

# How To Create High-Impact Writing Assignments That Enhance Learning and Development and Reinvigorate WAC/WID Programs: What Almost 72,000 Undergraduates Taught Us

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**Abstract:** This article reports on a study that suggests ways that Writing Across the Curriculum/Writing in the Disciplines (WAC/WID) programs can increase the effectiveness of their efforts, including implementation of writing-intensive courses, which are one of the Association of American Colleges and Universities' High-Impact Educational Practices. The study involved a collaboration between the Council of Writing Program Administrators (CWPA) and the National Survey of Student Engagement (NSSE) investigating the relationship between student writing and gains in learning and personal development. Twenty-seven questions focusing on writing were appended to the regular NSSE survey and administered at 80 bachelor's degree-granting institutions in the United States, yielding 29,634 surveys from first-year students and 41,802 surveys from seniors. Statistical analysis of the results identified three constructs relating to the way writing is assigned and used in coursework: Interactive Writing Processes, Meaning-Making Writing Tasks, and Clear Writing Expectations. More than the amount of writing students reported doing, these three high-impact writing practices were positively associated with several established constructs in the NSSE survey relating to students' participation in deep learning activities and to their personal and social development. Results of the study suggest important implications for how writing is integrated into coursework across the curriculum, what WAC and WID leaders can do to strengthen their cross-curricular implementation of writing, and how research can continue to explore the relationships between writing and learning in multiple settings.

What happens when students write in courses across the curriculum? What gains, if any, accrue to their learning of the course material or their general intellectual, social, and academic development? Is there a tangible payoff for teachers to spend the (often significant) time to design writing assignments, weave them into their courses, support students' progress, and respond to the resulting texts with either formative or summative evaluative comments?

These may seem to be odd questions to ask in a contribution to a special issue devoted to writing and the Association of American Colleges & Universities' (AAC&U's) list of High-Impact Educational Practices (HIPs) (Kuh, 2008). After all, writing-intensive (WI) courses across the curriculum are already included in

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the HIPs, suggesting that they provide a significant payoff. By extension, AAC&U's endorsement of WI courses is also interpreted by many as support for the inclusion of some (or more) writing, of whatever kind, in every course, not just those designated as writing intensive. However, the AAC&U also cautions that "While high-impact activities are appealing, ... to engage students at high levels, these practices *must be done well*" (Kuh, 2008, p. 20; italics in original). The purpose of this article is to explore what it means to "do well" when incorporating writing in courses across the curriculum.

Among the HIPs, there is good reason for focusing especially on writing. First, to the extent that it enhances learning, writing could affect students' experiences with any of the other HIPs. For example, in concert with Common Intellectual Experiences (HIP 2), many schools ask all incoming first-year students to read a common book before coming to campus. Various activities, including convocations, small-group discussions, and talks by the book's author, are designed to unite new students and faculty around a common theme and model university-level academic conversations and critical reflection. Encouraging or requiring students to respond in writing to well-designed prompts could strengthen the experience of reading the common book and engaging in the campus activities around it. Writing assignments allied with internships, study abroad, and other HIPs could be equally helpful.

A second reason for exploring what it means to do well with writing is that nearly 100 years of research on the effectiveness of writing as a tool for learning offers more ambiguous results than AAC&U's monograph on HIPs suggests. To demonstrate the positive results of most HIPs, the AAC&U monograph reports data from the National Survey of Student Engagement (NSSE) showing the relationships of the HIPs with various goals of undergraduate education, such as engagement in deep learning activities and self-reported personal, practical, and general gains. However, NSSE does not gather data on WI courses. For research supporting the inclusion of WI courses among the HIPs, the monograph refers to two books in a footnote. The first (Bok, 2006) offers an enthusiastic argument for the teaching of writing throughout students' college years, but does not discuss a link between writing and enhanced learning of subject matter. In the second, Light (2004) reports that the more pages students write in a course, the more time they spend on the course, the more intellectually challenging they perceive it to be, and the more engaged they feel in it. However, the use of the variable "amount of writing" is questionable, as we will show.

Still, at least as early as the 1920s (Ulrich, 1926), researchers demonstrated writing's ability to increase student learning in certain settings. Inspired by the research of Britton et al. (1975) and by Emig's (1977) sweeping assertion that "[w]riting represents a unique mode of learning" (p. 122), writing specialists sought a more prominent place for writing across all areas of the curriculum. Over the years, the WAC movement grew rapidly in both the United States and internationally, although sometimes under different names and with different emphases (Thaiss & Porter, 2010). Leaders of the movement have consistently assumed that "more writing leads to more learning," which eventually claimed support from three large-scale studies that weren't specifically about writing (Arum & Roksa, 2011; Astin, 1992; Light, 2004). In recent years, other theories—based, for instance, on neuroscience (Willis, 2011) and genre (Bazerman, 2009)—have buttressed the conviction that writing enhances learning in any course or program. The emphasis on "more" hardly seems controversial to most leaders of WAC programs; as the recently issued *Statement on WAC Principles and Practices* argues, a foundational goal of WAC programs is to "increase the amount and frequency of student writing, as well as offer students more sustained instruction in writing, in more courses, spread out over their academic careers" (Ad Hoc Committee, 2014, p. 2).

