Using Portfolio Assessment to Discover Student Learning

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Abstract

Portfolios are an effective and popular tool to assess learning outcomes in writing courses and programs. This paper reports on the results of content analysis of portfolio statements from multiple sections of a junior-level business communication course from Fall 2008 and Spring 2009 semesters. Using two coding schemes, results of the content analysis provide insight into students' rhetorical approaches to portfolio composition; their decisions related to selection of content; and the organization and design of their portfolio. As a result, both qualitative (content analysis) and quantitative (assessment scores) data are used to evaluate student achievement of outcomes related to business communication. The paper will conclude with an explanation of how the content analysis and scoring results are used to inform improvement of the course.

Introduction

In *(Re)Articulating Writing Assessment for Teaching and Learning*, one of the guiding principles of assessment described by Brian Huot is that it be research-based. Huot contends that writing assessment has become focused on the methods of assessment instead of on research questions about our students, our instruction, and our programs. In particular, Huot critiques the focus on perfecting the technical aspects of assessment, particularly the establishment of inter-rater reliability, rather than on a process of inquiry that leads to improvement of courses and academic programs (and, thus, teaching and learning). Instead, Huot contends, our focus should be on the collection of information about our students, courses, and programs in order to make informed decisions about our curriculum and teaching (Huot, 2002).

To contribute to on-going course improvement, the Technical Communication (TC) Program at Arizona State University (ASU) uses multiple methods to assess a junior-level business writing course. After each semester has ended, a random sample of portfolios are collected and then scored by two faculty raters. In addition, we gather feedback from instructors and students at the end of each semester. To further help us to answer questions about the course, our students, and their learning we analyze portfolio cover statements using content analysis. This approach is consistent with Huot's contention that assessment be research-based and ensures that course assessment is rigorous and systematic to provide continual data for improvement of course content and pedagogy.

The research described in this paper is part of course assessment of TWC347 *Written Communication for Managers*. TWC347 is a multi-section course (offered in 7-10 sections per semester) administered through the TC Program in ASU's School of Letters and Sciences and is taught by multiple TC instructors using a common syllabus and set of assignments (see http://techcomm.asu.edu/curriculum/twc347 for syllabus and assignment descriptions). The course is required by ASU's Morrison School of Management and Agribusiness as an upper-division literacy course focused specifically on business writing. However, the course attracts students from other colleges and schools on all four ASU campuses. Sections are offered both on ASU's Polytechnic campus and online.

As the final assignment of the semester, students are required to compose a portfolio of their work with a persuasive cover statement in which they present an argument for meeting the following course objectives:

- compose a variety of common business genres using appropriate formatting and organization
- compose in a tone and style that is clear, concise, and complete as appropriate for the audience and purpose
- compose using style and design, including text and visuals, appropriate for the audience and purpose
- find, summarize, analyze, and use information from appropriate primary and secondary sources to accomplish a purpose
- understand and apply ethical uses of information including proper APA documentation, copyright and intellectual property, ownership of information, privacy, etc.
- proofread, edit, and revise to ensure correct use of syntax, grammar, spelling, punctuation

Instructors evaluate the portfolio as part of the student's final grade. However, we also inform students in both the course syllabus and the portfolio assignment description that their portfolio may be selected for assessment purposes after the semester is over.

After scoring by raters is complete, portfolios are analyzed using content analysis to identify rhetorical concepts and to identify organizational and design patterns. The analysis is guided by the research questions:

- Which assignments do students choose to include in their portfolios (and concomitantly, which do they omit)?
- How do students organize their portfolios as an argument to demonstrate their learning?
- What persuasive techniques do students use to support their argument for learning?
- What tone and style do students use?
- Do students present an argument for their own learning or to enhance their grade?

By collecting and analyzing this data, in combination with scores, rater comments, and instructor feedback, we are able to make informed decisions about course design. To date, we have collected data from two semesters, leading to changes in assignments and course content. Though scoring results are described, the primary focus of this paper is on the content analysis results.

