagent problems. *Journal of Chemical Education*, *89*(9), 1148–1151.
- Tomasik, J. H., LeCaptain, D., Murphy, S., Martin, M., Knight, R. M., Harke, M. A., . . . & Acevedo-Polakovich, I. D. (2014). Island explorations: discovering

effects of environmental research-based lab activities on analytical chemistry students. *Journal of Chemical Education*, *91*(11), 1887–1894.
- Vanderveen, J. R., Martin, B., & Ooms, K. J. (2013). Developing tools for undergraduate spectroscopy: an inexpensive visible light spectrometer. *Journal of Chemical Education*, *90*(7), 894–899.
- Ye, L., Oueini, R., & Lewis, S. E. (2015). Developing and implementing an assessment technique to measure linked concepts. *Journal of Chemical Education*, *92*(11), 1807–1812.
- Zurcher, D. M., Phadke, S., Coppola, B. P., & McNeil, A. J. (2016). Using Student-Generated Instructional Materials in an e-Homework Platform. *Journal of Chemical Education*, *93*(11), 1871–1878.

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- Arabandi, B., Sweet, S., & Swords, A. (2014). Testing the Flat World Thesis: Using a Public Dataset to Engage Students in the Global Inequality Debate. *Teaching Sociology*, *42*(4), 267–276.
- Becker, S., & Paul, C. (2015). "It Didn't Seem Like Race Mattered": Exploring the Implications of Service-learning Pedagogy for Reproducing or Challenging Color-Blind Racism. *Teaching Sociology*, *43*(3), 184–200.
- Crowe, J. A., Silva, T., & Ceresola, R. (2015). The Effect of Peer Review on Student Learning Outcomes in a Research Methods Course. *Teaching Sociology*, *43*(3), 201–213.
- Grauerholz, L., & Bubriski-McKenzie, A. (2012). Teaching about Consumption The "Not Buying It" Project. *Teaching Sociology*, *40*(4), 332–348.
- Hochschild Jr, T. R., Farley, M., & Chee, V. (2014). Incorporating sociology into community service classes. *Teaching Sociology*, *42*(2), 105–118.
- Huggins, C. M., & Stamatel, J. P. (2015). An Exploratory Study Comparing the Effectiveness of Lecturing versus Team-based Learning. *Teaching Sociology*, *43*(3), 227–235.
- Irby-Shasanmi, A., Oberlin, K. C., & Saunders, T. N. (2012). Teaching with Movement: Using the Health Privilege Activity to Physically Demonstrate Disparities in Society. *Teaching Sociology*, *40*(2), 123–141.
- Khanna, N., & Harris, C. A. (2015). Discovering Race in a "Post-Racial" World: Teaching Race through Primetime Television. *Teaching Sociology*, *43*(1), 39–45.
- Latshaw, B. A. (2015). Examining the Impact of a Domestic Violence Simulation on the Development of Empathy in Sociology Classes. *Teaching Sociology*, *43*(4), 277–289.
- McCabe, J. (2013). Making Theory Relevant: The Gender Attitude and Belief Inventory. *Teaching Sociology*, *41*(3), 282–293.

- Nell Trautner, M., & Borland, E. (2013). Using the Sociological Imagination to Teach about Academic Integrity. *Teaching Sociology*, *41*(4), 377–388.
- Norris, D. R. (2013). Beat the Bourgeoisie: A Social Class Inequality and Mobility Simulation Game. *Teaching Sociology*, *41*(4), 334–345.
- Noy, S. (2014). Secrets and the Sociological Imagination: Using PostSecret. com to Illustrate Sociological Concepts. *Teaching Sociology*, *42*(3), 187–195.
- Osnowitz, D., & Jenkins, K. E. (2014). The Theory Forum: Teaching Social Theory through Interactive Practice. *Teaching Sociology*, *42*(3), 245–250.
- Parrotta, K. L., & Buck, A. R. (2013). Making Marx Accessible: Understanding Alienated Labor through Experiential Learning. *Teaching Sociology*, *41*(4), 360–369.
- Pelton, J. A. (2013). "Seeing the Theory Is Believing" Writing about Film to Reduce Theory Anxiety. *Teaching Sociology*, *41*(1), 106–120.
- Strangefeld, J. A. (2013). Promoting Active Learning: Student-Led Data Gathering in Undergraduate Statistics. *Teaching sociology*, *41*(2), 199–206.
- Upright, C. (2015). Bringing Color into the Living Room: Analyzing "TV Guide" Covers, 1953 to 1997. *Teaching Sociology*, *43*(3), 214–226.
- Whitley, C. T. (2013). A Picture Is Worth a Thousand Words: Applying Image-Based Learning to Course Design. *Teaching Sociology*, *41*(2), 188–198.
- Wright, E. (2012). Why, Where, and How to Infuse the Atlanta Sociological Laboratory into the Sociology Curriculum. *Teaching Sociology*, *40*(3), 257–270.