Yet the evidence that "more is better" has not proven as persuasive as proponents of WAC have desired. Of the 642 respondents to a survey of four-year U.S. colleges and universities, almost half (47%) reported that they don't have a WAC/WID program and/or a writing requirement beyond the first year (Gladstein, 2014). Of the 203 respondents from two-year institutions, the proportion without such programs and/or requirements was just over three-quarters (77%). Institution-wide skepticism about the cross-curricular integration of writing has led many WAC programs to operate in an evangelical mode, trying to cultivate allies—individual faculty or departments—to incorporate writing into their pedagogy, hoping that their

successes will lower the resistance of their colleagues. Even some writing specialists have expressed skepticism about writing to learn. Schumacher and Nash (1991) called research on writing to learn "confusing" (p. 67). Noting several shortcomings in 35 studies he reviewed, Ackerman (1993) concluded that they do "not provide the long-sought empirical validation of writing as a mode of learning" (p. 334). Assessing a broader range of the published research on writing and learning, Ochsner and Fowler (2004) argue that the efflorescence of the writing-to-learn movement is based primarily on testimonials from those predisposed to accept its claims and by adherence to orthodoxy among writing specialists. In a meta-analysis of 48 studies, Bangert-Drowns, Hurley, and Wilkinson (2004) caution that "the simple incorporation of writing in regular classroom instruction does not automatically yield large dividends in learning" (p. 51), even as they state that "one can reasonably expect some enhancement in learning from writing and that the enhancement is optimized by contextual factors" (p. 51). The most compelling research on writing to learn may be Graham and Hebert's (2011) meta-analysis of 95 experimental and quasi-experimental studies conducted between 1930 (Barton, 1930; Newlun, 1930) and 2008 (Conrad, 2008), which identified three writing strategies and seven substrategies for helping students in grades 1 through 12 to improve their reading. However, several of these writing strategies seem inappropriate for students in higher education, such as teaching sentence and paragraph structure (p. 732). Also, the claims of the WAC movement extend far beyond writing's ability to improve students' reading skills.

We return, then, to the question of what it means to "do well" with writing—well enough to justify its place among AAC&U's HIPs. Is it enough simply to persuade faculty in all disciplines to use writing in their content-focused courses? Does it suffice to define such requirements for writing-intensive courses as a minimum number of words written, a maximum number of students per section, and a provision that the instructor give feedback on drafts? Does simply increasing the number of assignments that students complete guarantee that they will learn challenging material more effectively (and perhaps improve their writing skills along the way)?

In a 2015 issue of *Research in the Teaching of English (RTE)*, we reported on a partnership between the Council of Writing Program Administrators (CWPA) and the National Survey of Student Engagement (NSSE) that addressed the relationship between writing and learning in a new way. In this project, we appended a set of questions about writing to the regular NSSE survey and used the data to identify three features of writing assignments that were associated with increased learning and development—above and beyond demographic variables, other forms of engagement, and the sheer quantity of writing that students were assigned (Anderson, Anson, Gonyea, & Paine, 2015). These three features—engaging students in interactive writing processes, creating meaning-making writing tasks, and providing clear expectations—expand our conceptual framework for understanding writing's relationship with student learning. The findings establish an additional benefit of writing for college students, namely increased social and personal development. As newly articulated high-impact practices, they also offer practical guidance for the design and implementation of writing assignments. In this article, we will summarize the CWPA/NSSE study and its results and discuss the study's significance for writing specialists, especially WAC/WID program administrators, and for writing instructors and writing researchers.

## History and Goals of the Study

The CWPA/NSSE partnership began when one of us (Paine) realized that NSSE, which gathers information from hundreds of thousands of students at U.S. colleges and universities, might be able to help writing specialists learn more about writing instruction and its impact on student learning. The NSSE was already well established and was continuing to collect and analyze a large amount of data focusing on student learning, engagement, and many curricular, co-curricular, and other factors that could correlate with measures of writing instruction and provide strategically useful information to institutions interested in student success, retention, and completion. At the same time, experts at NSSE were themselves interested in developing topical modules that ask about specific areas of college education (a NSSE feature since 2013).

The resulting partnership was officially launched at the 2007 annual meeting of the Council of Writing Program Administrators in Tempe, AZ, where approximately 35 writing teachers and administrators spent two hours discussing what they would like to learn from the partnership and the kinds of questions they thought could be profitably added to a special module on writing. Our original goal was to develop a snapshot of college and university writing instruction by asking the question: To what extent is the writing assigned to students across the nation incorporating what writing specialists consider to be best practices? Participants in the meeting generated an extensive list of potential questions. Soon after the conference, the questions were posted on WPA-L, the organization's listserv, yielding a helpful discussion and an expansion to 150 items. With these experts' help, the list was eventually whittled down to 27 questions that could be appended to the existing NSSE survey.