Methods

Three portfolios per section of TWC347 were selected from the Fall 2008 and Spring 2009 semesters. For each section, I generated a simple random selection using a random number generator (http://www.randomizer.org/form.htm) to ensure that portfolios were selected without researcher bias. Using these procedures, 21 portfolios were selected at the end of both semesters (seven sections per semester). One instructor did not submit portfolios selected from his sections and two students from Fall 2008 did not submit the portfolio as part of the course requirement. As a result, a total of 34 portfolios were analyzed, 16 from Fall 2008 and 18 from Spring 2009. After selection, each portfolio was labeled with a number to ensure anonymity. Portfolios were then loaded into Atlas.ti, a qualitative analysis software program, for coding.

Portfolio Scoring

External evaluation of portfolios takes place after the semester is complete and course grades have been submitted. Two faculty members, one from the TC Program and one from the Morrison School, use a 4-point scoring guide under Phase 2 assessment procedures (White, 2005) to evaluate how well students have demonstrated achievement of course outcomes. Each portfolio receives four scores: for Rhetorical Knowledge; Critical Thinking, Reading, and Writing; Processes; and Knowledge of Conventions. These categories are derived from the Writing Program Administrators' *Outcomes Statement for First-Year Composition* (WPA OS). The TC Program uses a version of the WPA OS modified to fit a technical and professional writing program to establish objectives for all writing courses (Maid, 2004), including TWC347. The scoring guide to assess portfolios is similarly developed based on our modified outcomes statement so that evaluation criteria are linked to objectives. This is similar to the strategy used by the TC Program to assess majors graduating with a BS degree and which is described elsewhere (D'Angelo and Maid, 2009). In the case of TWC347, specific outcomes from each of the four categories are linked to the course and articulated as course objectives. After evaluation is completed, scores and rater comments are aggregated and used for course improvement.

As an assessment philosophy, we do not attempt to achieve inter-rater reliability and so we do not hold norming sessions. As described earlier, Huot (2002) argued against the focus on the mechanics of assessment such as inter-rater reliability. More recently, Warnock (2009) described an assessment strategy in which context took precedence over achievement of normed rater scores. Warnock described a pilot at Drexel University's LeBow College of Business in which assessment is based on authentic responses of real readers:

> Because the ultimate assessment of writing comes from audiences that by their very nature are varied, our design allows us—and ideally, others—to view the different ways in which different audiences view writing and to incorporate those varied perceptions into the final results of assessment. (Warnock, 2009, p. 98)

Although conducted in a different setting and not using portfolios, our philosophy is similar to that described by Warnock. This strategy results in a large amount of data and allows us to gauge the perspective of two stakeholders: faculty in the TC Program responsible for teaching the course and faculty in the Morrison School where the majority of the students who enroll in the course are housed. Gaining this perspective is the purpose of our assessment so that we ensure consistency of course goals and stakeholder needs. Because raters represent two distinct disciplines, norming would undermine our purpose for collecting and using assessment data.

Coding

The use of portfolios as an assessment method is well-documented in rhetoric and composition and, to a lesser extent, in technical communication. The use of portfolios in business communication programs and courses is less well-documented. Allen (1994) proposed portfolios as one assessment method to evaluate the effectiveness of business communication curricula, teaching, and learning. Dillon (1997) described a portfolio contest as an assessment technique using community partnerships to assess student performance. Dubinsky (2003) discussed the use of e-portfolios using software created by the Open Source Portfolio Initiative to further students' life-long learning and engagement in learning. At the 2008 Association for Business Communication convention, Dubinsky (2008) further described Virginia Tech's pilot adoption of e-portfolios to assess student outcomes. Portfolios also have been used as an assessment method for technical communication courses and programs (see, for example, Elliot, Kilduff, & Lynch, 1994; Ostheimer & White, 2005; Johnson, 2006).