Appendix B

Article includes author-implemented practice

Bioscene

- Basey, J. M., Maines, A. P., Francis, C. D., & Melbourne, B. (2014). Impacts of digital imaging versus drawing on student learning in undergraduate biodiversity labs. *Bioscene: Journal of College Biology Teaching*, *40*(2), 15–21.
- Berkes, C., & Chan, L. L. Y. (2015). Investigation of Macrophage Differentiation and Cytokine Production in an Undergraduate Immunology Laboratory. *Bioscene: Journal of College Biology Teaching*, *41*(2), 3–10.
- Gillie, L., & Bizub, A. L. (2012). In Darwin's Footsteps: An On and Off-Campus Approach to Teaching Evolutionary Theory and Animal Behavior. *Bioscene: Journal of College Biology Teaching*, *38*(1), 15–21.
- Infanti, L. M., & Wiles, J. R. (2014). "Evo in the News:" Understanding Evolution and Students' Attitudes toward the Relevance of Evolutionary Biology. *Bioscene: Journal of College Biology Teaching*, *40*(2), 9–14.

- Janssens, P., & Waldhuber, M. (2012). Experimental Analysis of Cell Function Using Cytoplasmic Streaming. *Bioscene: Journal of College Biology Teaching*, *38*(1), 11–14.
- Kudish, P., Schlag, E., & Kaplinsky, N. J. (2015). An Inquiry-Infused Introductory Biology Laboratory That Integrates Mendel's Pea Phenotypes with Molecular Mechanisms. *Bioscene: Journal of College Biology Teaching*, *41*(1), 10–15.
- Lappas, C. M. (2012). The effect of CGS21680 Treatment on Thioglycollate-Induced Peritonitis: An Introduction to Immunopharmacology. *Bioscene: Journal of College Biology Teaching*, *38*(2) 3–9.
- MacLaren, R. D., Schulte, D., & Kennedy, J. (2012). Field Research Studying Whales in an Undergraduate Animal Behavior Laboratory. *Bioscene: Journal of College Biology Teaching*, *38*(1), 3–10.
- Soto, J. G., & Everhart, J. (2016). Transformation of a Traditional, Freshman Biology, Three-Semester Sequence, to a Two-Semester, Integrated Thematically Organized, and Team-Taught Course. *Bioscene: Journal of College Biology Teaching*, *42*(2), 3–15.
- Smith, M. J., Shaffer, J. J., Koupal, K. D., & Hoback, W. W. (2012). Laboratory Measures of Filtration by Freshwater Mussels: An Activity to Introduce Biology Students to an Increasingly Threatened Group of Organisms. *Bioscene: Journal of College Biology Teaching*, *38*(2), 10–15.
- Stanford, J. S., & Duwel, L. E. (2013). Engaging Biology Undergraduates in the Scientific Process through Writing a Theoretical Research Proposal. *Bioscene: Journal of College Biology Teaching*, *39*(2), 17–24.

Journal of Chemical Education

- Andraos, J., & Hent, A. (2015). Useful material efficiency green metrics problem set exercises for lecture and laboratory. *Journal of Chemical Education*, *92*(11), 1831–1839.
- Bauer, C. F., & Cole, R. (2012). Validation of an assessment rubric via controlled modification of a classroom activity. *Journal of Chemical Education*, *89*(9), 1104–1108.
- Benedict, L. A., Champlin, D. T., & Pence, H. E. (2013). Exploring transmedia: the rip-mix-learn classroom. *Journal of Chemical Education*, *90*(9), 1172–1176.
- Carmel, J. H., Jessa, Y., & Yezierski, E. J. (2014). Targeting the development of content knowledge and scientific reasoning: Reforming college-level chemistry for nonscience majors. *Journal of Chemical Education*, *92*(1), 46–51.
- Cruzeiro, V. W. D., Roitberg, A., & Polfer, N. C. (2016). Interactively Applying the Variational Method to the Dihydrogen Molecule: Exploring Bonding and Antibonding. *Journal of Chemical Education*, *93*(9), 1578–1585.
- Finch, L. E., Hillyer, M. M., & Leopold, M. C. (2015). Quantitative analysis of heavy metals in children's toys and jewelry: a multi-instrument, multitechnique