To assure that the 27 questions would be phrased unambiguously for student respondents, we refined them with the help of student focus groups and the experience and expertise of NSSE's survey designers. In 2010 and 2011, 80 bachelor's degree-granting schools in the U.S. volunteered to participate. Over 70,000 first-year students and seniors responded. The schools approximated the range of baccalaureate institutions in the U.S., with some overrepresentation of research universities, and the characteristics of the student respondents were representative of students in US bachelor's degree-granting institutions.

As we examined the data and shared it with colleagues at conferences and in various reports, our understanding of the most fruitful ways to analyze the student respondents' answers gradually evolved. Ultimately, we became interested in expanding the conversation about the relationship of writing to learning. Up to that point, the voluminous literature in WAC consisted mainly of small-scale studies that tested the effectiveness of specific writing assignments in a single section or a small number of sections of a particular course. Because each study was so firmly embedded in its own context, it was impossible to derive empirically verifiable generalizations about best practices in creating writing assignments. Among the small-scale studies, the writing interventions and the definitions of learning also varied considerably, causing the equivocal results of meta-analyses, as described above. However, we were especially interested in the three larger-scale studies that reported on a relationship between the amount of writing college students did and certain desirable learning outcomes (Astin, 1992; Light, 2004; Arum & Roksa, 2011). The implication derived from these studies is to support the WAC movement's general advocacy of more writing across the curriculum, of whatever kinds and however assigned. Often, this advice is accompanied by examples of the kinds of assignments that WAC/WID specialists imagined to be especially effective in promoting learning. Admonitions for faculty to include more writing in their discipline-based courses have not always produced the hoped-for result. Analyzing approximately 21,000 writing assignments given at 100 undergraduate courses across the disciplines at 100 schools, Melzer (2009) found that about two-thirds were addressed to the teacher-as-examiner and nearly a quarter were short-answer exam questions. Such assignments are not likely to engage students in deeper forms of critical analysis or dialogic explorations of challenging subject matter, but instead to have them render correct answers in simplistic prose.

Against the background of this emphasis on the single strategy of "more is better," we were interested in finding out whether certain generalizable principles could be discerned for using writing to enhance learning and that therefore would enable faculty in any discipline to gain the maximum benefit from the writing they incorporate in their courses. This project involved two major steps using specialized statistical procedures, which are detailed in our *RTE* article. Here, we will summarize these procedures and then discuss the implications of the results for writing specialists, including FYC/WAC/WID program administrators as well as writing instructors and researchers.

## Summary of the Study

Our study involved two major steps. First, we identified three latent constructs for effective writing assignments that appeared to be present within the new set of 27 questions. Latent constructs are theoretical

variables (such as intelligence, empathy, and introversion) that can't be observed directly. As the examples suggest, latent constructs are often the topic of research in sociology, psychology, and other social sciences. These constructs are defined operationally by measuring observable behaviors that are proxies for them. Often, the behavior measured takes the form of responses to a set of questions, as when intelligence is measured by answers on an IQ test. Using confirmatory factor analysis (CFA), we ultimately verified three constructs using 15 of our 27 questions<sup>[3]</sup> (see Table 1).

- Interactive Writing Processes occur when student writers communicate orally or in writing with one or more persons at some point between receiving an assignment and submitting the final draft. The person might be the instructor, another student in the class, a friend or family member, or any other individual or group, such as tutors in a writing center.
- Meaning-Making Writing Tasks occur when students engage in some form of integrative, critical, or original thinking. Examples include asking students to apply a concept learned in class to their past experience, relate knowledge learned in another class to knowledge in the current class, support a contestable claim with evidence, or evaluate a policy, practice, or position.
- Clear Writing Expectations occur when instructors provide students with an accurate understanding of what they are asking the students to demonstrate in an assignment and the criteria by which the instructors will evaluate the students' submissions.

**Table 1. Constructs for Effective Writing Practices**

Constructs	Questions
Interactive Writing Processes	<p>For how many of your writing assignments have you:</p> <ul style="list-style-type: none"> <li>• Talked with your instructor to develop your ideas before you started drafting your assignment</li> <li>• Talked with a classmate, friend, or family member to develop your ideas before you started drafting your assignment</li> <li>• Received feedback from your instructor about a draft before turning in your final assignment</li> <li>• Received feedback from a classmate, friend, or family member about a draft before turning in your final assignment</li> <li>• Visited a campus-based writing or tutoring center to get help with your writing assignment before turning it in</li> </ul> <p>In how many of your writing assignments has your instructor:</p>