However, the bulk of research on the use of portfolios for writing assessment has been conducted by researchers of first-year composition courses. None of the literature on portfolio assessment in business or technical communication, for example, incorporates the use of content analysis. Therefore, for the research reported on in this paper, I chose to use two coding strategies developed for use in research on first-year composition portfolios that raised questions similar to my own. I coded portfolio statements using categories established by Bower (2003) and by Scott (2005). Both of these researchers were attempting to answer similar questions to those posed by my research in order to more fully understand how students approach the task of composing a persuasive reflective cover letter for portfolio assessment. As a result, it made more sense to replicate the use of these two sets of codes rather than attempt to develop an entirely new set.

Bower (2003) analyzed 88 cover statements from first-year writing portfolios to, in part, discover what kinds of strategies students exhibit using three theoretical lenses: Aristotle's rhetorical appeals, Toulmin's theory of argumentation, and Burke's theory of dramatism. For the purposes of this research, I used Bower's codes based on Aristotle and Toulmin to answer the research questions related to student arguments and persuasive techniques.

Code	**Definition**
Ethos	assertions of student authority
Nomos	expressions of commonly held values established in the classroom (or in the case of this study, course outcomes)
Pathos	expressions of emotion (hardships, pride in work, reactions to assignments)
Logos	rational or supportive reasoning to support decisions
Artifact Selection	assertions about why artifacts had been chosen for inclusion
Skills Supported	assertions about specific skills that were supported with evidence
Skills Unsupported	assertions about specific skills that were claimed but not supported
Process	assertions about writing process
Ability Positive	positive assertions about abilities that were not related to writing or the course but influenced grade
Ability Negative	negative assertions about abilities that were not related to writing or the course but influenced grade
Improvement	assertions about weaknesses or improvements needed in writing
Grade	assertions about how portfolio should be read or graded
Schmooze	assertions about teachers, the course
External Learning	assertions about internships, service learning, or other external learning that influenced grade

Scott (2005) reviewed 56 cover letters from Kentucky's state-mandated writing portfolio assessment program. His analysis resulted in five broad categories: form, tone, mention of growth, and appeals to reviewers. The use of these codes facilitated answers to research questions related to tone, style,, and growth. I made one adjustment to Scott's original categories by adapting the codes for form to better fit the context of the TWC347 portfolios.

Code	**Definition**
Generic Form	introduction-body-conclusion organization without artifact context
Other Form	introduction-body-conclusion organization with artifact context
Growth	letters that address growth
No Growth	letters that do not address growth
Positive Tone	enthusiastic about the portfolio or writing
Negative Tone	negative attitude toward the portfolio or writing
Intermediate Tone	no clear tone
Explicit Appeal	appeal directly to the reviewer
Implicit Appeal	less direct appeal to reviewer
No Appeal	no appeal to reviewer

Results and Discussion

Scoring

As mentioned earlier, inter-rater reliability is not a goal of our assessment; instead we are interested in the nuances of differences (and similarities) between the two raters. Rater 1, a TC faculty member, consistently scored portfolios higher than Rater 2, a Morrison School faculty member. Based on comments by the two raters, approaches to scoring may account for the differences. Rater 2 more frequently commented on details such as presentation style, tone, and mechanics whereas Rater 1 more frequently seemed to take a holistic approach to the portfolio and was more forgiving of minor mechanical errors. Since Rater 2 is a faculty member in the Morrison School, these results are significant for us to both understand disciplinary values of our stakeholders and, in combination with other data, to improve the course.

Which assignments do students choose to include in their portfolios (and concomitantly, which do they omit)?

All sections of TWC347 use a common syllabus and set of assignments. The course is constructed around a role playing scenario in which students create their own small business and write as a business owner to a variety of audiences, both internal and external. The scenario mimics, as much as possible in a classroom setting, the types of writing students are expected to do as managers in the workplace.

The course consists of four core units: correspondence (email, memo, letter), meeting documents (agenda and minutes), a policy, and a proposal. An initial branding assignment asks students to create a logo for use in stationary and other documents for each of these written assignments. Students are required to write a short reflective essay to accompany their logo to address their decision-making related to design. In addition, prior to composing the email assignment, students complete an audience analysis. Drafts are required for two assignments for peer review. A research summary is required as part of the policy assignment. In addition, each student is responsible for leading a "manager round table" (MRT) once during the semester and for participating in all others. MRTs are designed to help students to learn how to organize and lead a meeting and to actively participate in one.