exercise in analytical chemistry and public health. *Journal of Chemical Education*, *92*(5), 849–854.
- Glover, S. R., Sewry, J. D., Bromley, C. L., Davies-Coleman, M. T., & Hlengwa, A. (2013). The Implementation of a Service-Learning Component in an Organic Chemistry Laboratory Course. *Journal of Chemical Education*, *90*(5), 578–583.
- Halstead, J. A. (2012). Teaching the Spin Selection Rule: An Inductive Approach. *Journal of Chemical Education*, *90*(1), 70–75.
- Hibbard, L., Sung, S., & Wells, B. (2015). Examining the effectiveness of a semi-self-paced flipped learning format in a college general chemistry sequence. *Journal of Chemical Education*, *93*(1), 24–30.
- Hoyer, C. E., & Kegerreis, J. S. (2013). A Primer in Monte Carlo Integration Using Mathcad. *Journal of Chemical Education*, *90*(9), 1186–1190.
- Jacobs, D. L., Dalal, H. A., & Dawson, P. H. (2015). Integrating Chemical Information Instruction into the Chemistry Curriculum on Borrowed Time: The Multiyear Development and Evolution of a Virtual Instructional Tutorial. *Journal of Chemical Education*, *93*(3), 452–463.
- McCollum, B. M., Regier, L., Leong, J., Simpson, S., & Sterner, S. (2014). The effects of using touch-screen devices on students' molecular visualization and representational competence skills. *Journal of Chemical Education*, *91*(11), 1810–1817.
- Morizot, O., Audureau, E., Briend, J. Y., Hagel, G., & Boulc'h, F. (2014). Introducing the Human Element in Chemistry by Synthesizing Blue Pigments and Creating Cyanotypes in a First-Year Chemistry Course. *Journal of Chemical Education*, *92*(1), 74–78.
- Phipps, L. R. (2013). Creating and teaching a web-based, university-level introductory chemistry course that incorporates laboratory exercises and active learning pedagogies. *Journal of Chemical Education*, *90*(5), 568–573.
- Priest, S. J., Pyke, S. M., & Williamson, N. M. (2014). Student perceptions of chemistry experiments with different technological interfaces: a comparative study. *Journal of Chemical Education*, *91*(11), 1787–1795.
- Rodrigues, R. P., Andrade, S. F., Mantoani, S. P., Eifler-Lima, V. L., Silva, V. B., & Kawano, D. F. (2015). Using Free Computational Resources To Illustrate the Drug Design Process in an Undergraduate Medicinal Chemistry Course. *Journal of Chemical Education*, *92*(5), 827–835.
- Schiltz, H. K., & Oliver-Hoyo, M. T. (2012). Physical Models That Provide Guidance in Visualization Deconstruction in an Inorganic Context. *Journal of Chemical Education*, *89*(7), 873–877.
- Thomas, A. C., Boucher, M. A., & Pulliam, C. R. (2015). Qualitative to quantitative and spectrum to report: an instrument-focused research methods course for first-year students. *Journal of Chemical Education*, *92*(3), 439–443.
- Tomasik, J. H., Cottone, K. E., Heethuis, M. T., & Mueller, A. (2013). Development and preliminary impacts of the implementation of an authentic research-Based experiment in General Chemistry. *Journal of Chemical Education*, *90*(9), 1155–1161.

- Yeagley, A. A., Porter, S. E., Rhoten, M. C., & Topham, B. J. (2015). The stepping stone approach to teaching chemical information skills. *Journal of Chemical Education*, *93*(3), 423–428.

Teaching Sociology

- Becker, S., & Paul, C. (2015). "It Didn't Seem Like Race Mattered": Exploring the Implications of Service-learning Pedagogy for Reproducing or Challenging Color-Blind Racism. *Teaching Sociology*, *43*(3), 184–200.
- Bramesfeld, K. D., & Good, A. (2015). The Game of Social Life: An Assessment of a Multidimensional Poverty Simulation. *Teaching Sociology*, *43*(2), 92–103.
- Chin, L. G., & Gibbs Stayte, P. (2015). Can Human Subject Pool Participation Benefit Sociology Students?. *Teaching Sociology*, *43*(1), 27–38.
- Crowe, J. A., Silva, T., & Ceresola, R. (2015). The Effect of Peer Review on Student Learning Outcomes in a Research Methods Course. *Teaching Sociology*, *43*(3), 201–213.
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Appendix C

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