	<ul style="list-style-type: none"> <li>• Asked you to give feedback to a classmate about a draft or outline the classmate has written</li> </ul>
Meaning Making Writing Tasks	<p>In how many of your writing assignments did you:</p> <ul style="list-style-type: none"> <li>• Summarize something you read, such as articles, books, or online publications</li> <li>• Analyze or evaluate something you read, researched, or observed</li> <li>• Describe your methods or findings related to data you collected in lab or field work, a survey project, etc.</li> <li>• Argue a position using evidence and reasoning</li> <li>• Explain in writing the meaning of numerical or statistical data</li> <li>• Write in the style and format of a specific field (engineering, history, psychology, etc.)</li> </ul>
Clear Writing Assignments	<p>In how many of your writing assignments has your instructor:</p> <ul style="list-style-type: none"> <li>• Provided clear instructions describing what he or she wanted you to do</li> <li>• Explained in advance what he or she wanted you to learn</li> <li>• Explained in advance the criteria he or she would use to grade your assignment</li> </ul>

Note: Response options were no assignments, few assignments, some assignments, most assignments, or all assignments.

Next, we correlated how often students participated in the three writing constructs with their responses to previously established indicators of learning and development already measured by the NSSE survey. We used six scales (valid and reliable sets of related questions) from the regular NSSE to which our writing questions had been appended. The first three scales measure student engagement in Deep Approaches to Learning (see Table 2).

- *Higher-Order Learning* concerns how much students say their coursework emphasizes analyzing experiences and theories, synthesizing concepts and experiences into more complex relationships, making judgments about the value of information, and applying learned concepts to practical problems.
- *Integrative Learning* concerns the students' engagement in combining ideas from various sources, such as including diverse perspectives in coursework, using ideas from different courses in assignments or class discussions, and discussing course concepts with either faculty members or others outside of class.

- *Reflective Learning* concerns students' self-examination of views on a topic, understanding the perspectives of others, and learning that changes the way they understand an issue.

**Table 2. Deep Approaches to Learning Scales and Items**

Constructs	Questions
Higher Order Learning Activities <sup>a</sup>	<p>During the current school year, how much has your coursework emphasized the following mental activities?</p> <ul style="list-style-type: none"> <li>• ANALYZING the basic elements of an idea, experience, or theory, such as examining a particular case or situation in depth and considering its components</li> <li>• SYNTHESIZING and organizing ideas, information, or experiences into new, more complex interpretations and relationships</li> <li>• MAKING JUDGMENTS about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions</li> <li>• APPLYING theories or concepts to practical problems or in new situations</li> </ul>
Integrative Learning Activities <sup>b</sup>	<p>In your experience at your institution during the current school year, about how often have you done each of the following?</p> <ul style="list-style-type: none"> <li>• Worked on a paper or project that required integrating ideas or information from various sources</li> <li>• Included diverse perspectives (different races, religions, genders, political beliefs, etc.) in class discussions or writing assignments</li> <li>• Put together ideas or concepts from different courses when completing assignments or during class discussions</li> <li>• Discussed ideas from your readings or classes with faculty members outside of class</li> <li>• Discussed ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.)</li> </ul>
Reflective Learning Activities <sup>b</sup>	<p>During the current school year, about how often have you done each of the following?</p> <ul style="list-style-type: none"> <li>• Examined the strengths and weaknesses of your own views on a topic or issue</li> <li>• Tried to better understand someone else's views by imagining how an issue looks from his or her perspective</li> <li>• Learned something that changed the way you understand an issue or concept</li> </ul>

- a. Response options were very little, some, quite a bit, and very much.
- b. Response options were never, sometimes, often, and very often.

The other three NSSE scales—collectively called Perceived Gains in Learning and Development—measure how strongly students believed that their experiences at their institution contributed to their knowledge and development in three broad areas (Table 3).

- *Perceived Gains in Practical Competence*, including acquiring job- or work-related knowledge and skills as well as the ability to work effectively with others, using computing and information technology, analyzing quantitative problems, and solving complex real-world problems.
- *Perceived Gains in Personal and Social Development*, including learning independently, understanding oneself, understanding other people, developing a personal code of values and ethics, and contributing to the community.
- *Perceived Gains in General Education*, including the ability to write and speak clearly and effectively, and to think critically and analytically.

**Table 3. Perceived Gains in Learning and Development Scales and Items**

Constructs	Questions
Perceived Gains in Practical Competence	<p>To what extent has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas?</p> <ul style="list-style-type: none"> <li>• Acquiring job or work-related knowledge and skills</li> <li>• Working effectively with others</li> <li>• Using computing and information technology</li> <li>• Analyzing quantitative problems</li> <li>• Solving complex real-world problems</li> </ul>
Perceived Gains in Personal and Social Development	<p>To what extent has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas?</p> <ul style="list-style-type: none"> <li>• Developing a personal code of values and ethics</li> <li>• Understanding yourself</li> <li>• Understanding people of other racial and ethnic backgrounds</li> <li>• Voting in local, state (provincial), or national (federal) elections</li> <li>• Learning effectively on your own</li> <li>• Contributing to the welfare of your community</li> </ul>

	<ul style="list-style-type: none"> <li>• Developing a deepened sense of spirituality</li> </ul>
Perceived Gains in General Education	<p>To what extent has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas?</p> <ul style="list-style-type: none"> <li>• Writing clearly and effectively</li> <li>• Speaking clearly and effectively</li> <li>• Acquiring a broad general education</li> <li>• Thinking critically and analytically</li> </ul>

Note: Response options were very little, some, quite a bit, and very much.