Table 1 presents how many portfolios included each of the assignments. The majority of students chose to include assignments representing three of the four core units (correspondence, policy, proposal) and MRTs. Students perhaps recognize the emphasis placed on these assignments in course documents or that they are the most substantial in the course. In addition, the branding assignment was well represented in both fall and spring semesters. Students overwhelming stated in their portfolios that they enjoyed the role-playing scenario as a way to enhance the "real world" character of the writing and as a creative activity. These two reasons may have been factors in students' decisions to include their logo in their portfolio.

Table 1. Assignments Included in Portfolios

	Fall 2008	Spring 2009
Branding	9	11
Agenda	4	7
Minutes	2	7
Audience Analysis	6	1
Email	4	5
Memo	11	14
Letter	8	14
Policy	9	10
Proposal	10	10
Manager Roundtable	10	12
Peer Reviews	4	5
Research Summary	3	3
Drafts	1	3

Few students included documents representing the meeting unit during Fall 2008. This unit was included in the course design as the result of focus groups conducted with local industry representatives during summer 2006 as part of an overall course redesign (D'Angelo & White, 2008). Employers stressed that new employees have difficulty understanding how to organize, run, and participate in meetings. To address this need, we incorporated the meeting unit to help students learn how to write and use agendas and minutes. Based on instructor feedback after the Fall 2008 semester, we believed that students may initially have perceived that composing an agenda and minutes were "easy" assignments or less substantial than other more lengthy genres. Instructors also felt the course design did not make clear the importance of crafting these documents well in order to bring structure and effectiveness to a meeting. As a result, we made some adjustments to the syllabus and assignments for Spring 2009 to emphasize the importance of these documents and now require students to construct an agenda for the MRT which they lead. Further, we added a requirement for the students to submit an evaluation of each MRT, including how well the agenda had been used to organize and prepare for it. More students included these documents in their portfolio in Spring 2009 and more statements referred to their importance in organizing and running good meetings.

Few students included other process documents and assignments. Only one student included the reflective essay from the branding assignment. Since ethos and audience are objectives of the course, the omission of the essay is interesting. In addition, the omission of other process documents required in the course is perplexing since course objectives include writing processes. It is possible that students may have been reluctant to include documents which did not highlight their best work. Students are aware that the purpose of the portfolio is to demonstrate that they had achieved course objectives and, therefore, it would be understandable if they chose to include the work they believed best illustrated that achievement. The reluctance of students to include these types of documents to show growth and learning is something we have yet to address but clearly impacted scores by Rater 2 for the Processes category. We are contemplating pedagogical approaches to strengthen how the writing process is perceived by students and to emphasize that the use of process documents strengthens their argument about their learning.

How do students organize their portfolios as an argument to demonstrate their learning?

The majority (26) of students organized their portfolio generically with an introduction, a body which included claims and evidence, and a conclusion. In these generically organized portfolios, students presented an overall reflection about the course, described artifacts individually without context, and summed up in a conclusion. Seven students used some other type of organization. While all had an introduction, body, and conclusion, these seven portfolios were arranged more contextually, either by highlighting best vs. worst assignments, by strengths vs. weaknesses, or by course objectives. Organization did not appear to influence readers, however. Scores for students who used a non-generic organizational format did not receive notably higher scores than others and raters did not comment on the arrangement of portfolios in their comments.

Without interviewing or observing the raters, it is difficult to understand why this was the case. Sample size may have been a factor as could the scoring guide itself since a 4-point scale may not have given raters enough differentiation to reflect nuances of sophistication in the portfolio statements. An organization based on contextualizing an argument based on course objectives or on the students' strengths and weaknesses would seem at first glance to be a stronger organizational strategy. Whether this trend continues is something that we intend to watch as we continue to collect data.