In addition to assessing the relationships of our three new constructs to the six scales, we also assessed the relationships of the amount of writing—the only other generalizable variable present in the discussions of writing and learning—to the scales. To estimate a total number of pages written in their courses over the academic year, we used each student's responses to three questions in the regular NSSE about the number of assignments of various lengths that they completed (fewer than 5 pages, 5 to 19 pages, or 20 pages or more).

We found positive bivariate correlations that were generally moderate in strength between the writing scales and both the Deep Approaches and Perceived Gains scales. We then isolated the impact of the three writing constructs on each of the six scales by using blocked hierarchical regression models to control for the other variables that might account for the correlations, including institutional and personal characteristics, participation in other relevant forms of engagement (such as amount of assigned reading, group work, high institutional expectations, and involvement in high-impact practices), and—most notably—the amount of writing.

As expected, we found that the other forms of engagement accounted for a good deal of variation in the six scales. For Deep Approaches to Learning they explained 19% to 41% of the variance, and for Perceived Gains in Learning and Development they explained 24% to 29% of the variance. However, when we controlled for these and other variables, including the amount of writing, our three constructs still explained an additional 4% to 6% of the variance in two of the Deep Approaches scales and all three of the Perceived Gains scales. In every case, the net effects of our three constructs exceeded the net effect of the *amount* of writing, which explained less than 1% of the variance.

In sum, this research project has added new dimensions to the study of writing's relationship to learning. The study also established that the impact of the three constructs, derived from best practices in writing as identified by writing specialists, has a stronger relationship to learning and development than does the number of pages students write. In other words, the quality of assignments and what students do to produce them appear to contribute to these aspects of student development more strongly than quantity alone. This is not to suggest that students will not gain from writing in response to assignments that don't incorporate the high-impact practices we have articulated here. Like any activity, simply practicing, even without guidance or response, may be preferable to nothing, although more research is needed to compare audience-less self-sponsored writing with self-sponsored writing that takes places in richly dialogic contexts (see Anson, forthcomingA). Instead, our findings suggest that some minimal effort on the part of instructors can *significantly enhance* students' learning experiences, leading to more tangible gains.

In addition, our study has also demonstrated that effective writing assignments may, according to students' perceptions, enhance personal and social development. Specifically, the three constructs for effective writing assignments are associated with students' Perceived Gains in Personal and Social Development, a NSSE scale that combines questions about "developing a personal code of values and ethics," "understanding people of other racial & ethnic backgrounds," and "learning effectively on your own." This scale, then, is a measure of one of various non-cognitive domains that have been identified in recent decades as essential to deeper learning and transferable knowledge and skills. Baxter Magolda (2014), for instance, argues that "self-authorship"—or "the internal capacity to construct one's beliefs, identity, and social relations" (p. 25)—must be considered part of a "holistic perspective" on college learning because it is "inextricably intertwined" with other kinds of learning and development (p. 26). Similarly, the National Research Council (NRC) (Pellegrino & Hilton, 2012) concludes that students who "develop intertwined cognitive, interpersonal, and intrapersonal competencies" achieve deeper learning and develop transferable 21st-century skills (p. 99). However, to our knowledge, this highly desirable outcome of higher education has not been included in discussions of the benefits of writing for college students.

## Limitations

Three limitations of our study suggest the value of additional research. The sizeable and diverse set of bachelor's degree-granting colleges and universities that volunteered to participate approximates, but does not precisely duplicate the population of such institutions in the United States. It also does not include K-12, associate degree, and graduate students, who are included in the broad research literature on WAC/WID. Also, our second independent variable, perceived gains, depends on self-reports, which do not always coincide with direct tests of cognitive or non-cognitive (affective) gains, although there is reason to believe that they serve as important attitudinal measures about learning experiences (Gonyea & Miller, 2011; Pascarella & Terenzini, 2005). Third, our survey asked students at the 80 schools to volunteer to answer our 27 writing questions after they had already responded to over 100 questions on the regular NSSE. Only 75% of the students who volunteered responded to all 15 of the questions related to our three constructs. Because we used data from students who answered all 15 questions, there may be a non-respondent bias in our results.

Although our study has limitations, we believe that the results can be generalized to the larger population of students enrolled in U.S. bachelor's degree-granting institutions. The samples of schools and individuals are large and do approximate the populations they represent. Of course, there may be variations at specific institutions and groups of students, which future research can explore.