What persuasive techniques do students use to support their argument for learning?

Based on Bower's set of codes using Aristotle's persuasive appeals, ethos, nomos, pathos, and logos were all well represented. Statements coded as nomos were almost entirely references to course outcomes or objectives. Students who used ethos or pathos to appeal to the reader tended to make statements asserting their authority or emotional appeals once. On the other hand, the use of logos—in which students demonstrated achieving objectives by supporting claims—tended to be repeated multiple times.

Nomos was used in 21 of the 34 portfolios. In almost all cases in which nomos was used, students either included the list of course outcomes or referenced course values in some way. For example, in Portfolio #4 the student commented that "ensuring you write your message according to your audience is pertinent." Given the emphasis in the course on understanding and analyzing audiences in order to write and communicate effectively, it is not surprising that students such as this one came to the conclusion that it was a course value.

Table 2. Use of Appeals

	# of portfolios	Total # of statements
Ethos	14	19
Nomos	21	31
Pathos	17	29
Logos	23	51
Artifact Selection	10	11
Skills Supported	23	65
Skills Unsupported	18	39
Process	20	24
Ability Positive	7	7
Ability Negative	5	5
Improvement	10	11
Grade	1	1
Schmooze	19	30
External Learning	2	2

The use of logos included a statement of claim and clear linkage to evidence to support that claim. In many cases, this was manifested by the use of arrows or highlighting in the design of the portfolio to link the claim to the artifact to ensure reviewers could "see" the evidence clearly. Twenty-three students used logos, typically multiple times within the portfolio. The same number of portfolios was coded as "Skills Supported" using the categories based on Toulmin's theory of argumentation. This is not surprising since the category represents statements of support for a claim. For 13 portfolios both logos and Skills Supported codes were accompanied by Improvement, indicating that students recognized mistakes and improvements needed in their writing and then provided evidence to support that recognition. However, 18 students made unsupported claims; of these, eight students made unsubstantiated claims only. On the other hand, 13 students supported all of their claims while ten included both supported and unsupported claims. This is an area for us to look into more closely as we continue with this project, particularly since there seems to be little correlation with scores. While we are pleased at the number of students to use logos and support their claims related to learning, nearly 1/4th only made unsubstantiated claims. Limitations of this research prevent us from understanding why this is the case—whether it was a failure of the student to understand how to construct an argument, rushing through the portfolio statement, or other reasons. One strategy we are attempting to develop is pedagogical approaches related to persuasion within class activities. Another potential strategy is to strengthen the research summary assignment to enhance the tie between finding and summarizing evidence to its use for persuasion and argumentation.

Seventeen students incorporated pathos to persuade their audience, most often these statements referred to initial fear or anxiety at the beginning of the course. If not fear, pathos was more positively expressed as excitement about the role playing scenario of creating a business. In this case, pathos and the Tone Positive code were linked. In no case was pathos used successfully by a student to support a claim as it was never used to link an assertion to evidence. Instead, pathos was a more holistic or implicit appeal used to set the tone for the overall portfolio.

Table 3. Tone, Types of Appeal

	# of portfolios
Growth	28
No Growth	6
Positive Tone	24
Negative Tone	3
Intermediate Tone	7
Explicit Appeal	2
Implicit Appeal	14
No Appeal	18

It is tempting to interpret the use of pathos in this case as an attempt to schmooze the instructor in order to gain sympathy or as a form of nomos to express enthusiasm for the course. However, the codes for pathos and schmooze were linked in only four portfolios. More often, schmooze was linked with either implicit or explicit appeals. Only two students attempted to appeal to reviewers explicitly, addressing the reader using "you" to draw the reader's attention to an area the student believed showed off his or her work at its best. Implicit appeals were more subtle and tended to flatter either the course with statements such as "this course was the most thought-provoking course I have taken at ASU" (Portfolio 9) or the teacher such as "X made the course enjoyable" (Portfolio 6) or to thank the instructor for their help, instruction, or interest. These statements occurred in 19 portfolios despite instructions in the assignment which specifically ask students not to engage in this type of flattery. Whether these statements are genuine attempts by the student to compliment and thank their instructor at the end of the course or attempts to influence their grade could not be determined by this research.