## Significance for WAC/WID Directors

This study provides WAC/WID directors, as well as other writing specialists and researchers, with further evidence that writing can enhance learning. It also expands our understanding of the benefits of writing by demonstrating that writing enhances personal and social growth—two outcomes not, to our knowledge, previously discussed in the literature on writing in college—and by providing additional reasons to offer faculty across the curriculum as inducements to incorporate writing into their courses using the high-impact practices we have articulated.

On a practical level, the study suggests three new, empirically supported strategies that WAC/WID specialists could give special attention to when working with faculty across the disciplines.

- Include interactive writing processes, such as peer review, whether in class or as homework.

- Include meaning-making tasks, such as ones that ask students to analyze, synthesize, apply, or otherwise do more than simply report what they already feel or think, or give "correct answers" to well-structured problems (Simon, 1973).
- Communicate clear writing expectations, for instance by explaining what the instructor wants students to learn through the assignment.

Considering that we began our study by asking leaders of writing programs and teachers of writing to identify these constructs, one might ask how they contribute to WAC/WID practice. We believe that the answer lies in the nature of the constructs. The individual behaviors reflected in our 15 questions are regularly explained and advocated by WAC/WID specialists as part of a much larger assortment of tactics presented to faculty in the disciplines. Typically, none is advocated more strongly than another. In contrast, the constructs provide empirical support for emphasizing high-impact WAC/WID pedagogy—"threshold concepts" (Anson, 2015)—that might have more impact on student learning and development than simply encouraging faculty to use more writing in their courses, employing whatever tactics seem appealing and workable to them. It is undoubtedly true that in some departments at some institutions there is so little writing that any increase would be advantageous. However, our study suggests that many departments could realize greater increases in student learning and development by paying more attention to the design and integration of their assignments than by increasing their number.

Reviewing their local situations in light of our findings, WAC/WID directors may find practical strategies for improving their strategic plans and reinvigorating attention to writing at their institutions. Based on the results of our study, we suggest the following:

- Present the constructs as heuristics. Emphasizing the heuristic nature of the constructs rather than the specific questions that indicated their validity could encourage faculty to develop their own ways of creating or revising assignments that are best suited to their disciplines, courses, contexts, and students, thereby giving them greater ownership of their designs. For example, consider the use of Interactive Writing Processes. Peer review is the most common instructional technique recommended by WAC/WID specialists to prompt students to interact with others while working on a writing assignment. While some faculty find that peer review works effectively, many others find it frustrating and futile, and soon give up trying to include interactive processes in their writing assignments. Others believe that spending time in class on students' writing takes away from their "coverage" of the course material (Scheurer, 2015). Keeping in mind the general goal of helping faculty make writing assignments interactive, WAC/WID specialists might develop a wide variety of peer review strategies as options for different faculty. WAC/WID specialists could also suggest other ways of adding an interactive element to students' writing processes. Depending on the course and discipline, these might include having students in an upper-division course review drafts by lower-division students, or developing initiatives similar to Moskowitz's (2014) Volunteer Expert Readers approach, in which students submit their drafts to and receive responses from community volunteers—alumni,

campus employees, and other professionals who have real-world expertise and experience and whose judgments students trust.

- Provide one-to-one or small-group support. For faculty who want to use familiar WAC/WID strategies or have tried them to little effect, programs might provide detailed, one-to-one mentoring. For example, the success of peer review depends crucially on how the process is designed and implemented, how students are prepared, and what measures of accountability are included for their performance, suggesting that WAC/WID leaders could focus on developing a set of best practices. They might also be ready to provide detailed guidance in helping instructors to develop a method of peer review that works most effectively in their particular course, such as whether it is conducted in class, out of class, or online, or whether student reviewers and writers are anonymous. Further, there is no reason why all of the possible strategies should come from WAC/WID specialists. Developing assignments, like developing a research article and other text, is a recursive process. Faculty who create new or refine existing assignments in their disciplines can share their results with colleagues, possibly gaining through the interchange further ways to improve and also inspiring others in ways that WAC/WID specialists cannot because they are not in the discipline. Thus, the creative work performed by WAC/WID specialists can be shared more broadly through programs that plant the seed by focusing on the three constructs discovered through our research, rather than offering an overwhelming number of options.
- Thematize improvement of assignments for all faculty. Using the three constructs as themes also suggests a way that a WAC/WID program could reinvigorate attention to writing. WAC/WID strategies, as well as their underlying rationale, have changed little over the past few decades, perhaps with the exception of placing more emphasis on technology. For some faculty, especially those who have more recently entered the profession, such messages will be new. For others, the message can feel stale or too familiar. Programs could shift their announced focus from increasing the amount of writing done across the curriculum to a campus-wide campaign to design assignments that incorporate the three constructs.