Fourteen students used ethos as a means of persuasive appeal. Most of these statements asserted their authority as writers or managers by referring to their jobs or to previous writing situations in which they had done well. In some cases, ethos was used to discuss the student's goals for the course or career. In no case was ethos used successfully to support a claim. Instead, students used ethos similar to pathos to set a tone for the portfolio by asserting credibility or authority as a writer. However, many comments by portfolio raters indicate that the design and presentation of portfolios by students lacked credibility and undermined the purpose of the portfolio. Establishing a professional ethos is an emphasis of the course. Since assignments revolve around student's role playing as business owners, we consistently emphasize the use of tone, style, and content to convey the ethos of both the individual and the company. However, the portfolio assignment shifts students out of the role playing scenario. Based on results from Fall 2008 and Spring 2009, we believe students may fall back on the ethos of a student writing to an instructor in their portfolio statement rather than maintaining the professional ethos of a business owner. To address this, we are considering having students continue in their role playing by addressing their portfolio statement to a chair of the board of directors for their company or some other external audience that would place them in a business communication scenario rather than as a student writing to instructor. In addition, we are adding a new MRT topic towards the end of the semester in which students will evaluate a professional PowerPoint. We intend this new topic to reinforce how design conveys (or undermines) professionalism.

What tone and style do students use?

Twenty-four portfolios used a positive tone while only three used a negative tone. The tone of 6 was unidentifiable as they expressed neither an explicitly positive nor negative attitude towards the course, instructor, or their work. The majority of portfolios exhibiting a positive tone is not surprising since students were aware they were submitting the portfolio for coursework that would be graded. As mentioned earlier, positive tone was frequently associated with pathos in student assertions of excitement about the role playing scenario.

Do students present an argument for their own learning or to enhance their grade?

The majority of students in this research supported claims by presenting an artifact and drawing the reader's attention to the specific instances of proof related to the claim. This finding contrasts with Bower who found that students generally made claims but did not provide support and that they typically argued for a better grade than they did for growth in their writing. Others (see Costello et al., 2008, for example) have found similar results. The difference in results may be due to different demographics represented by the study since TWC347 is a junior-level course and the other studies were conducted with first-year composition students. The context and detail of instructions may also have resulted in a different level of student understanding of the purpose for the portfolio. The difference in our results from these earlier studies speaks to the need for longitudinal studies to determine how student approaches to and attitudes toward writing change from first-year composition through their advanced disciplinary business communication courses.

The use of portfolios for learning and for assessment represents two different purposes. Portfolio pedagogy typically emphasizes metacognition and self-assessment on the part of the student so that s/he critically analyzes his/her work. On the other hand, the use of portfolios as an assessment tool is intended to measure specific characteristics or outcomes. Scott found that students "…saw the composition of the reflective letter primarily as a bureaucratic exercise rather than as an empowering or even worthwhile learning event." (p. 26) As a result, they learned to adapt the genre to achieve favorable scores. Of course, one could argue that by doing so students are demonstrating the rhetorical goals of a course such as TWC347 in which they are analyzing their audience and using the means of persuasion they believe will best lead to a good grade. If that is the case, then we could argue that students demonstrated learning of audience in that they constructed portfolios which met the intended purpose and expectations of its audience. This can be seen in the Rhetorical Knowledge and Critical Thinking, Reading, and Writing scores which were typically higher than Processes and Knowledge of Conventions scores. In addition, the frequent use of nomos to appeal using course values and ethos to establish credibility of the portfolio writer indicates that students attempt to meet the purpose of the portfolio assignment (achievement of outcomes) and expectations of the audience (faculty) by demonstrating their learning.