Such a reorientation could provide a way to re-engage with faculty who are already enacting the advice and strategies previously provided by a WAC/WID program by encouraging them to review and refine their assignments—and providing assistance in that effort. For faculty who have not responded to earlier arguments in favor of incorporating writing into their courses and programs, the constructs can provide new empirical evidence for them to consider. Approaches already the mainstay of many WAC/WID programs could be expanded nationally in a variety of ways, such as making assignment design and the design of clearly articulated criteria the focus of

workshops, presentations, and consultations. Assignments could be one of the things created in maker spaces, or there could be "meet-ups" for faculty to review one another's assignments. An assignment of the month or week could be posted on the WAC/WID website. Faculty could be invited to submit their assignments for gentle, anonymous "litmus test" reviews by student consultants at the campus writing center—a practice at Miami University of Ohio, Elon University, and North Carolina State University (Anson, 2014).

Many WAC/WID directors emphasize the value of low-stakes writing assignments—assignments that are ungraded or constitute only a very small portion of the students' course grade. Low-stakes assignments are used to help students read more thoroughly and critically (Anson, forthcomingB) and master some of the component writing and thinking skills that contribute to their success in larger, high-stakes projects or that help them to grapple with difficult course material. Because the goal of low-stakes assignments is learning, the three constructs can be as significant an element for them as for high-stakes assignments.

For all faculty, the third construct—Clear Writing Explanations—is one that puzzles many teachers in the disciplines, either because they feel they are being clear or because they feel that excessive clarity will "spoon-feed" students rather than presenting them with a desired intellectual challenge. Other faculty rely on generic rubrics which are too general to provide students with the needed guidance about the nature of the challenge that the assignment presents (Anson, Dannels, Flash, & Gaffney, 2014). WAC/WID specialists might use our study to refocus faculty attention on how to communicate writing expectations that are both clear and intellectually challenging, for instance by assembling annotated examples from faculty who are successfully using various techniques for achieving these twin goals.

- Use the constructs in articulation efforts. The three constructs for best practices in writing also suggest a new audience for WAC/WID efforts: first-year composition, first-year seminars, and advanced writing courses, as well as technical writing, business writing, and journalism. Often, WAC/WID directors treat these courses as a separate domain with classes that already include considerable writing and are taught by writing specialists or by graduate students teaching under the guidance of writing specialists. From section to section, course to course, and school to school, the approaches taken in these courses vary significantly. But all give writing assignments. Our study suggests that whatever the particular goals of these assignments, students will learn more from them if the instructors incorporate the three constructs. An emphasis on these aspects of assignment design could prove to be especially helpful to graduate teaching assistants and other

new instructors by making them more aware of ways they can help their students.

Further afield, the instructors could also provide a way to enhance the transfer of students' writing knowledge and abilities across contexts. Similar programs of instructional development in feeder high schools and community colleges could help to smooth students' transition as they move across domains and face new literacy challenges. For example, recognizing the importance of developing clear expectations and criteria for writing assignments can help teachers build opportunities for students to use such criteria formatively, enhancing their general skills of assignment interpretation and analysis.

The three constructs can be used by WAC/WID directors to foster conversations among members of individual departments. They can share ways of incorporating the constructs that they have found to be particularly effective with students in their courses. Where all are having difficulty, the WAC/WID director can make suggestions, offer to construct pilot implementations with one or more department member, and otherwise assist. Moreover, as a way of refining their curricula, faculty can jointly discuss what they want their students to learn in each course—with a special focus on the transferable skills they want to build on and reinforce across courses.

In determining how to apply these three constructs, WAC/WID directors should remember a point made earlier: Our constructs are best conceived of as heuristics that instructors can use when designing writing assignments. For example, the Meaning-Making Writing Tasks construct is grounded in how often students performed the specific writing activities inquired about in six of our 27 questions. However, in every discipline, there are many other forms of cognitively complex tasks that faculty could incorporate into their writing assignments. Both in future research and in teaching, there is no need to stick with the six tasks about which we asked.

## Implications for Research

Our study suggests avenues for further research in addition to those already mentioned. Clearly, there are additional constructs of effective writing practice beyond the three we have identified. Characterizing them could expand our knowledge of writing and learning, as well as provide evidence to strengthen the consensus list of effective writing practices.

Individual institutions or groups of institutions also have an opportunity to conduct studies that combine NSSE data with data that the institutions have but NSSE does not. Every institution receives a data file containing the responses from each student. Researchers at a university could match the students' answers to the writing module questions with other data in its records, such as grades, time to degree (for seniors), and use of various student support services such as the writing center.

Disciplinary differences in the integration of writing can also be studied, not only to understand how the constructs manifest themselves across contexts but also to identify areas of the curriculum that need additional development in WAC and WID. For example, in this article we have discussed results based on data from the more than 70,000 students who completed all relevant questions on the regular NSSE and in the additional module about their experiences with writing. In these results, we controlled for many variables, including the students' majors. As one might expect, differences among disciplines surfaced in the data. For example, significant variation was identified among ten major field categories entered into the analytical models (see the appendix that appears in the online version of Anderson, Anson, Gonyea, & Paine, 2015). Likewise, the 2015 Faculty Survey of Student Engagement (FSSE) module on writing, which asks faculty a set of questions parallel to the student module on experiences with writing, shows considerable differences among reports by 4,533 faculty at 28 institutions with respect to the writing assignments they give students. Whereas 95% of faculty in Social Services Professions and 94% in Social Sciences asked students in their writing assignments to analyze or evaluate something they had read, researched, or observed, only 82% in Engineering and 76% in Physical Science, Math, and Computer Science reported doing so (National Survey of Student Engagement, 2015).

Future research could also investigate contributions that our findings might make to other studies of factors that promote learning. For example, in *Education for Life and Work: Developing Transferable Knowledge and Skills for the 21st Century*, the NRC (Pellegrino & Hilton, 2012) places "deeper learning" at the heart of the educational enterprise, describing it as the kind of learning that enables the intellectual and practical transfer that is essential in our era. Learner activities that the NRC associates with deeper learning include synthesizing, applying, integrating, and reflecting, which are also items in the NSSE scales for Deep Approaches to Learning that are positively related to the use of our three constructs in writing assignments. In addition to the cognitive dimension of transfer, the NRC argues that various intrapersonal and interpersonal developments also increase people's ability to transfer knowledge and skills. Our study's finding that writing assignments incorporating our constructs have a positive relationship with Perceived Gains in Personal and Social Development suggests another area for exploration. Of course, the NRC's study of the general nature and conditions of transfer would apply also to transfer in specific fields, including the active and important research on teaching for transfer by writing specialists (Yancey, Robertson, & Taczak, 2014; Wardle, 2012). This research might also be enriched by considering the ways our findings can promote students' writing abilities and flexibility through transfer in college and after graduation.

## Conclusion

In addition to the suggestions above, WAC/WID programs will be able to create many other ways to make good use of the three constructs. The differences we found between the reports that faculty in different disciplines made on the FSSE about their practices indicate the value of each WAC/WID program studying the results from their own institutions. Every WAC program has more possible initiatives than it would have time or resources to implement. Studying local results can help directors prioritize their potential projects, deciding which campus-wide strategies or goals to emphasize, which programs to focus on, and which goals they might suggest their administrators establish with respect to student writing and use of student writing in courses. The practical significance of the three constructs our study established is to provide programs with new ways to pursue their goals and new avenues for research into the ways writing can be used to enhance student learning and development.

More broadly, our study suggests that fruitful next steps in improving higher education might be examining what would constitute "doing well" for each of the other AAC&U High-Impact Educational Practices and developing ways to incorporate well-done writing assignments into the other HIPs to increase what students gain from them.

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## Notes

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[2] The order of authorship is purely alphabetical.

[3] We tested a hypothesis that 22 of the 27 questions indicated three underlying constructs representing effective writing practices. The five omitted questions, although important in the assessment of writing, did not fit within the hypothesized constructs and did not have potential to form an additional construct. An iterative process involving confirmatory factor analysis identified seven additional items with poor factor loadings and/or cross-factor loadings, thus reducing the number items in the final model to 15 (as shown in Table 1). See Anderson, Anson, Gonyea, & Paine (2015) for a full explanation.

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8. High Learning Productivity. It seems that the more hours are spent on learning a subject, the better the result. However, surveys have demonstrated quite the opposite - the more time students spend learning, the worse their results are in the PISA. Teachers may profess integral learning and creative thinking, however, as long as a given accountability system consists of multiple choice tests, such proclamations make no sense. 10. Learning From Best Practices. For instance, Singapore has created the best model for borrowing best practices. Nevertheless, they've learned how to adjust and apply the success factors from various countries and, thus, have been able to create one of the world's most advanced education systems. Date. 19 April 2017. Distance learning offers many teachers the opportunity to possess new skills, develop professionally and, finally, start teaching online. However, if you're used to paper books, printed worksheets, cutting flashcards working online must be frustrating. Teachers have so many questions: how to start teaching online? What do I need? Users create flashcards to memorise and review vocabulary or topic content. Users can create interactive games or printable worksheets using templates for such activities as Airplane, Anagram, Balloon pop, Conveyor belt, Crossword, Find the match, Gameshow quiz, Group sort, Higher or lower, Image quiz, Labelled diagram, Match up, Matching pairs, Maze chase, Missing word, Quiz, Rank order, True or false, Unjumble, Unscramble, Whack-a-mole, Wordsearch. But writing a scientific paper is not only about creativity, but also about good structure and following some key rules. If you don't follow these rules, your article may end up being either boring or incomplete, which means that it won't be cited. Jeffrey Robens, Springer Nature Journal development manager, conducted an open workshop at ITMO University, where he shared some advice on how to write a good scientific article. Here you describe how the results you have found will contribute to the further development of this research area, how it can be applied, and what further research could be conducted as a result. Jeffrey Robens. How to clearly express your motivation for conducting this research.