Conclusion

The primary purpose of assessment for TWC347 is to improve course design and pedagogy. To accomplish this, we collect data through portfolio scoring, feedback from instructors, and content analysis of portfolio cover statements. As indicated by the changes mentioned above, we have begun to adjust and adapt the course based on the results of portfolio scoring, content analysis, and instructor feedback.

We consider the results of assessment, including the content analysis, to be preliminary since the research encompassed two semesters only. We plan to continue the portfolio assessment project and to collect data from instructors and students at the end of each semester. We recognize that more data is needed and that several questions have been raised that we cannot yet address or answer. In addition, we are cognizant of the reality that our students ultimately must be able to transfer what they learn in the course to their workplace writing. To reinforce the need to apply what they learn, we would like to add evaluators from local industries. Since some of the course design (MRTs) were the result of industry focus groups, bringing them into the assessment process will be an important step for us to take. To date, that has not been possible due to budget and other resource issues. In the meantime, we believe that our preliminary results have allowed us to make changes to the course based on assessment results. Changes which will continually be assessed to ensure course design and improvement is based on data. Further, we are demonstrating that, when considered research, assessment is a valuable tool for making informed decisions about what and how we teach.

References

Allen, J. (1994). Assessment methods for business communication: Tests, portfolios, and surveys. *The Bulletin*, 1-5.

Bower, L.L. (2003). Student reflection and critical thinking: A rhetorical analysis of 88 portfolio cover letters. *Journal of Basic Writing, 22*(2), 47-66.

Costello, C. L., Hudson, D., & Leathers Dively, R. (2008 March). *Reflection and rhetorical facility: Exploring the realities of assessing the portfolio preface as English 101 capstone*. Paper presented at the Fifty-Ninth Annual Convention of the Conference on College Composition and Communication, New Orleans, LA.

D'Angelo, Barbara J. & Maid, Barry M. (2009). Assessing outcomes in a technical communication capstone. In C. Schreiner (Ed.), *Handbook of Research on Assessment Technologies, Methods, and Applications in Higher Education* (152-166). Hershey, PA: IGI Global.

D’Angelo, B.J. & White, O. (2008 October-November). *Learning from Our Stakeholders: Using Research to Redesign a Business Writing Course*. Paper presented at the Association for Business Communication Annual Convention, Lake Tahoe, NV.

Dillon, W. Tracy (1997). Corporate advisory boards, portfolio assessment, and business and technical writing program development. *Business Communication Quarterly, 60*(1), 41-58.

Dubinsky, J. (2008 October-November). *ePortfolios: Hope or hype for students and teachers?* Paper presented at the Association for Business Communication Annual Convention, Lake Tahoe, NV.

Dubinsky, J. (2003). Creating new views on learning: ePortfolios. *Business Communication Quarterly, 66*(4), 96-102.

Elliot, N.; Kilduff, M. & Lynch, R. (1994). The assessment of technical writing: A case study. *Journal of Technical Writing and Communication, 24*(1), 19-36.

Huot, B. (2002). *(Re)articulating writing assessment for teaching and learning*. Logan, UT: Utah State University Press.

Johnson, C.S. (2006). The analytic assessment of online portfolios in undergraduate technical communication: A model. *Journal of Engineering Education*, 279-287.

Maid, B. M. (2005). Using the outcomes statement for technical communication. In S. Harrington, K. Rhodes, R. Overman Fischer & R. Malenczyk (Eds.), *The outcomes book. debate and consensus after the WPA outcomes statement* (pp. 139-149). Logan, UT: Utah State University Press.

Ostheimer, M.W. & White, E.M. (2005). Portfolio assessment in an American engineering college. *Assessing Writing*, *10*, 61-73.

Scott, T. (2005). Creating the subject of portfolios. Reflective writing and conveyance of institutional prerogatives. *Written Communication, 22*(1), 3-35.

Warnock, S. (2009). Methods and results of an accreditation-driven writing assessment in a business college. *Journal of Business and Technical Communication, 23*(1), 83-107.

White, E. M. (2005). The scoring of writing portfolios: Phase 2. *College Composition and Communication, 56*(4), 581-600.

Biography

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